

**Utilisation and service productivities in  
community social care for older people:  
patterns and policy implications**

**London School of Economics**

**Thesis submitted for  
PhD examination**

**José-Luis Fernández Plotka**

**2005**

## PREFACE

The research reported in this thesis relates to work carried out while I was a member of the 'Evaluating Community Care for Elderly People' [ECCEP] research team, lead by Professor Bleddyn Davies. I would therefore like to start this preface by expressing my gratitude to Bleddyn for providing me with the opportunity to be involved in the project, as well as for his continued inspiration, encouragement and support. I am particularly grateful for the efforts he has invested in reading the different versions of the chapters, and for his valuable suggestions about ways of improving them. Whereas not all of them have been incorporated - doing so would have meant doubling the length of the manuscript, and extending its remit to at least half a dozen subjects and research disciplines - I can only hope that the content in this thesis reflects some of Bleddyn's passion, insight and understanding of the world of social care. As a late arrival to the ECCEP research team, I had no part in the design and administration of the ECCEP survey and its measures during the data collection process. However, I independently conceived and carried out the analyses of service utilisation, service productivities and optimisation reported in the thesis. The analyses included in two of the chapters in the thesis (Chapters 5 and 7) have also appeared in a jointly authored book, *Equity and Efficiency Policy in Community Care* (Ashgate, Aldershot).

I am equally indebted to Professor Martin Knapp for his insightful comments and suggestions regarding the content of the thesis, and particularly for making it possible for me to combine my other professional responsibilities with the time required for finishing the thesis. Heartfelt thanks to other colleagues at PSSRU, and particularly to Julien Forder and Andrew Healey, who in addition to helpful comments on the thesis, provided emotional support through the many tribulations of quasi-simultaneous doctoral submissions. My gratitude is also extended to Ann Richardson and her editing skills.

Closer to home, the process of writing-up the thesis has provided me with first hand experience about the critical value of informal support networks. As a 'supplier', my (failed) attempts to fulfil my caring responsibilities (contributing to looking after my two daughters Emma - four - and Sara - two) while meeting the deadline for submission have illustrated, even if on an altogether smaller scale, some of the dilemmas faced by those in society looking after the most dependent.

In fact, if I am able to submit this thesis at all, it is only because I have been myself the beneficiary of substantial levels of informal support. Just as family and friends constitute the primary source of assistance for dependent older people in the community, my journey towards submission has benefited from the at times sanity-preserving help from a number of members of my family. In particular, to the delight of the European aeronautic industry, Angelique Plotka (my mother), José-Luis Fernández (my father) and Heide Schmidt (my mother in law) have sustained the last months of writing-up by providing quasi-permanent international childcare emergency support. My greatest debt, however, is with my wife Brita, who has shouldered stoically a share of the duties and responsibilities of running a household with two energetic infants well beyond the call of duty, while managing to extract the strength to encourage me during those times where the concept of PhD submission seemed permanently exiled to Plato's world of abstract ideas. To all of them I profess my heartfelt gratitude. This thesis would not have been completed without their support.

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**PART ONE**

**POLICY CONTEXT, ANALYSIS FRAMEWORK AND  
AVAILABLE EVIDENCE**

# 1 POLICY BACKGROUND AND CONTEXTUAL RATIONALE FOR THE STUDY

The study seeks to make two contributions. One is to participate in the development of theories and methods for the analysis of equity and efficiency in community care. The second is to yield evidence which assists policy-makers and managers to improve the effectiveness of their policies.

The broad context is the evolution of the policy discourse about issues of equity and efficiency in community care of elderly people. More narrowly, the context is the implementation of the 1989 community care reforms, set out in *Care in the Community: Policy Guidance* (Department of Health 1990) and the government's commitment to commission research to evaluate their impact on equity and efficiency in social care. The more recent White Paper, *Modernising Social Services* (Department of Health 1998), is also an important element of the context.

The detailed analysis in the thesis will therefore focus around two main foci:

- (1) the extent to which care brokered by social services departments has achieved the equity- and efficiency-related goals stated by the 1989 White Paper and developed in the 1998 White Paper; and
- (2) the extent to which current policies need to be adjusted in the light of understanding about how the new system produces equity and efficiency effects.

## **1.1 Public policy and the Holy Grail: improving efficiency in the use of public funds**

The Conservative administration which produced the 1989 White Paper attached a higher priority to efficiency in the use of public funds than its predecessors. However, the origins of its concerns could be traced back to the 1970s.

In 1975, Rose had already discussed 'government overload': faced with the oil crisis, governments trying to achieve a wide range of objectives were achieving fewer and fewer of them (Rose 1975). After the election victory in 1979, the Thatcher administration promoted new ways of thinking, based around the philosophy of the 'new-right'. Right-wing think tanks, such as the Institute for Economic Affairs, alleged that the State was 'overgrown' (Anderson 1980, p.37) and asserted its inability to produce and distribute services without incurring severe inefficiencies as well as its 'ineptitude in monitoring local welfare' (Lait 1980, p.59).

The inflexibility and inefficiencies of government were ascribed to the nature of public bureaucracies, seen to favour producers over consumers both on the demand and supply sides (Wistow et al. 1996). On the demand side, new right theorists claimed governments were more likely to submit to the pressures of well organised lobby groups than to the wishes of taxpayers expressed through intermittent and limited electoral processes (Downs 1967). On the supply side, as noted by Rowley, it was argued that 'the principal components of a senior bureaucrat's utility function – power, income, security, perquisites of office and patronage - are all positive monotonic functions of budget size' (Rowley 1994, p.viii). In other words, it was argued that bureaucrats were bound to try to maximise their budgets regardless of their function.

Competitive markets were put forward as the solution to the problem, leading to the privatisation of public utilities and enterprises<sup>1</sup>, the creation of autonomous agencies to perform functions previously undertaken by government, the reform of the NHS around the purchaser/provider split, and the local management of schools.

In the field of social care, the new attitudes were in marked contrast with historical precedents. In the post war period, the continuation of the destruction of the Poor Law,

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<sup>1</sup> In fact, in his book of 1994 Niskanen (whom many consider as the 'father' of the hypothesis about budget-maximising bureaucrats) notes how this literature had encouraged many 'practical experiments', and gives as a specific example the 'British government under Prime Minister Margaret Thatcher'. (Niskanen, 1994, p.269).

following a policy of 'progressive dismemberment' had been formulated around the Fabian assumption that the subsidisation and provision of services should be combined (Ministry of Health 1947; Webb and Webb 1909). As Challis et al. note, there was a clear belief that if 'a job needs doing, the Council will do it and do it well' (Challis et al. 1988 in Wistow et al., 1996: p.91). Such assumptions also underpinned the Seebohm proposals (Seebohm Committee 1968), which saw the constitution of strong unified social work departments, free from the domination of the medical profession (Lewis and Glennerster 1996).

By the late 1970s, there were mounting academic critiques concerning inflexibility and targeting in a wide range of policy areas, including community care (Audit Commission 1986; Davies 1981; Goldberg and Connelly 1982). At the same time, new theories of management were put forward as a potential answer. This 'new managerialism' implied, first, the adoption by government of some of the values and techniques used in private sector management. These included clear mission statements as well as statements of concrete objectives for managers at all levels against short-term time scales. This gave public sector managers responsibility for the success of the 'cost centres' and 'profit centres' and involved the monitoring of their performance, using information systems which collected process and outcome information as well as inputs to produce 'the incentivising of line managers' (Pollitt 1990, p.56). There were attempts to combine new styles and techniques with values and accountabilities suitable for politically accountable policy bodies (Davies et al. 1990; Stewart 1986).

As part of the Financial Management Initiative (FMI), the government replaced the Audit Inspectorate by the Audit Commission for Local Authorities in England and Wales. This was to focus on broad cost-effectiveness, rather than simply financial integrity. Also as a response to the Financial Management Initiative, the Department of Health replaced the largely advisory, professionally dominated Social Work Service by a Social Services Inspectorate (SSI) with the task of monitoring and promoting efficiency as well as effectiveness. By the mid-1980s, some of its inspections and reports were supporting the academic critiques about failures to match resources to needs in community care, as well as about the implications of inefficiencies in the targeting of resources on outcomes. For instance, an influential SSI inspection report on home care services showed widely identifiable shortfalls in the 'technical efficiency of home care

services' (Social Services Inspectorate 1987: p. 24). It also noted that social services departments were 'by and large unable to make available to senior management and elected members, on a regular basis, information about what was being achieved from different levels of resourcing, and to what effect' (Social Services Inspectorate 1987: p. 24).

Similar criticisms were voiced in a highly influential Audit Commission report, which concluded that 'the one option that is not tenable is to do nothing about present financial, organisational and staffing arrangements' (Audit Commission 1986: p. 4). Inaction, the report continued, would result in a 'continued waste of scarce resources and, worse still, care and support that is either lacking entirely, or inappropriate to the needs of some of the most disadvantaged members of society and the relatives who seek to care for them' (Audit Commission 1986: p. 4-5).

In response to this damning analysis by the Audit Commission, the government commissioned a report from Sir Roy Griffiths (the chief executive of Sainsbury's who had previously led an inquiry into the effective use of manpower and related resources in the NHS) to provide advice on 'the options for action that would improve the use of (public) funds as a contribution to more effective community care' (Griffiths 1988, para. 3.4). The ensuing Griffiths' Report would inspire to a large extent 'Caring for People', the White Paper which set the basis for the *revolutionary*<sup>2</sup> reforms in community care of 1989.

## **1.2 Equity and efficiency implications of the reforms**

As noted above, the reforms of the 1990s attached higher priority to efficiency in the use of public funds than any earlier reforms of community care of comparable comprehensiveness. The opening chapter of the White Paper illustrates well this new managerialist explicitness about ends and means. The focus was 'to establish the right financial and managerial framework which will help to secure the delivery of good

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<sup>2</sup> The ambitious nature of the reforms actually inspired the title of the Audit Commission report, 'The Community Revolution: Personal Social Services and Community Care' (1992).

quality local services in line with national policy objectives' (Department of Health 1989, para. 1.7).

It had taken more than a year from the publication of the Griffiths report for the Government to produce the White Paper. Some commentators have suggested such a delay was related to the failed attempts by the Tory government to find arrangements which would avoid placing local authorities at the centre of the new social care system, as had been recommended by Griffiths in his report (Lewis and Glennerster 1996; Means, Morbey and Smith 2002; Wistow et al. 1996). In fact, the community care reforms gave local authority social services departments the responsibility not only of funding care, but also of setting eligibility criteria, carrying out assessments of needs, and of ensuring that appropriate care would be available by acting as enablers of the local mixed economy of care.

In addition to the central role of local authorities, most of the other key recommendations contained in the Griffiths report were also reflected in the content of the White Paper. Notable exceptions were the refusal to designate a minister exclusively in charge of Community Care, and the rejection of the earmarking of Community Care funds.

Following the poll tax fiasco, and in the midst of widespread criticism of the implementation of quasi markets in health and education, the Government opted to stage the community care reforms, which were not to be fully implemented until 1993 (Lewis and Glennerster 1996; Wistow et al. 1996). This provided the Department of Health with an opportunity to provide ample quantities of guidance to local authorities.

The objectives of 'Caring for People' are summarised in Inset 1.1. They constitute the reference point in the thesis for the evaluation of the equity and efficiency achievements of the reform efforts. The discussion below introduces each of the key equity and efficiency propositions embodied in the White Paper, relating them to their historical background.



**Inset 1.1 *Caring for People*: key objectives for Community Care**

1. to develop domiciliary day and respite services to enable people to live in their own homes wherever feasible and sensible;
2. to ensure that service providers make practical support for carers a high priority;
3. to make proper assessment of need and good case management the cornerstone of high-quality care;
4. to promote the development of a flourishing independent sector alongside good quality public services, making maximum possible use of private and voluntary providers;
5. to clarify the responsibilities of agencies and so make it easier to hold them to account for their performance; and
6. to secure better value for taxpayers' money by introducing a new funding structure for social care, removing the incentive to use residential and nursing home care rather than care in the home.

*Source: Caring for People, Cm 849, para.1.11*

***1.2.1 To develop domiciliary day and respite services to enable people to live in their own homes wherever feasible and sensible***

This was the first objective listed in the White Paper, and one which was long overdue. The National Assistance Act of 1948 had intended the provision of residential homes for "persons who by reason of age, infirmity or any other circumstances are in need of care and attention not otherwise available to them" (Ministry of Health 1947, section 21; Wistow et al. 1996). By 1964, more than half of the residents were elderly 'not materially handicapped', a considerably higher proportion than a decade earlier (Davies 1968, p.71). Although largely unheard by the government, academic critiques emerged, condemning the lack of clear rationale for the allocation of modes of care. In 1962, Townsend suggested that the failure to act on the principle of caring for the elderly in their own homes would be selected by

future social historians "as the most striking failure of social policy in the last decade" (Townsend 1962, p.399). In fact, few among a sample of chief welfare officers, responsible for providing services under the National Assistance Act to elderly and disabled persons, conceived residential care, home help, and other community services as potentially alternative modes of care (Davies 1968).

Up to the 1980s, and despite efforts by the Labour Government in the 1970s to develop joint planning and joint finance initiatives, the picture remained largely unchanged (Lewis and Glennerster 1996). As noted above, in 1986 the Audit Commission report *Making a Reality of Community Care* had severely criticised community care, and the 'perverse incentives' of the funding system (Audit Commission 1986). In the words of Wistow et al. (1994: p.3) the report ensured that community care 'remained in the policy agenda ever since'. It judged the use of residential care to be excessive and criticised the slow creation of community-based services and the uneven pattern of local provision. It considered that community-based alternatives could be provided within current levels of expenditure. Health provision was free, leading to the diversion of demand to home nursing services. Likewise there was a diversion of demand to hospital care. More of the demand was deflected because local authorities were restricting services to cope with tight budgets. Among those qualified to receive supplementary benefit (having a low income and savings of below £1,200), uncapped social security benefits in the form of the Boarding and Lodging Allowance fully funded private residential care. As a result, as the White Paper now argued, existing funding structures had worked against the development of domiciliary, day and respite services (para.1.11). Indeed, the fact that social security payments were also not really available to fund community-based services encouraged residential and nursing home care to grow rapidly at the expense of often more appropriate home care (Audit Commission 1997), and certainly faster than the rate needed to keep pace with demographic change (Wistow et al. 1996).

It is important to note that the White Paper explicitly included in the definition of the objective the need for targeting resources on 'those people whose need for them is greatest' (para.1.11). In 1987, the SSI report *From Home Help to Home Care* had also stressed the fact that in order to enable increasing numbers of older people to remain in the community 'either a higher volume of domiciliary services [would] be needed

or the currently available resources [would] have to be more specifically targeted on those in most need, and those for whom most can be achieved' (Social Services Inspectorate 1987, p. 26).

Indeed, pre-reform research had shown the lack of co-ordination of services. Access to the home help service was via the service organiser, who would normally accept referrals from any relevant agency, such as the general practitioner, the district nurse, voluntary organisation, family member or elderly people themselves. In the same way, access to the home nursing service was through the general practitioner, who was open to referrals from any relevant party. For services such as meals-on-wheels or day care, practice varied widely, with these being accessed via social workers, home help organisers, or even the service organisers themselves. This variety in access routes for different services caused the multiple agencies to have their own priorities for the resources that they controlled. This could lead to a situation in which the elderly person was the only person with an overview of all the various services received (Davies and Challis 1986). More importantly, this lack of co-ordination had drastic effects on the effectiveness of care packages, to the extent that research exploring the impact of community care packages on the welfare of users failed to find significant evidence of improvements other than in indicators of general satisfaction (Davies et al. 1990).

It was therefore a key assumption of the reforms that changes in the targeting of resources, and the concentration of resources on those at greatest risk of institutionalisation, would bring about significant improvements in the productivity of social care inputs.

### *1.2.2 To ensure that service providers make practical support for carers a high priority*

As in several other countries, the White Paper's perception of carers was mostly instrumental in nature. An OECD study on frail older people suggested that caregivers were to be helped to undertake informal care-giving activity so that they could continue longer (Organisation for Economic Cooperation and Development 1994). In

the words of the White Paper ‘helping carers to maintain their valuable contribution’ was ‘both right and a sound investment’ (Department of Health 1989, para.2.3).

However, practice at the field level was often more ambitious. The values of social work education put emphasis on the reduction of stress, together with the promotion of aspects of psychological well-being (Erikson 1963). Some social workers in social services departments managed to translate these values into action at least to some degree. The broader influence of the women’s movement had already worked through to utilisation patterns in some authorities by the mid 1980s (Davies et al. 1990). For instance, Twigg and Atkin (1994) describe that general service providers ‘operated in a mixed and middle ground where instrumental approaches operated in parallel with principles that stressed the interest of the carer per se’ (p. 150).

Also during the mid 1980s, Twigg derived her categorisation of social service perception of caregivers precisely in order to handle the ambiguities, inconsistencies and ambivalence of policy and practice emerging from an equity and efficiency study of community social services (Twigg 1989; Twigg 1992b; Twigg and Atkin 1994). In summary, Twigg’s typologies were designed to differentiate between models of care in which:

- carers are understood by formal services as *resources*, and as such are taken for granted
- *instrumental* models in which formal services treat carers as *co-workers*, providing them with support and encouragement so that they can continue fulfilling their caring role
- models in which formal services aim to meet the needs of carers per se, hence treating carers as *co-clients* of the services
- and those models in which carers are *superseded* by formal services, who aim to replace fully the caring activities they undertake.

Whereas the wording of the White Paper emphasised the instrumental role of carers, subsequent legislation, and in particular the Carers (Services and Recognition) Act 1995 and the National Carers Strategy (Department of Health 1999) illustrate how the line could not be held against the extension of the goal towards the treatment of

caregivers not just as co-clients but as potentially the principal beneficiaries of the interventions<sup>3</sup> (Pickard 2001).

*1.2.3 To make proper assessment of need and good case management the cornerstone of high-quality care*

The single most important general statement of the aim of the reforms in the DH implementation literature is that services should be ‘needs-led’ not ‘supply-driven’ (Social Services Inspectorate 1992). For the Government, the effective performance of the core tasks of care management (case finding and screening, assessment, care planning and monitoring and review) represented the means for the achievement of this aim.

In the words of the White Paper, care management provided ‘an effective method of targeting resources and planning services to meet specific needs of individual clients’ (Department of Health 1989, para. 3.3.3). The Griffiths argument had made it a necessary condition for the success of the reforms: the metaphor was case management as a keystone of the policy, not just a cornerstone as in the 1989 White Paper (Griffiths 1988, para. 21). The case was based partly on experiments in the late 1970s in intensive budget-devolved care management, which had shown that substantial returns could be achieved through the use of care management for users with specific characteristics. These studies had demonstrated that care managers responded positively to the increased opportunity to provide care better tailored to the assessed needs of clients. As a result, assessments had become more wide-ranging and were no longer concerned primarily with service eligibility. In terms of final outcomes, the experiments had yielded reduced rates of institutionalisation and improved levels of satisfaction and well-being of elderly people and their carers. At least as important, such improvements had been achieved at no greater cost to public funds (Challis and Davies 1986; Davies and Challis 1986).

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<sup>3</sup> In fact, the main report of the Royal Commission on Long Term Care went as far as recommending the provision of ‘carer blind’ services, hence advocating for the superseded carers model.

Thus, the care management argument was about engineering the right incentives for responding to the needs of users and carers in ways which improved both equity and efficiency. Later research, aimed at generalising the messages by covering all community social services recipients, demonstrated the neglect of local authority mechanisms, technology, and skills to perform the care management tasks in a systematic way (Davies et al. 1990). Such research also showed the absence of policy to guide care management decisions. These conclusions were confirmed by an important DH SSI inspection, which identified how informal systems of 'people processing' had developed, with 'rules and procedures becoming a means to ensure a continuous flow of clients through service processes, rather than a framework for determining efficient resource use or effective outcomes for clients' (Social Services Inspectorate 1987: para. 2.5.1).

In the context of criticisms about the lack of suitable arrangements for the co-ordination of service provision, case management theory provided the mechanisms by supplying some explicit statements about ends, means and desirable process. In other words, to the reformers, the generalisation of the use of care management to all users represented the means to achieve coherence in the allocation of resources, and thus substantial and wide scale gains in the effectiveness of care packages.

As Davies and Challis (1986) demonstrated, of particular relevance would be improvements in horizontal and vertical targeting efficiency<sup>4</sup>. Respectively, these terms refer to improvements in the rate of service uptake by those target groups deemed most in need of assistance, and the degree of concentration of resources on such target groups. The perceived relevance of the concepts of horizontal and vertical targeting efficiency, initially developed in studies of poverty and social security (Davies and Reddin 1978; Weisbrod 1970), had grown in social care policy and academic circles alike in the years prior to the publication of the Community Care Act. In their study of home care services, Bebbington and Davies (1983) identified substantial shortfalls in targeting efficiency in England, particularly across regions and between men and women. In a later paper, the same authors concluded that

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<sup>4</sup> As Davies and Challis (1986) put it, 'horizontal and vertical target efficiencies reflect the Yin and Yang of social policy; for homeostasis, the body politic must keep the two in balance' (p. 25).

between 1980 and 1985, the expansion of home care services had not translated into increases in targeting efficiency, and that instead they could be linked to decreases in levels of vertical targeting efficiency (Bebbington and Davies 1993). An identical point had been made in an Audit Commission report, which noted that the beneficiaries of the increase in provision in the 1980s had mainly been ‘younger elderly people aged 65 to 74 who are likely to be less frail than those aged over 75’ (Audit Commission 1992b: para. 18).

***1.2.4 To promote the development of a flourishing independent sector alongside good quality public services, making maximum possible use of private and voluntary providers***

If choice and independence were to be achieved, the White Paper argued, local authorities would need to promote a mix in the provision of social care services. As stated in the White Paper:

“Stimulating the development of non-statutory service providers will result in a range of benefits for the consumer, in particular:

- a wider range of choice of services;
- services which meet individual needs in a more flexible and innovative way;
- competition between providers, resulting in better value for money and a more cost-effective service.”

(Department of Health 1989, para.3.4.3).

As in the case of improvements in care management arrangements, the development of the independent sector was perceived as a necessary condition for the achievement of good ‘value for money’, and thus greater efficiency and equity in the system. Griffiths’ phrase had been ‘making the maximum possible use of voluntary and private sector bodies to widen consumer choice, stimulate innovation and encourage efficiency’ (Griffiths 1988, para.1.3.4).

Under their new 'enabling' role (Department of Health 1989, para.1.11), SSDs were exhorted – and given powerful financial incentives – to make maximum use of the independent sector. In fact, 85% of the social security money transferred to local authorities (through the Special Transitional Grant) had to be used for the purchase of services from the independent sector. In addition, in order to make competition between suppliers from different sectors fairer, the White Paper advocated an organisational separation of the performance of some local authority tasks: care management and its management, the supply of services, the sponsorship and development of supply and service providers, and quality assurance of the services. SSDs were also required to establish inspection and registration units at arm's length from the management of their own services to check standards in both their own homes and independently-owned homes (Wistow et al. 1994).

***1.2.5 To clarify the responsibilities of agencies and so make it easier to hold them to account for their performance***

The White Paper reflected the long-standing view that effectiveness and efficiency would be better served with a redistribution of resources and functions from hospitals and the health care system to community care and local authorities.

'The focus of this White Paper is on clarifying roles and responsibilities, bringing together the relevant sources of finance, delegating responsibility for decision making at the local level wherever possible, improving accountability and providing the right incentives'

(para. 1.7)

Therefore, as Griffiths had done in his earlier report, the White Paper recognised the 'perverse incentives' to all participants (users, their family caregivers, and agencies) in the funding system, a concern which had been at the centre of the academic and policy critique of community care during the 1980s. In its report of 1986, the Audit Commission had stressed the need for a more rational structure with 'local responsibility, authority and accountability for delivering a balanced community-based care services ... more clearly defined', with 'greater managerial authority delegated to the



local level'. Changes were needed in the 'organisational framework for community care' (Audit Commission 1986).

The concerns with the over-reliance on institutions, including hospitals, had been stated earlier in the *Care in the Community Circular* of 1983 (Department of Health and Social Security 1983). Indeed, this had been a theme in the indicative planning norms and ten-year planning of the 1960s and 1970s (Department of Health and Social Security 1963). At the time, there had been national attempts to establish systems for co-ordination and the use of NHS funds to procure the development of social care to reduce pressure on hospital services. Central government had exhorted local agencies to collaborate. Much of the academic and policy debate during the 1970s was about the incentives created by these frameworks (Webb and Wistow 1987). Such exhortation, it was maintained, was unlikely to be successful where there were structures creating incentives to pursue narrow agency goals.

Yet the 1989 White Paper continued the traditional division: activities treated as within the health care domain were separated from their social care counterparts, although success in each domain would depend on the success of the other (Department of Health 2000a; Fernández and Forder 2002). The White Paper implied therefore the application of the tools of new managerialism to old problems, begging the question of how much equity and efficiency gain could be obtained by changes in other than broad structures. Arguably, the Seebohm Report changes had deepened the health and social care divide, making each organisation more introspective; the Seebohm Report dealt with local health services in a page and a half (Seebohm Committee 1968).

Whereas social security arrangements had provided perverse incentives affecting the development of community-based alternatives of care, they had also 'inadvertently come to the rescue' of the NHS at a time of significant fiscal pressures (Lewis and Glennerster 1996, p. 4) by providing the funds for patients to be admitted into residential homes following discharge. The social security system had made 'an otherwise intolerable situation possible' (Lewis and Glennerster 1996, p. 4). With the end of the social security scheme, local authorities were now exhorted to develop effective partnership arrangements with health authorities in order to relieve, or at

least not to increase, existing pressures on already significantly stretched acute health care resources. However, as for many of the recommendations in the White Paper, there was no a significant body of evidence to prescribe detailed strategies for the coordination of local health and social care services (Wistow et al. 1996). In particular, no quantitative evidence existed about the relationship between the provision of social care services and performance in the acute health care system. So, in a sense, the new arrangements - and the new pressures on resources at a time of fast change - actually made more serious the perverse incentives created by incompatible principles of financing and organisation of health and social services. These perverse incentives were felt particularly acutely by individuals at the interface between the systems, for instance, when being discharged from hospitals to homes. Years later, the government would return to this issue with the setting up of the national beds inquiry (Department of Health 2000a).

*1.2.6 To secure better value for taxpayers' money by introducing a new funding structure for social care, removing the incentive to use residential and nursing home care rather than care in the home*

The Board and Lodging Allowance, which provided uncapped social security benefits for the funding of private residential care, was removed. As Lewis and Glennerster (1996) note, there is still 'some dispute about how far politicians and officials were aware of what they were doing when they drew up these regulations' (p. 3). The increase in demand and supply of independent residential care was widely understood from 1984 onwards. By the mid 1980s, the level of social security expenditure on residential care placements had reached over £500 million (from £10 million in 1979). Despite a freeze on local reimbursement fees in 1984 and the introduction of a national limit on the payments per resident in 1985, the main arrangements were not stopped until 1993, by which time expenditure levels had reached £2480 million (Lewis and Glennerster 1996; Wistow et al. 1994).

One observer recalls that during the late 1970s there were those in the official service who were aware of the quantitative evidence about the growing gap between the costs of local authority provision and the prices charged in the private sector, and were

speculating about its long run policy implications. Regardless of their original intent, by the time the reforms were implemented, the social security 'voucher system' (Lewis and Glennerster 1996, p. 2) had funded the development of a large volume of independent residential care homes, most of which were owned by small entrepreneurs of the type so liked by Mrs Thatcher (Wistow et al. 1994). Changes to social security arrangements could not be at the expense of significant numbers of home closures, an issue closely linked both to the redefinition of the role of local authorities from main providers of community care to market enablers, and to the imposition of the 85% expenditure rule.

### **1.3 New administration, new means for a common set of objectives**

In November 1998, *Modernising Social Services* (Department of Health 1998) was published. It defined the goals and priorities of the new Labour administration, in office since May 1997. Despite a different lexicon and some changes in emphasis, the new Government shared most of the objectives previously phrased in *Caring for People*.

#### ***1.3.1 A sustained quest for efficiency***

Arguably, the overall efficiency related objectives remained broadly unchanged. The changes in funding arrangements announced in December 1997 removed the 85% rule as a condition for receiving the transitional grant. However, the end of the financial incentive gave way to 'Best-Value' policy, with strong threats from Ministers that failure to open in-house services to competition resulting in lower value would be ruthlessly exposed.<sup>5</sup>

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<sup>5</sup> See for instance the Ministerial interviews with the representatives of Barking and other authorities following critical joint inspections by the Audit Commission and the Social Services Inspectorate. (Department of Health Press Release, December 1997). The whole tone of these reports was often markedly critical, as in the case of, for example, the reports on Sheffield and Bury (Audit Commission for England and Wales and DoH SSI, 1998).

The emphasis on achieving Best Value was reflected in the White Paper, which noted that 'an important finding of the Joint Reviews so far is that there is scope for many authorities to get more for what they spend on social services.' (para. 1.4). Commenting on the expenditure implications of the White Paper, it was noted that 'this is investment for reform and the Government expects to see improvements in quality and efficiency in return for the increased investment' (para. 7.9). Moreover, the new government concurred with the previous administration in the value placed on developing the local mixed economy so as to achieve more flexible user oriented services. Hence, the White Paper recognised that 'the near-monopoly local authority provision that used to be a feature of social care led to a "one size fits all" approach where users were expected to accommodate themselves to the services that existed' (para. 1.7).

However, the need for efficiency improvements was placed within a wider context, namely the pursuit of consistency across the system. Improvements in consistency, it was argued, were to be obtained in other ways as well, such as the production of clear eligibility criteria and more coherent charging policies. Here again, the government was placing significant emphasis on the achievement of improvements in the system's horizontal and vertical target efficiency levels.

In consequence, the 1998 White Paper's list of objectives for social services, with a focus on the need to improve efficiency, reflected identical concerns as those previously voiced in *Caring for People*

- to maximise the benefit to service users for the resources available, and to demonstrate the effectiveness and value for money of the care and support provided, and allow for choice and different responses for different needs and circumstances. For adult services, to operate a charging regime which is transparent, consistent and equitable; and which maximises revenue while not providing distortions or disincentives which would affect the outcomes of care for individuals.
- to identify individuals with social care needs who are eligible for public support, to assess those needs accurately and consistently, and to review care

packages as necessary to ensure that they continue to be appropriate and effective.

(Department of Health 1998, p. 111)

As discussed below, the parallels extended to the specification of the final objectives of services.

### *1.3.2 A similar set of final objectives*

Keeping users at home and relieving carer's stress remained the principal final policy aims of government for social services for the elderly. However, both objectives were placed within a new overarching objective: promoting independence.

Achieving independence had already been mentioned in *Caring for People* as one of the 'key components' of what community care should be about (Department of Health 1989, para.1.10). Arguably not a straightforward concept to operationalise, this was presented in the White Paper as a means of providing 'direction' for social services, listed first in the catalogue of national objectives. Specifically, it designated the need to provide 'the support needed by someone to make most use of their own capacity and potential' (para 2.5), through the effective use of available resources in the production of the final policy objectives.

As was shown above, the Conservative instigated 1989 reforms stressed the need to concentrate resources on the neediest. As a result, by the time the new administration took over, changes in targeting had brought about significant reductions in the resources allocated to lower dependency cases and a reduction in the coverage of services among the population (Warburton and McCracken 1999). *Modernising Social Services* expressed concerns about the long-term effects of the new pattern of allocation of resources. For instance, the White Paper stated that

'some people who would benefit from purposeful interventions at a lower level of service, such as the occasional visit from a home help, or over a shorter period, such as training in mobility and daily living skills to help them cope with visual impairment, are not receiving any support. This increases the

risk that they in turn become more likely to need much more complicated levels of support as their independence is compromised. That is good neither for the individual nor, ultimately, for the social services, the NHS and the taxpayer<sup>7</sup>

(Department of Health 1998, para. 2.6).

Together with the careful targeting of low intensity packages, the White Paper argued for the development of services specifically aimed at the rehabilitation or recuperation of physical ability. It was felt that significant proportions of users could be helped to improve their physical dependency through the provision of such services, and that a significant reduction in hospital use would follow, as well as a general decrease in the levels of unwanted institutionalisation<sup>6</sup>. Special new funds were created to finance special rehabilitation schemes and programmes fostering increased health-social care co-operation.

It is important to note that the doubts expressed by the 1998 White Paper about the extent of concentration of resources on the neediest were not out of universalist concerns, or worries about the loss of public support for the services because of a reduction in the pool of recipients of care. Instead, such concerns were mainly to do with efficiency considerations, and expressed in terms of missed opportunities for 'investment', because of the potentially preventive effect of small packages of care.

As the previous government, the 1998 White Paper recognised the need for further assisting carers in their role. It argued that the care system did not adequately recognise the contribution of informal carers to the welfare of people with care needs, and criticised the 'patchy' implementation of the 1995 Carers Act. On 10 June 1998, the Prime Minister announced the development of a National Carers Strategy, which aimed to bring together activity across all government departments in support of carers. As illustrated by its key aims (see Inset 1.2) the phrasing of the government's policy objective on carers went beyond providing support to avoid the breakdown of

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<sup>6</sup> The White Paper also noted the importance of good review processes and the use of direct payments, which would, it was argued, empower users and carers and increase their control over their own lives.

caring, and recognised informal carers as rightful beneficiaries of publicly funded support.

#### **Inset 1.2 National Carers Strategy key aims**

- empowering carers so that they have more say about the types of services that they and the person they care for need
- considering how best carers who work can be supported so that they can remain in employment
- considering how the health needs of carers can better be met by the NHS and especially primary care groups
- looking to see how communities can better support carers especially through volunteering
- looking at the specific needs of other groups such as young carers and ethnic minority groups.

*(Department of Health 1999, para. 2.23)*

## **1.4 Conclusion**

### ***1.4.1 Need for evaluation***

Observers have commented on the weakness of the evidence available for the development of social care policy for older people, particularly compared with the situation in respect to children's services (Department of Health 1994). Specifically in the context of the Community Care Act, Wistow et al. (1996) suggest that other than the recommendations on care management 'the reforms combined ideology and rhetoric with minimal evidence' (p.12). This view was supported by the Audit Commission. Referring to the '*Cascade of Change*' brought about by the reforms, the Commission noted that 'much of the new approach is theory – as yet untried and

untested on any large scale' (Audit Commission 1992a: para. 52). The lack of evidence basis of the foundations of the reforms emphasises the importance of evaluative work.

Most of the academic literature about the evaluation of the community care reforms has analysed processes and means (see for instance Gostick et al. 1997; Lewis and Glennerster 1996; Means, Morbey and Smith 2002; Wistow et al. 1994). From the outset, however, legislators had placed great emphasis on the need for good evaluation of the impact of policy on final outcomes. Hence, in *Policy Guidance*, the Department of Health stated how a principal function of DH-funded research would be to evaluate the impact of the reforms:

'The Department intends to evaluate the policy set out in "*Caring for People*" and this guidance booklet. This evaluation will consider not only the achievement of service objectives but also how far and how cost efficiently the outcomes for service users and carers have been advanced. This is likely to require in depth surveys and detailed longer term research.'

(Department of Health 1990).

The need for micro-level outcome evaluation was also recognised in the academic literature. In their study of the implementation of the reforms, Lewis and Glennerster write:

'The 1990 reforms were distinguished by their ambition to measure outcomes for users. It was not clear at the end of 1994 that that was actually happening. ... The template against which the Department of Health evaluated progress was a minimal one... Thus monitoring has been concerned with means rather than ends.'

(Lewis and Glennerster 1996, p.208).

Even by the time the Royal Commission on Long Term Care reported its findings in 1999, one of the research annexes noted how little could be said about value for



money in long term care services because of the lack of systematic evidence about the extent to which 'services provided people with the care they need' (Browning 1999, p.117).

The thesis aims to fill some of these gaps in knowledge, particularly the effects of community care services on final outcomes. Hence, the analysis will attempt to map the key *production of welfare* relationships emerging in post-reform community care from a micro perspective. It will particularly concentrate on an analysis of current relationships between the characteristics of cases, the resources invested and improvements in the welfare of users and carers.

The next section discusses in greater detail the relationship between such analysis and the objectives set in '*Caring For People*'.

#### ***1.4.2 The community care reforms and the thesis***

##### ***Improving efficiency in the use of resources***

Section 1.2 has illustrated the concerns of reformers with improving the efficiency and effectiveness of community-based social services. Filling the gap in knowledge about the efficiency effects of the reforms is therefore of particular policy interest. This is especially true since the preoccupation of the last administration with Value for Money is at least matched by this administration's insistence on Best Value, illustrated by the vigorous pursuit of those authorities whose performance in this respect has been shown to be lacking.

However, when judging the spirit of the White Paper, it is important to note that its drive for efficiency was not intended to achieve a reduction in social care expenditure levels (which, in fact, were increased substantially in the years following the Community Care Act). Instead, the analysis above has indicated that the focus was on rationalising the process of allocating resources, so as to improve the tailoring of care packages to individual circumstances, and raise the *productivity* of the resources distributed. Arguably, therefore, it is on *the impact of services on final outcomes*

where evaluative efforts ought to be concentrated. Such a theme constitutes the analytical core of the thesis.

### ***The selection of outcomes***

Chapter 1 has identified two main welfare objectives of both the initial reforms and, arguably, the current government: extending the length of stay in the community and supporting carers. The clarity of – and apparent degree of consensus on – these objectives are surprising, and almost certainly new. For instance, the present study has found from interviews with service managers at all levels that their interpretation of the local prioritisation of White Paper goals gave overwhelmingly highest importance to enabling more people to remain well supported in the community. This was the case in all ten authorities, and at all levels of management, from the Director of Social Services to the care manager or manager of a day care centre.

The extension of users' stay in the community and the support of informal carers' welfare must therefore be a major focus of analysis of this thesis. However, in spite of their prominence in the White Paper, confining the analysis to those two outcomes would be far too restrictive. Not surprisingly, given the complexity of the problems addressed by social services, the carefully ambiguous wording of the policy documentation allows much wider interpretations of the policy objectives. A good example is the framing of outcomes in '*Modernising Social Services*' to include the broader notion of the maximisation of '*independence*'. A wider range of indicators of welfare improvement will therefore be used, including those considered to be most relevant both in the gerontological literature on the subject and by field workers and local authority managers.

### ***The analysis of the production of outcomes***

For each of the welfare outcomes investigated, the thesis will explore separately the issues of effectiveness and efficiency. In other words, through quantitative modelling, the analysis will estimate

- the nature of the relationship between community care services and levels of welfare outcomes for users and informal carers

- the extent to which changes in the allocation of services could bring about further gains in the outcomes achieved.

The former analysis will be referred to as the service '*productivities*' analysis while the latter will be described as the '*optimisation*' analysis. Hence, when analysing the substitution of community for residential care, the service *productivities* analysis will investigate the ***whether and how post-reform community care packages extend the length of time that recipients of care remain in the community before they enter a residential home.*** It will also describe the distribution of benefits between users in different circumstances. Subsequently, using the knowledge derived from the *productivities* analysis, the *optimisation* analysis will identify which changes in the allocation of services would achieve the maximum aggregate *number of days that users could stay in the community*, and the implications for the distribution of resources between users and for the achievement of other outcomes.

By comparing the results of the *productivities* and the *optimisation* analysis across outcomes, the thesis will also study the nature of trade-offs in the prioritisation of outcomes and user types. For instance, the thesis will explore ***the system's implicit prioritisation*** between improvements in users' and carers' welfare.

### ***Improving the targeting of resources***

Although achieving an understanding of the impact of resources on final outcomes represents the main analytical focus of this thesis, it will not be confined to this issue. As indicated above, the White Paper had argued that targeting patterns would need to change drastically in order to achieve its welfare objectives, and in particular to transform domiciliary care services into a credible alternative to institutional care. The analysis will therefore begin by exploring the extent to which the mechanisms for change put forward in *Caring for People* succeeded in bringing about the desired changes in allocation patterns.

As set out above, the end of the use of social security payments for residential care was aimed at constraining future growth in residential care expenditure. It also

removed a strong perverse incentive reducing the development of community based alternatives of care, and a source of significant territorial inequity<sup>7</sup>. The reforms made local authorities the central players in the social care arena, with the role to oversee needs assessments, care planning and the funding of services. However, with these new roles came heavy responsibilities, and so a need to implement radical changes in existing processes and organisational structures (Audit Commission 1992a; Audit Commission 1992b). Reflecting strong influences from new managerialists, the White Paper required local authorities:

- to develop **local care management arrangements** to promote a **needs-led service** which would **concentrate resources on the neediest**
- to act as **enablers of local social care markets**, and to make as much use as possible of private provision as a means of insuring **flexibility in service provision** and responsiveness to users preferences.

The thesis will therefore explore the extent to which the post-reform allocation patterns suggest significant degrees of horizontal and vertical targeting efficiency, and the extent to which the allocation of resources amongst recipients of community care services in the post-reform are predominantly needs-led.

Not surprisingly, there are areas of the reforms which the thesis will not be able to address, at least directly. Hence, it will not analyse directly the appropriateness of the existing structures and processes for the management of the mixed economy of care. A substantial and growing body of literature already addresses this issue (Forder 2000; Forder 1997; Forder et al. 2004; Forder and Netten 2000; Wistow et al. 1994; Wistow et al. 1996) It will, however, consider the implications of different constraints on local authorities' flexibility in purchasing on the performance of care packages.

Again, the thesis will not be able to tackle the appropriateness of local arrangements for the coordination of health and social care activity. However, the analysis will

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<sup>7</sup> 'Making a Reality of Community Care', the 1986 Audit Commission report, indicates for instance how partly as a result of the then prevailing social security arrangements, 'there are now nearly ten times as many places per 1,000 people aged 75 or over in private or voluntary homes for elderly people in Devon and East Sussex than there are in Cleveland' (Audit Commission, 1986: p.3).

investigate the degree of substitutability and complementarity between community-based health and social care inputs in the production of welfare outcomes.

Finally, the thesis will not address issues about the design and suitability of care management arrangements.

### ***1.4.3 Structure of the thesis***

In order to tackle the issues described above, the thesis is structured in three parts. The first, comprising three chapters (of which this is the first), introduces successively the policy background, its methods for analysis and the nature and characteristics of the dataset. The second part, consisting of Chapters 4, 5 and 6, reports on the results of the empirical modelling of the relationships between (i) resources and needs, and (ii) the characteristics of cases, the services provided and the different welfare outcomes investigated. Finally, the third part of the thesis (Chapters 7, 8 and 9) discusses the lessons for policy derived from the empirical estimates of the productivities of services, in order to maximise equity and efficiency improvements in the allocation of community care resources.

## 2 EQUITY AND EFFICIENCY RESEARCH: THE PRODUCTION OF WELFARE [POW] APPROACH

Chapter 1 put forward the case for evaluating the post-reform community care system. It argued that such evaluation should concentrate on understanding the impact of post-reform services on key welfare outcomes for users and their carers. That is, to describe at the individual level what has been termed the '*production of welfare process*' (Davies and Knapp 1981; Knapp 1984). The present chapter sets out the methodological framework for carrying out such evaluation.

Selecting analytical frameworks and research methodologies is no less important than defining the questions for investigation (Goldberg and Connelly 1981). Often, particular analytical methods appear tightly associated with broader philosophical approaches to research, and even with 'political' attitudes to the research topic in question. In the context of social care, for instance, feminist writers and those associated with the disability 'movement' have often been linked to sociological approaches to research, frequently of a distinctly normative nature (Glendinning 1983; Lewis and Meredith 1988; Twigg 2004; Twigg and Atkin 1994; Wright 1986). In contrast, the relatively few economists operating in the area have used predominantly quantitative evidence to 'model' key features of the care system (Davies and Knapp 1981; Forder 2000; Forder 1997; Knapp, Baines and Gerrard 1990; Knapp 1984; Knapp 2003; Knapp et al. 1987).

The choice of analysis methods also delimits the nature of the evidence required and the expected output of the research. For instance, through techniques such as in-depth interviews, semi-structured interviews, focus groups and participant observation, qualitative methods of analysis have been claimed to paint a 'holistic' picture of the context researched, and to 'explicate the ways people in particular settings come to understand, account for, take action, and otherwise manage their day-to-day situations' (Miles and Huberman 1994). In contrast, quantitative methods enable the researcher to describe broad average patterns of behaviour and to test – arguably more

rigorously than qualitative methods – the statistical significance and generalisability of patterns found. It can be argued that this may be at the cost of a less detailed description of underlying processes and of reduced sensitivity and specificity at the individual case level.

Given that the principal aim of this thesis is to quantify key relationships in the production of welfare process, it not surprisingly leans heavily in the direction of the quantitative analysis tradition. It does so, however, within the ‘Production of Welfare’ [POW] approach, an analytical framework which strives to contextualize the specification of research questions, analysis tools, and interpretation of the results thus derived, by taking into account the lessons gained from a wide range of research disciplines and traditions (Davies and Knapp 1981; Davies 1985; Knapp 1984).

Such a framework for analysis, apologists of the POW approach assert, should ideally be supported by two kinds of understanding. One is provided by theories about the relationships involved in the production of welfare relations, such as those derived from gerontological studies. The second is provided by the development of analytical tools for the measurement and analysis of the relationships thus derived. Therefore, as noted in Knapp (1984), although POW "is essentially an evaluative technique", it is "one which builds explicitly and painstakingly on a body of received theory and empirical evidence, and so one which avoids the many pitfalls associated with many of the ad hoc evaluations which are all too common." (page 27).

This chapter, intended to introduce the POW argument as the framework for analysis, is therefore divided into two distinct parts. The first exposes the overarching conceptual framework of POW theory, and relates it to other analytical frameworks traditionally used in related areas of research. The second presents the tools employed in testing the hypotheses derived from the POW framework.

## **2.1 The POW overarching framework**

### ***2.1.1 Historical background***

Following the Seebohm reforms, the concentration of a wide range of social care functions on the new local authority social services departments created institutions capable of achieving, at least potentially, improvements in the process of resource allocation. However, the new social services departments operated within assumptive worlds dominated by top-down, command-and-control management styles, which failed to achieve adequate tailoring of resources to needs, although relatively successful in terms of aggregate needs-based planning (Webb and Wistow 1987). Indeed, it could be argued that during the post-Seebohm era, little concern was attached by government to making services more responsive to the wishes of service users. As a consequence, as noted in Chapter 1, service targeting was characterised by the provision of standard packages of care poorly tailored to the very diverse characteristics of the people looked after by services.

By the late 1970s, increasing research efforts were focussed on identifying ways of improving the logic for matching resources to needs, through the development of for instance need-assessment tools. In particular, a set of influential community care experiments were carried out in Kent to investigate potential gains from matching resources, both in terms of quantity and nature, to particular groups of users (Challis and Davies 1986; Davies and Challis 1986; Ferlie, Challis and Davies 1989; Knapp et al. 1992; Qureshi, Davies and Challis 1989). One of the pillars of these experiments was the creation of incentive structures to align the objectives of individuals (particularly professionals) with those compatible with the social optimisation of the use of public resources. Around the same time, Schultze (1977) noted that in order to motivate individuals to act in publicly beneficial ways, it was not necessary to change their values, but only their calculation of what is in their self-interest.

By developing the right incentive mechanisms at the front line level, the community care experiments produced a framework which created care management arrangements for users with different characteristics, capable of improving welfare outcomes without the need for additional resources (Challis and Davies 1986; Davies



and Challis 1986). In terms of research methodology, the community care experiments proved a keystone in the development of the POW approach. Indeed, the design of the appropriate incentive mechanisms required developing theories 'defining with greater precision key features of alternative models for the organisation of social care, and the causal processes which, it is argued, connect these features to beneficial outcomes' (Davies and Challis 1986, p.19). The following sections explore the central tenets of such theories.

### ***2.1.2 The POW propositions***

As noted in Davies and Knapp (1981), the POW approach represents an analytical framework, a collection of tools, and a collection of policy theory for research on equity and efficiency in community care and related areas. The foundations for such a framework lie in two key propositions.

In its "strong" form, the POW proposition states that "increases in resource inputs are associated with one or more improved outcomes for some ranges of inputs" (Davies 1985, p.3). The central contention of this proposition is therefore the acknowledgement of a causal relationship between changes in levels of inputs (however defined) and levels of outcomes (final policy objectives of evaluative importance). The justification of the POW approach, however, lies in the "weak" form of the proposition. This states that "*although other factors are the biggest influences on status and changes of outcomes of evaluative importance*, increases in resource inputs are associated with one or more improved outcomes for some ranges of inputs" (Davies 1985, p.3, emphasis added). The key difference between the "weak" and "strong" POW propositions therefore lies in the acknowledgement in the latter that factors outside the control of policy makers may have crucial effects on desired outcomes.

Decades of research in human services - for instance, in education and health - suggest that variations in the quantities of a service (e.g. class size in schools) have a smaller impact on final outcomes than the personal circumstances of the individuals involved, including material, psychological, social and cultural influences (Benzeval

and Judge 2001; Blane 1995; Davies and Challis 1986; Davies and Verry 1976; Wolff 2000). The same has generally been the case for social care services (Knapp 1978a; Knapp 1978b). As Goldberg wonders, the question is how to 'be sure that the outcome – favourable or unfavourable – is due to the social work carried out, rather than to the myriad of events in the lives of our clients which have nothing to do with social work' (Goldberg 1970, p.27).

Following the POW proposition, in order to develop a good understanding of the impact of services on users and carers' welfare, one needs to gather comprehensive information on the range of influences on outcomes, particularly those outside the control of policy makers which are likely to be the source of most variation. Doing so involves determining which processes are affecting the production of welfare process (and in what way they do so) and the broader and more lasting, often system wide, influences which have caused patterns to be what they are over time. Following Davies (1985), we refer to these questions as the *how* and *why* questions, respectively.

### 2.1.3 *Understanding the 'how'*

Davies summarises the *how* question as referring to the ways in which 'each of the influential characteristics of social care systems or circumstances of recipients affect the production of outcomes?' (Davies 1985, p.4)

In the specific case addressed here, the analysis examines the way in which the provision of social services impacts on the welfare of older people and their carers, in order to identify ways in which this 'production process' could be improved. The first goal, therefore, is to estimate the influence of factors, other than services, on the welfare (however defined) of older people. Examples might include the social environment of the older person (does he/she live alone, is there an informal carer who provides support when needed?); health and dependency status (does he/she suffer from health problems, is he/she able to do the shopping, undertake personal care tasks, cook, clean, etc. without the help of others?); material environment (does the accommodation present risk hazards, is there an inside toilet, is the area safe?), etc.

Determining the appropriate factors, and then using them in the analysis, allows the researcher to 'control' for the level of welfare that would have been attained had services not been provided, and so to obtain a measure of the contribution of services to the welfare of users and their carers. It is essential to avoid misinterpretation of the impact of each such factor in the course of analysis if suitable recommendations for service changes are to be derived.

However, the impact of services on the welfare of users does not depend exclusively on the *level* at which they are provided, but also on the *way* they are provided. For instance, different care management arrangements, the qualifications of the professional involved, the intensity and frequency of reviewing processes, or particular preferences within local authority goals, are all likely to have an impact on the effectiveness of services.

Answering the *how* question should therefore yield information about (i) which factors should be taken into account when analysing the impact of services on the welfare of their recipients and (ii) in which way the relationships between such factors and the outputs should be described.

#### **2.1.4 Understanding the 'why'**

The *why* question is of a higher level of generality, and can be interpreted as explaining the factors underlying the answer to the *how* question. It can be summarised as: 'historically, how was it that systems acquired different characteristics and care recipients different circumstances?' (Davies 1985, p.5) For instance, social composition or traditional beliefs of individual local authorities condition their likely policy evolution. One of the local authorities involved in the present study, for instance, has had an extreme reluctance to charge for services since 1948. By the time the data was collected, and despite the recommendations of the White Paper and significant pressures on spending, home care had remained free of charge.

Other influences will come into play at the national level. As Chapter 1 has noted, one of the implicit assumptions of the reforms was that services ought to be better targeted, and resources concentrated on users in the greatest need.

Although difficult to incorporate into the data analysis, factors answering the 'why' question not only help to explain why historically the "welfare production" process is what it is, but also provide a key to suggesting ways in which the system might be improved.

### ***2.1.5 The 'why', the 'how' and the 'what'***

The weak form of the proposition underlying the POW approach has stated that many factors, most of which will not be easily influenced by policy makers, affect the state of – and changes in – the welfare of the older person. Thus, an understanding of the impact of specific factors on the welfare of an older person (for instance, the effect of different levels of services on the morale of recipients, or on the risk of institutionalisation) depends on a concomitant understanding of the role of a comprehensive set of other factors. The definition of the set of factors and the way factors interact with each other is achieved through answering the *how* and the *why* questions.

Adapted from Knapp (1984, p. 26), Figure 2.1 summarises the set of factors relevant to the analysis of equity and efficiency in social care of older people, together with the main relationships between them, as postulated by the POW approach.

**Figure 2.1 The production of welfare process**

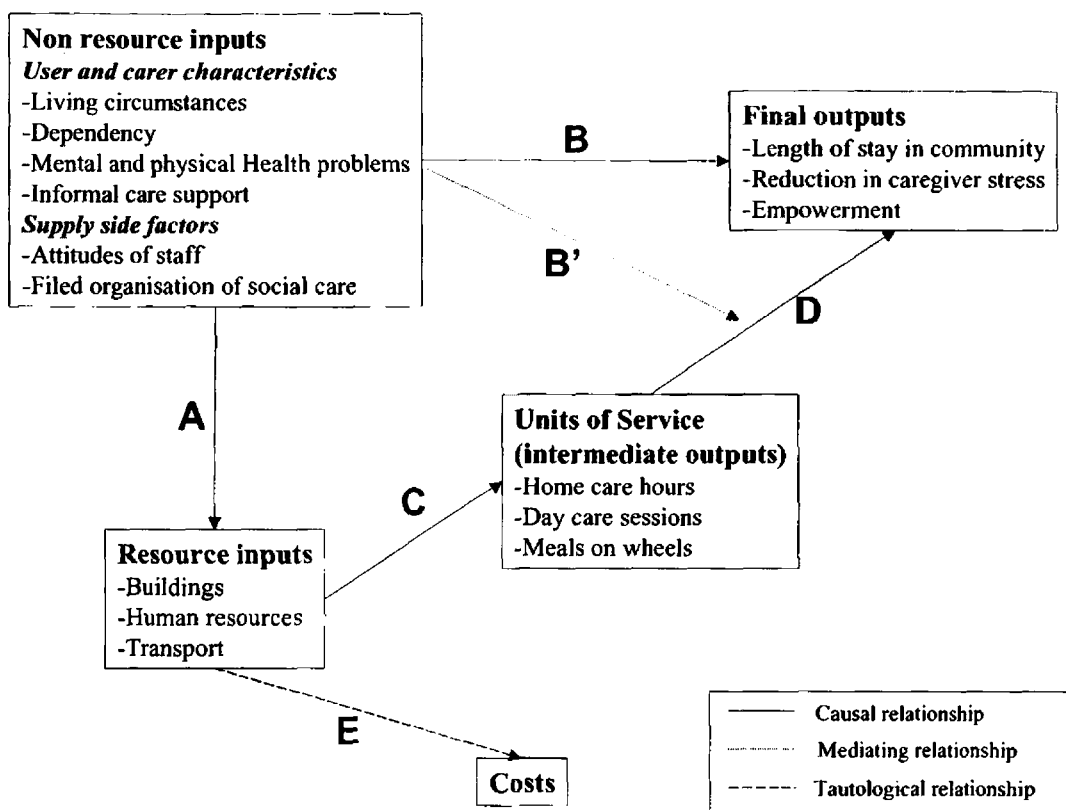


Figure 2.1 categorizes the key factors in the production of welfare process into the following groups:

- **Non-resource inputs** are likely to explain a majority of the variations in outcomes. They can be divided between two main groups. One group consists of characteristics of systems (for instance, the characteristics of organisations, care environment, staff attitudes or prices of inputs). The other consists of client characteristics, and particularly of need-related circumstances [NRCs] such as disability levels, health problems or the presence of informal support.
- **Resource inputs** represent physical units of resources; for instance, numbers of hours of inputs of types of staff, building space units, or vehicle miles.
- **Costs** constitute aggregate indicators of resource-inputs. They measure the value of physical units of inputs in monetary terms, applying opportunity cost principles (see for instance Drummond et Al (1987, p.54-67) and Netten and Beecham (1993)). These are generally used in a form of analysis which relates

outputs to costs rather than resource inputs to outputs (see next section of the chapter).

- **Intermediate outputs** correspond to units of service activity which are produced (from resource inputs) in order to produce final outputs. The broad services treated as resource inputs for the present study are home care hours, day care sessions, meals on wheels, days of respite care, hours of social work and nursing visits.<sup>8</sup>
- **Final outputs** symbolize outcomes for the beneficiaries of the production process of direct significance for evaluation; that is outcomes significant in their own right and not because they are thought merely to influence or be associated with less easily measured outcomes which are of direct significance (Davies 1985; Davies 1995). Final outputs constitute the primary focus of attention in POW studies. In the present case, the set of final outcomes investigated will include the final policy objectives as defined by the White Paper (and discussed in Chapter 1), as well as other important final objectives of the services advocated by the academic literature or other relevant parties.

In addition to specifying key groups of indicators, Figure 2.1 postulates a set of relationships between them, the study of which ought to be the focus of analysis.

- Figure 2.1 depicts a care system in which resource inputs are determined by non-resource inputs (this relationship is summarised by vector A). For instance, the number of home helpers employed by social services would be hypothesised to vary with factors such as the number of older people in need of social support, their health status, functional capacity, physical and mental health needs.
- In turn, as depicted by arrow C, resource inputs get transformed into units of service to be consumed by recipients of care. Following the previous example, home helpers would provide a certain number of hours of contact with users. The precise relationship between resource inputs and intermediate outputs

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<sup>8</sup> The study has collected information on other services and on the narrower components of these broad services. However, the ones cited above account for the large majority of care package expenditures in the sample.

would be postulated to depend on issues such as the efficiency of providers, population density or workforce motivation.

- The effect of these units of service on final outputs, that is on the welfare of users and carers, is then illustrated by arrow D. Knowledge about the characteristics of this relationship thus constitutes a fundamental asset for the derivation of prescriptions about ways of improving the matching of resources to needs.
- As reflected in Figure 2.1, the production of welfare model argues that non-resource inputs have a dual effect on final outputs.
  - Firstly, vector B illustrates the hypothesis that non-resource inputs have a direct effect on final outputs. In fact, as mentioned above, the influence of non-resource inputs, such as functional status, physical and mental health and informal support, is likely to dominate variations in levels of final outputs across cases.
  - Secondly, vector B' represents the mediating effect that non-resource inputs have on the 'productivity effect' of formal services. As indicated by Knapp (1984), 'exactly identical resources, service configurations and caring environments will affect different people in different ways' (p.32). The implication for the analysis of this mediating effect is that services cannot be assumed to have a uniform impact on the welfare of users with different characteristics.

The POW approach advocates that in order to appreciate the performance of the social care system – and so to be able to make recommendations about ways to improve it – research ought to evaluate each of the vectors in Figure 2.1. However, the central emphasis should be on final outputs, and thus on vectors B, B' and D (Knapp 1984).

This is in some contrast with the bulk of efficiency-related literature in health care, which has concentrated on intermediate outputs, and particularly on the study of the relationship depicted by vector C in Figure 2.1 between resource-inputs and units of service (Worthington 2004). Through techniques such as Data Envelopment Analysis (DEA), the focus has been on maximising levels of health care throughput given resource inputs (Worthington 2004). The rationale for such focus has often been

argued in terms of the difficulties associated with measuring final outputs, such as improved health status, or even more generally, improved quality of life (Kooreman 1994, p. 305).

However, in order to be confident about its implications in terms of the welfare of services users, focusing the efficiency analysis on intermediate outputs requires the existence of a straightforward relationship between intermediate and final outputs, invariant to differences in the characteristics of service users. As Knapp (1984) has pointed out, such assumption is clearly untenable in social care:

‘One cannot assume that there exists a one-to-one association between the services rendered and the effects on recipients. There is more than one way to meet most kinds of need and it is this variety which is the very essence of dispute and innovation. To base one’s policies entirely on intermediate outputs would run the danger of paralysing innovative practices which achieve favourable client-level effects by routes which appear unacceptable, immoral or unlawful.’ (p.32)

Of course, a large body of research in health care does focus on measuring the impact of formal resources (pharmaceutical products, for instance) on indicators of final outcomes. However, the analysis in such studies has focused primarily on the comparison of costs and effects between experimental and control groups, largely ignoring issues of patient heterogeneity and within group variation<sup>9</sup>. As noted in Sefton (2002)

‘An experimental design effectively treats the intervention as if it were a single homogeneous service, even though the service consists of a number of very different activities. So, this approach is unable to inform decisions about the appropriate mix or timing of activities.’ (p.61)

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<sup>9</sup> As noted by Hotch et al. (2002, p.415), this is due to a large extent to the fact that because of its statistical properties ‘the statistic of interest in cost-effectiveness analysis, the incremental cost-effectiveness ratio is not amenable to regression-based methods’.



In fact, it is only recently that academics in the health care area have begun to argue for the use of multivariate regression techniques to account for these effects in the economic evaluation of trial-based studies. (Hoch, Briggs and Willan 2002; Willan, Briggs and Hoch 2004). In addition to showing the importance of controlling for patient heterogeneity, these papers point out the potential of multivariate regression-based techniques to adjust for errors in the randomisation process.

The analysis in the thesis will therefore concentrate on final outputs, and particularly on the estimation of the relationship between intermediate and final outputs, taking account as much as possible of the effects of heterogeneity in the characteristics of recipients. Nevertheless, recognising the difficulties in the specification and measurement of final outcomes, the analysis will also explore patterns of targeting of services. The following section discusses the specification of the modelling framework for carrying out such analyses.

## **2.2 The tools for analysis**

The present section describes the main analytical tools used in the estimation of the relationships postulated in Figure 2.1. These tools can be divided into two main groups. The first group, under the generic name of utilisation functions, is used in the modelling of the relationship between non-resource inputs and intermediate outputs. The second group, which include production functions and costs functions, is used in the estimation of the impact of non-resource inputs and resource inputs on final outputs. Their essential common characteristic is that they both use statistical modelling techniques.

The present section introduces each of these in turn. A final subsection discusses optimisation analysis, which brings together the information derived from utilisation functions, production functions and costs functions so as to identify ways of improving equity and efficiency in the targeting of resources.

### 2.2.1 Utilisation functions

Utilisation functions describe the relationship between non-resource inputs and intermediate outputs. In other words, they look at the "who gets what" question, which in terms of Figure 2.1 represents the 'reduced-form' aggregation of the effects described by vectors A and C.

Given the previously discussed complexities involved in the specification and measurement of final outputs, utilisation functions can provide valuable evidence at a higher level of generality about the appropriateness of patterns of allocations of resources. For instance, they provide evidence for discussing issues of horizontal and vertical targeting efficiency<sup>10</sup>.

The relationships between non-resource inputs, resource inputs and intermediate outputs pictured in Figure 2.1 can be formulated mathematically in the following way:

Equation 2.1

$$R_i = R(N_i, S_i, u_i)$$

Equation 2.2

$$I_i = I(R_i, v_i)$$

Where  $R_i$  represents resource-inputs associated with case  $i$

$I_i$  represents the services (inputs) provided to case  $i$

$N_i$  represents need-related non-resource inputs associated with case  $i$

$S_i$  represents supply system-related non-resource inputs associated with case  $i$

and  $u_i$  and  $v_i$  represent error terms, in order to illustrate the stochastic nature of the relationships described

Substituting Equation 2.1 into Equation 2.2 provides the reduced-form, general specification of utilisation functions:

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<sup>10</sup> Horizontal and vertical targeting efficiency were defined in Chapter 1 as indicating the extent to which equal resources are allocated to cases in identical circumstances, and the extent to which higher resources are allocated to cases in worse circumstances, respectively.

**Equation 2.3**

$$I_i = I(N_i, S_i, w_i)$$

Where  $w_i$  represents the error term.

Equation 2.3 states that resource inputs are dependent on non-resource inputs, which distinguish between supply system characteristics outside the control of policy makers ( $S_i$ ) and need-related characteristics ( $N_i$ ).

Although it provides a general structure for their estimation, Equation 2.3 does not state the precise mathematical specification of the relationship between non-resource inputs and intermediate outputs. That is, it does not specify its function form. During the estimation process, the analysis will explore different specifications of the effects in order to account for the following potential targeting patterns:

- the concentration of resources on the very dependent, which would be accounted for through the specification of higher order indicators of need (square terms, for instance)
- the existence of threshold effects, which can be accounted for through the specification of logarithmic effects or dummy indicators
- the focus on 'complex' cases which exhibit a combination of need-related problems, modelled through the specification of interaction terms.

Given the lack of a priori evidence to form specific hypotheses, the specification of the functional form of the effects in Equation 2.3 during the estimation process will be selected as that which provides the best fit of the observed patterns.

Depending on the definition used for the indicator of intermediate output  $I_i$ , utilisation functions as specified in Equation 2.3 can be employed to estimate the relationship between non-resource inputs and, for instance

- the allocation of individual services (day care, home care, etc.)
- the triaging between modes of care following assessment

- the overall cost of the package of care, by defining  $I_i$  as the sum of the levels of services provided weighted by their unit cost<sup>11</sup>.

The system's degree of horizontal and vertical targeting efficiency should be reflected in the extent to which the estimation of Equation 2.3 identifies a strong and positive correlation between levels (and types) of resources and the need-related circumstances of cases. In general, the greater the proportion of the variation in  $I_i$  which remains unexplained by Equation 2.3, the greater the degree of randomness in the allocation process and the lower the degree of horizontal and vertical targeting efficiency.

The nature of the individual correlations found between services and characteristics of cases will also be important. For instance, utilisation functions will identify the extent to which services respond to individuals' specific characteristics, such as the existence of physical or mental health problems, levels of dependency or socio-economic factors. Of notable importance in the context of the reforms, the utilisation functions will provide important evidence as to the extent to which community care systems have achieved a needs-led resource allocation process. An indication of this will be derived by measuring the proportion of the variation in the allocation of inputs which is explained by need-related circumstances ( $N_i$ ).

*Summary:* Utilisation functions estimate the relationship between units of services provided (intermediate outputs) and non-resource inputs (client circumstances and supply system characteristics outside the control of policy makers). They are therefore useful for addressing questions such as:

- Which services are allocated to what cases?
- Do users in higher need receive higher levels of services?
- Are carers' needs recognised in the allocation of resources?
- Is service allocation needs-led?
- What is the system's degree of horizontal and vertical targeting efficiency?

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<sup>11</sup> When focusing on packages costs, utilisation functions are usually referred to as expenditure functions.

### 2.2.2 *Production functions*

This section explores the main econometric tool for the study of the impact of service inputs on final measures of outputs (summarised by vector D in Figure 2.1). It is structured in two parts. The first summarises the main theoretical concepts of production function theory. The second explores the adjustments to the standard form of the production function required to fit it to the needs of the POW approach.

#### *Production function theory*

The production function is the economist's device for describing the relationship between 'factor' inputs and those outputs produced by 'firms' (Koutsoyiannis 1977). In the one output  $k$  input case, this relationship can be mathematically summarised as

#### **Equation 2.4**

$$Y_i = Y(I_i^1, \dots, I_i^k, \gamma_i)$$

where  $Y_i$  represents the level of output achieved by individual  $i$

$I_i^j$  represents the level of input  $j$  allocated to individual  $i$

and  $\gamma_i$  represents the error term.

Even in contexts where a high degree of technological determinacy in the relationship between inputs and outputs can be assumed, production functions can be difficult to estimate empirically. First, there are difficulties of measurement and data collection. More importantly, however, the successful estimation of a production function will rely on its ability to describe flexibly the intricate relationships involved in the production process (Fernández and Knapp 2004).

Among other things, the estimates must describe the following patterns.

***Changes in marginal productivities of inputs at different levels of provision.*** The extent to which an output increases following small increments in inputs can vary depending on the level of provision of the input. The concepts of increasing, constant and diminishing returns to scale describe respectively situations in which the effect on

outputs of marginal increases in input factors increases, remains constant and diminishes as levels of inputs rise. Mathematically, following Koutsoyannis (1979, p.77) returns to scale effects can be illustrated in the following way:

- Increasing returns to scale exist if  $Y(q \cdot I_i^1, \dots, q \cdot I_i^k) > q \cdot Y(I_i^1, \dots, I_i^k)$
- Constant returns to scale exist if  $Y(q \cdot I_i^1, \dots, q \cdot I_i^k) = q \cdot Y(I_i^1, \dots, I_i^k)$
- Decreasing returns to scale exist if  $Y(q \cdot I_i^1, \dots, q \cdot I_i^k) < q \cdot Y(I_i^1, \dots, I_i^k)$

where  $q$  represents a given proportional change in input factors.

Increasing, constant and decreasing returns to *factor* are the terms employed for describing identical phenomena at the individual input level. That is, for examining changes in levels of outputs following changes in levels of one input, instead of a proportional change in all inputs. It is generally assumed that the marginal productivities of most inputs will diminish beyond some level of inputs (Kreps 1990).

In social care, describing patterns of returns to scale provides important information for discussing, for instance, the benefits of concentrating resources on individuals in greatest need compared to redistributing resources to individuals with lower need (to reap potential long term preventive effects), or to serving less intensive care packages to a greater number of clients.

***Input substitutability.*** The majority of production processes are such that targeted levels of output can be achieved through various combinations of inputs. Therefore, a production function ought to describe the possible trade-offs between inputs in the production process. The marginal rate of technical substitution, which describes the rate at which one input needs to be substituted by another input in order to keep levels of output constant, is therefore defined as:

$$\frac{\partial Y / \partial I^a}{\partial Y / \partial I^b}$$

where  $I^a$  and  $I^b$  refer to the two inputs  $a$  and  $b$ .

***Input complementarity.*** The rate at which inputs can be substituted in the production of a target output may differ depending on which – and at what levels – other services are provided. In other words, the marginal productivity of one input may depend on the level of other inputs. In the social care context, the presence of complementarity in the production process could occur if two services exhibit positive (or negative) synergetic effects, hence yielding higher (or lower) output levels in combination than the sum of their individual separate effects. For instance, home care and meals on wheels could be found to ‘work better’ together, rather than individually, by complementing each other’s virtues. Thus, production functions need to test for the presence of such effects by postulating a functional form which allows the marginal effect of services to depend on the levels of other inputs. Mathematically, the chosen functional form should allow for the following effects to take place

- $\frac{\partial Y}{\partial I^a \partial I^b} > 0$  denoting the presence of positive complementarity between services *a* and *b*
- $\frac{\partial Y}{\partial I^a \partial I^b} = 0$  denoting the lack of complementarity between services *a* and *b*
- $\frac{\partial Y}{\partial I^a \partial I^b} < 0$  denoting the presence of negative complementarity between services *a* and *b*

Given a set of input prices, knowledge about the degree of substitutability and complementarity between inputs represents the fundamental evidence for making recommendations about ways of improving cost-effectiveness in the targeting of resources. Hence, whereas the existence of significant complementarity between services may discourage the allocation of single-service packages of care, the presence of significant substitutability between services may allow the replacement of relatively more cost-ineffective services by more cost effective ones.

### ***Specifying production functions for community care research***

Starting from different postulates about input substitutability and complementarity, the main families of production functions in standard microeconomics are (Koutsoyannis 1979, p. 76-84)

- **Input-output production function** (see Leontief 1951). This kind of production function assumes that unique combinations of inputs are required for the production of any particular level of output, and therefore does not allow for any substitution between the factors of production.
- **Linear production function** (see Kreps 1990). Contrary to the input-output production function, linear production functions allow for perfect substitutability between inputs, that is for the possibility of single inputs producing any amount of output desired. In their simplest form, however, linear production functions cannot capture the existence of complementarity between inputs or of varying returns to factor. Mathematically, the functional form of linear production functions can be summarised as

$$Y_i = \sum_{j=1}^k \alpha^j \cdot I_i^j$$

- **Cobb-Douglas production function** (see Varian 1987). One of the most popular forms of production functions due to its simplicity and easy mathematical manipulation, the Cobb-Douglas production function allows for substitution and complementarity effects between inputs. However, because of its multiplicative form, a Cobb-Douglas production function does not allow for perfect substitutability between inputs, as it requires strictly positive levels of all inputs for the production of outputs. The general functional form of Cobb-Douglas production functions is

$$Y_i = \alpha_0 \cdot \prod_{j=1}^k \left[ (I_i^j)^{\beta_j} \right]$$



Through the years, these forms of production function have been modified and expanded in order to relax some of their assumptions and constraints. Hence, Cobb-Douglas production functions have given birth to new specifications, like the Constant Elasticity of Substitution production function (which includes as special cases the Cobb-Douglas, input-output and linear production functions), or the Translog production function which additionally relaxes some of the assumptions CES makes about the nature of the substitutability of inputs (see Intriligator, Bodkin and Hsiao 1996, p.284-289 for a detailed discussion).

The choice between forms depends on what relationships are likely to be important in the field of application, and the nature of the questions to be illuminated by the estimates. In our case, the aim of the production function is to establish the pattern of relationships between the amount and nature of SSD services (the intermediate outputs) and several measures of final outputs, given the different need related circumstances [NRCs] and other risk factors of the recipients of the services (the non-resource inputs)<sup>12</sup>. In order to accommodate best the idiosyncratic world of SSD brokered services, the specification of the production function will need to be selected so as to account for the following factors.

**i) Many users receive only one service**

First, the model needs to be compatible with the fact that many users of community care receive only one service. In fact, approximately two fifths of the users in the sample received only one out of the four main community care inputs (home care, day care, meals on wheels or respite care). It is therefore imperative that our production function allows perfect substitutability between inputs to be made evident if it exists. Not to do so would imply, for instance, that no beneficial effect could be expected from packages providing exclusively home care (accounting for around a third of the packages in the sample).

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<sup>12</sup> For simplicity sake, we will refer hereafter to resource inputs as inputs, to final outputs as outcomes, and will restrict non-resource inputs to NRCs

Accordingly, the core structure of the model is based around an expanded generalized linear production function of the types developed by Lau (1974) and Dietwart (1971). The chosen functional form is summarised in Equation 2.5

**Equation 2.5**

$$Y = \alpha_0 + \sum_{i=1}^K \alpha_i I_i + \sum_{i=1}^K \beta_i \ln(I_i) + \sum_{i=1}^K \sum_{j=1}^K \gamma_{ij} I_i I_j$$

Although more cumbersome, Equation 2.5 is arguably more flexible than the basic Cobb-Douglas production function. Amongst other things, it allows for

- the effect of inputs on their own (thus allowing for perfect input substitutability)
- variations in returns to factor (through quadratic and logarithmic terms) and
- complementarity between inputs (through the interaction terms).

**ii) Risk factors in the production process**

As it stands, Equation 2.5 does not acknowledge the key role that NRCs play in affecting outputs levels. Thus, the specification of the model is adapted by including additional terms to capture the three following types of effects.

- *Direct effects of NRCs on outputs.* Previous sections have argued NRCs to be the likely main determinants of variations in outcomes. It is necessary therefore for the model to incorporate indicators of NRCs to avoid serious misspecification, particularly given the likely correlation between the provision of services and NRCs. This is achieved through the inclusion (as additive terms) of NRC indicators in the model.
- *Targeting captured risk effects.* Even after the inclusion of available NRC indicators in the model, variations in individual circumstances of cases are likely to remain difficult to account for. In particular, available NRC indicators might not control fully for the correlation between subtle combinations of needs and the receipt of individual services. Failing to do so could lead to biases in the estimates of service productivities, as these would become ‘contaminated’ with the effect of unaccounted-for NRCs on outcomes. In order to control for these targeting-captured need effects, variables interacting indicators of *receipt* of services with characteristics of cases are introduced in the model.

- *User group marginal productivity terms.* In addition to the direct effect of NRCs on outputs, Figure 2.1 hypothesised the existence of a mediating role on the effect of inputs on outcomes. In order to allow differences in service productivities between sub-groups of users, the model is modified to incorporate interaction effects between indicators of *levels* of services and NRCs<sup>13</sup>.

Following the addition of the three terms just discussed to account for the impact of risk factors on the production of welfare process, the general specification of the production functions becomes

**Equation 2.6**

$$Y = \alpha_0 + \sum_{l=1}^M \phi_l N_l + \sum_{i=1}^K \sum_{l=1}^M \eta_{li} N_l D_i + \sum_{i=1}^K \alpha_i I_i + \sum_{l=1}^M \sum_{i=1}^K \phi_{li} N_l I_i + \sum_{i=1}^K \beta_i \ln(I_i) + \sum_{l=1}^M \sum_{i=1}^K v_{li} N_l \ln(I_i) + \sum_{i=1}^K \sum_{j=1}^K \gamma_{ij} I_i I_j + \sum_{l=1}^M \sum_{i=1}^K \sum_{j=1}^K \rho_{lij} N_l I_i I_j$$

where  $N_l$  represents indicators of NRC and

$D_i$  represents dummy variables indicating the receipt of given services

Several points are worth noting about the proposed functional form.

**Linear specification.** The model postulated in Equation 2.6 is a linear model: each of the terms specified within it is by definition estimated to have a constant marginal effect on the dependent variable. Non-linear relationships between for instance inputs and outputs are approximated by including quadratic or logarithmic terms which, although they have a linear relationship with the dependent variable, imply a non-linear effect of the underlying variable (input level in this case). Achieving flexibility in the nature of the relationships postulated between dependent and explanatory variables in linear models is therefore achieved at the cost of defining arguably more cumbersome model specifications, less elegant and compact mathematically than for instance Cobb-Douglas type production functions. In the context of the production of welfare process, however, a linear specification offers the significant advantage of

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<sup>13</sup> In order to simplify the interpretation of these interactions, the indicators of NRCs were expressed as dummy variables so that marginal effects were associated with the effect of a marginal increase in inputs for a given sub-group of users.

allowing the individual components of the model (and particularly NRC and services) to have an impact on outcomes independently of each other. As a result, the estimation is able to decompose variations in outputs in terms of the effects of services and those of other factors, and thus to calculate service-related contributions to the welfare of users and carers (Tukey and Wilk 1970).

***Practical implementation of the theoretical model.*** Equation 2.6 presents the generalised specification of the production functions to be estimated. It therefore accounts for the complete gamma of relationships explored during the process of modelling production functions. However, Equation 2.6 should not be understood as a blue-print to be imposed during the estimation process, with the expectation that every one of its terms is to appear in the final models. Forcing the complete battery of terms specified in the models reported would complicate unduly the interpretation of the estimated coefficients, would create serious problems of multicollinearity between indicators, and would represent a serious loss of degrees of freedom and therefore of precision in the estimates. Thus, only indicators identified as having a significant influence on final outputs will be included in the models.

***Targeting captured risk effects versus group marginal productivity effects.*** Although at first sight indicators of targeting captured risk effects  $N_i D_i$  and of user group marginal productivity effects  $N_i I_i$  may appear almost identically defined, their purpose in the model is entirely different.

- ‘Targeting-captured-risk-effect-indicators’ are designed to account for differences in characteristics of cases reflected in the patterns of targeting of services of the kind which traditional NRC indicators may be incapable of accounting for. Cognitively impaired people targeted by day care services, for instance, may be ‘different’ from cognitively impaired users targeted to receive other services (for instance, because of their perceptions of the service, their sociability and behavioural problems, or because of the nature of their informal support)<sup>14</sup>. The

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<sup>14</sup> In that sense, this problem is not dissimilar to issues of bias related to self-selection, as discussed for instance in Garen, John. 1984. "The returns to schooling: a selectivity bias approach with a continuous choice variable." *Econometrica* 52:1199-1218, Heckman, James. 1979. "Sample selection bias as a specification error." *Econometrica* 47:153-161.

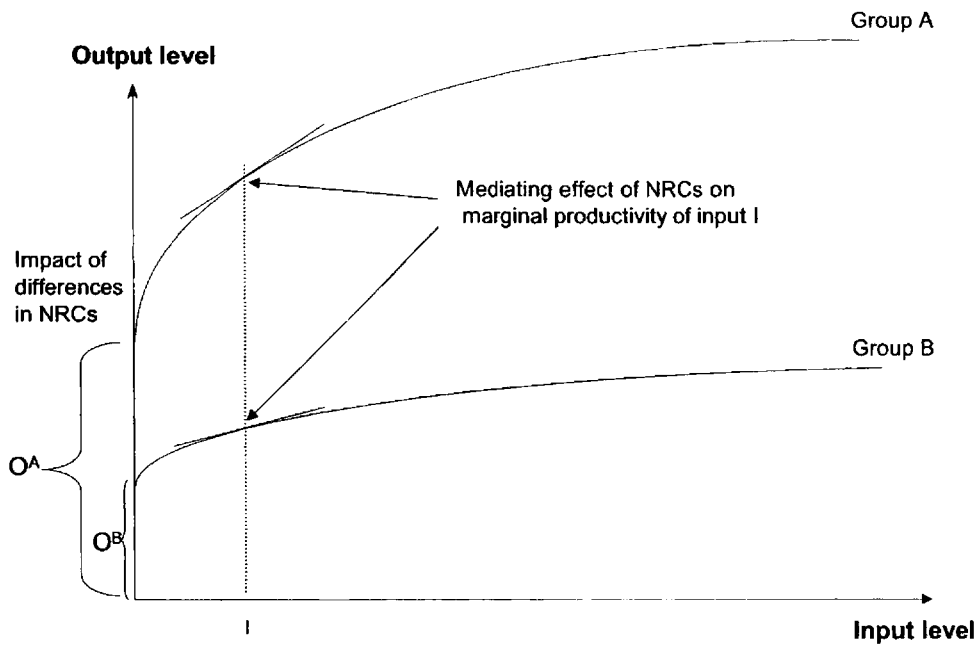
subtlety of the factors taken into account during the arrangement of care packages is encapsulated in the following quote from the government guidance on the Single Assessment Process: ‘Professionals should be aware of the impact of age, gender, race, living arrangement, personal relationships, lifestyle choices and disability on older people and their needs, but not make assumptions about this impact and be prepared to respond appropriately’ (Department of Health 2003a). Importantly, although such combinations of factors may not be easily accounted for by available NRC indicators, they may be captured, at least partially, by interaction terms between indicators of service *receipt* and of NRCs.

- In contrast, the aim of ‘user-group-marginal-productivity-effects’ is to capture potential differences in the productivities of services between groups of cases. Following the example above, day care services may have a significantly different *impact* on the welfare of users who suffer from cognitive impairment than on the welfare of users who do not. In contrast with targeting captured risk effects, group marginal productivity effects capture the effect associated with increases in levels of services because of their continuous nature, and thus indicate differences in marginal productivities.

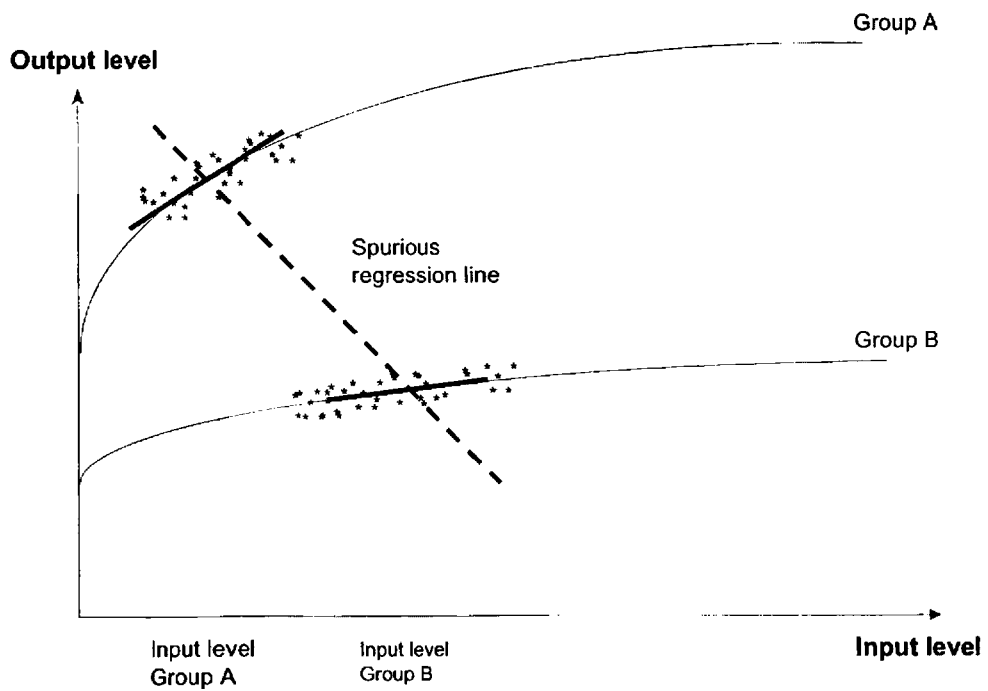
**Figure 2.2** depicts hypothetical productivity curves (curves indicating the relationship between inputs -on the horizontal axis- and outputs -on the vertical axis) for two user groups A and B. For both groups of cases, decreasing returns to factor are assumed, that is a reduction in input marginal productivities as levels of provision increase. The figure further exemplifies the rationale for introducing NRC related terms in the model specification in order to estimate service productivities.

- First, **Figure 2.2** illustrates that the effect of including indicators of direct-NRC-effects and targeting-captured-need-effects ( $\phi_i$  and  $\eta_{ii}$  in Equation 2.6, respectively) is to account for differences in the outputs that would have been achieved had services not been provided, by locating the intercept of the productivity curves for the user groups at different points along the vertical axis. In the example, users in Group B are assumed to be in greater need than users in Group A, so that in the absence of services they enjoy OA-OB less outcome.

**Figure 2.2 NRC effects on the production of welfare process**



**Figure 2.3 Potential bias in regression estimates**



- Secondly, Figure 2.2 illustrates that by interacting levels of services with indicators of users' characteristics, the user-group-marginal-productivity-terms account for differences in the marginal productivity of services between user groups (indicated by the slope of the curve at a given level of input).

Figure 2.3 demonstrates how the risks of bias in the estimates of service productivities increase significantly in the presence of a correlation between levels of services and the characteristics of cases. Given the productivity curves in Figure 2.2, Figure 2.3 hypothesises that higher levels of services are allocated to users in greater need (Group B). As a result, the cluster of observations relating to Group A are located to the left of the cluster of observations relating to Group B (hypothetical observations for the two groups are indicated by star signs). Attempting to estimate service productivities without accounting for the impact of NRCs on the production of welfare process would imply fitting a regression line along all the observations, and hence estimating a spuriously negative relationship between inputs and outcomes.

In practice, the nature of the bias illustrated in Figure 2.3 would depend on the nature of the targeting of inputs between user groups, the impact of NRCs on outcomes and the differences in marginal productivity effects between groups. However, the situation exemplified by Figure 2.3 is particularly relevant because of the likely overwhelming effect of NRCs on outcomes, and the emphasis placed by the reforms on concentrating resources on the neediest.

*Summary:* Production functions are used for the estimation of the impact of levels of service provided and NRCs on outcomes. Commonly used specifications of production functions cannot account for the particularities of the production of welfare process. Therefore, traditional functional forms have been amended to account for the effect of NRCs. Once this is done, production functions can help to answer such questions as:

- Are the services provided having an impact on the welfare of the recipients of the services?
- If so, how do different services compare? For which users?

- What is the relative impact of the services on welfare as compared with the impact of the NRCs of the users?
- Can different services be substituted in the production of a particular output?
- Are there combinations of inputs that work particularly 'well' together?
- How do inputs productivities change with different levels of service; that is, is the marginal benefit reached from a marginal increase in the service provided constant regardless of the level of service?

### *2.2.3 Cost functions*

Cost functions represent the other major tool developed by economists to explore the relationship between resources and outputs in the production process. They are derived from the technological relationships implied by production functions (Sheppard 1970). In fact, duality theory in microeconomics shows that under the assumptions of profit maximisation or cost minimisation, the estimates of production and costs functions can be derived from one another (Fuss and McFadden 1978). However, cost functions reverse the order of causality between inputs and outputs. Hence, in the POW context, instead of predicting outcome levels with indicators of NRCs and services, they estimate costs as a function of NRCs and final outputs.

Because of their similarities, cost and production functions describe in common many features of the production process. For instance, increasing or decreasing returns to scale in production functions are equivalent in cost functions to, respectively, decreasing or increasing marginal costs of outputs. It is therefore not surprising that many of the adjustments required for the appropriate use of cost functions in social care are the same as those discussed for production functions. Particularly, cost functions need to account for the impact which NRCs have on the costs of achieving particular outputs for cases with different characteristics.

However, in spite of many common features, cost and production functions are also different in important ways. In particular:



- Because cost functions use aggregated costs as indicators of formal inputs, they cannot inform policy about the relative impact of different services on particular outputs, and therefore about how to tailor care packages to maximise welfare gain, given the characteristics of the recipients of care. In other words, they cannot explore issues of input mix efficiency. Instead, cost functions estimate expected costs of improvements in outcomes for different user groups, given observed practice.
- In contrast, whereas production functions treat one output at a time, cost functions include all outputs as explanatory variables in one single model. As such, they are better suited than production functions to examine directly issues of joint supply: the effect that the levels of one or more of the outputs produced have on the additional resources required to produce an additional unit of a second output. It could be, for instance, that improvements in caregiver stress bring about improvements in user morale, or reduce the risk of institutionalisation.

In view of the central importance for this study of understanding patterns of allocative efficiency in the allocation of community care services, the analysis will estimate production relations using production functions rather than cost functions. Issues of joint supply will be addressed during the optimisation analysis, introduced in the following section.

*Summary:* Cost functions are directly linked to production functions, and provide in some respects the same information about the production of welfare process. However, there are key differences between cost and production functions:

- Cost functions cannot reveal the relative impact of different services on different outputs, because they treat all services aggregated through costs. Production functions can.
- Because they include all outputs in one equation, cost functions allow the estimation of interdependence in the production of different outputs.

Because of the importance of estimating allocative efficiency, the analysis will explore the production process estimating production functions rather than cost functions.

#### ***2.2.4 Optimisation analysis***

So far, we have presented three tools for the evaluation of the production of welfare process, each describing a different aspect, or a different perspective. Utilisation functions allow the analysis to explore the range of factors affecting who gets what services, and thus to answer, for instance, questions about horizontal and vertical targeting efficiency and the extent to which the service allocation process is needs-led. Production and cost functions, on the other hand, derive quantitative estimates of the impact of formal resources on the welfare of service recipients. Optimisation analysis makes two contributions. First, it allows the description of variations in aspects of efficiency, and thus the identification of potential ways of improving the resource allocation process. Secondly, it allows the exploration of implicit equity criteria for the prioritisation of user groups and welfare goals.

#### ***Exploring efficiency in the allocation of resources***

The process of allocating community care resources is one which involves many actors and a multitude of steps. Amongst other factors, such a process entails: decisions about local and central taxation rates, the apportionment of public moneys across government departments, the allocation of central government funds to individual local authorities, local decisions about budget shares for different local services, choices about budget shares for user groups within personal social services, local policies about patterns of service targeting, attitudes and perceptions of management and front line staff, and circumstances and wishes of service users and carers. The ultimate aim of this intricate allocation process, however, could be described as attempting to match resources to needs so as to maximise, from a societal point of view, improvements in the welfare of users and carers, given the circumstances of cases and subject to available resources (Davies and Challis 1986; Knapp et al. 2004). The role of optimisation analysis is to explore how far current service allocation patterns are from attaining such a goal, by identifying differences between observed and optimum packages of care and their implications in terms of forgone gains in outcomes.

Just as for production and cost functions, the application of optimisation analysis in the POW context is derived from methods developed in microeconomics for the analysis of firms. In that context, optimisation analysis is employed for studying the choice of optimal combinations of factors by the firm in order to maximise output for a given cost, or to minimise costs subject to a given output (Koutsoyannis 1979, p. 86). Assuming decreasing marginal productivities of factors, it can be shown that the optimum combination of factors of production is such that

**Equation 2.7**

$$\frac{\partial Y/\partial I_1}{p_1} = \dots = \frac{\partial Y/\partial I_k}{p_k}$$

where  $p_i$  refers to the price of input  $I_i$  (Koutsoyannis 1979, p. 89).

In other words, assuming that the production process is characterised by decreasing returns to scale<sup>15</sup>, the optimum combination of inputs will be that in which the marginal productivity (standardised by input prices) of all inputs is equal.

In the present case, the optimisation analysis will explore which combinations of service inputs maximise outcome levels given the available resources, by switching levels of resources from the less productive inputs to the most productive ones. In cases where the production function is found to be concave, the optimum solutions will be derived using Lagrangian multiplier methods (Lambert 1988, p.105). In other cases, the solution will be derived by manual iterative exploration. The analysis will therefore explore the differences between optimum packages of care and observed packages of care, in order to derive recommendations about potential changes in the design of care packages to improve the efficiency of community care resources.

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<sup>15</sup> This assumption is often expressed in terms of the concavity of the production function. A second associated assumption is the continuity and derivability of the production function (see for instance Chiang (1984, p. 232)).

The application of optimisation analysis to the social care context requires information about a key set of features of the production of welfare process.

- ***Prioritisation between case types and outcomes.*** First, the analysis must recognise the ‘multi-product’ nature of the production of welfare process. That is, the fact that services will aim to achieve a series of potentially competing goals, such as reducing caregiver stress while preventing users from entering institutions, or maximising user empowerment while minimising risks to them. The first requirement to applying optimisation analysis is therefore the specification of the goals of services, and of weights indicating their prioritisation for users in different circumstances (supporting the welfare of informal caregivers, for instance, will only constitute a relevant outcome goal for cases benefiting from non-negligible levels of informal support). Given the difficulties involved in deriving a priori weights for aggregating outcomes, the analysis will apply a single output maximand policy. In other words, it will treat sequentially the outcomes included in the study as the only goal associated with the provision of community care services. However, following each optimisation, the analysis will explore the ‘*collateral effects*’ on other outcomes associated with optimum care packages.
- ***Available means.*** Secondly, the analysis will need to define the nature of the resource constraints faced, and in particular the list of services available, their prices, their availability and the budget constraints (overall and for specific user groups) faced. In terms of the supply of services, the optimisation will consider two situations, one in which unconstrained levels of services are available at current prices, and a second in which levels of services are constrained in aggregate to their observed levels.
- ***Service productivities.*** Finally, the analysis requires information about the nature of the relationship between the available means (services) and the desired goals (improvements in welfare outcomes). In other words, information about service productivities derived from the estimation of the production functions as discussed in Section 2.2.2.

#### ***The system’s implicit equity valuations***

Maximising one output at a time facilitates the interpretation of the estimated optimum packages of care. Each set of ‘optimum’ solutions points to the distribution

of resources which would maximise the system's performance with regards to one particular objective. However, the single output maximand assumption is clearly unrealistic. Even though some will be more important than others, it is highly unlikely for just one outcome to drive exclusively the resource allocation process. The question remains, therefore, of the overall performance of observed allocation patterns in terms of achieving optimum levels of aggregate outcomes.

Instead of addressing this question directly, the analysis will compare shortfalls in observed levels of outcomes relative to optimum achievable levels, to derive indicators of implicit prioritisation of outcome goals. In other words, the analysis will reverse the assumptions of the optimisation analysis. Rather than perceiving shortfalls in the production of individual outcomes as evidence of inefficiencies, the analysis will assume the observed allocation of resources to be optimum. Therefore, relative differences between the observed and maximum achievable levels for the different outcomes for the different user groups will be interpreted as inverse indicators of their implicit degree of priority.

The rationale for reversing the interpretation of the optimisation results lies in the fact that current allocation patterns may conceivably reflect a set of equity patterns balancing the achievement of the different outputs for the different users. And even if one can be reasonably certain that in their detail they are less the product of policy choice than of inefficiencies, to treat the broad features as if they were implicit equity choices helps us to consider whether there are equity biases. In the terminology of Legrand (1991, p.41), this analysis would amount to testing the degree to which the system's implicit prioritisation of cases and outcomes succeeds in passing the 'test of intuition'.

*Summary.* In the thesis, optimisation analysis will serve two aims. First, the measurement of inefficiencies in current service allocation patterns with respect to the maximisation of the production of the different outcomes in the study. Secondly, the derivation and criticism of the implicit equity criteria underlying the observed distribution of outcomes amongst cases in different circumstances. Therefore, through optimisation analysis, the thesis will address questions such as:

- What changes in who gets what would be implied by the maximisation of the different objectives associated with services?
- For the different objectives of services, how far are current outcome levels from the maximum attainable levels?
- Are the implicit priorities between users and between outcomes what they should be? For instance, are the needs of the carers sufficiently recognised by the social care system?
- Could those objectives be achieved at a lower cost through the use of different combinations of services? For instance, are services such as day care or respite care offered to the right groups of users? Should home care remain the core in the structure of packages of care?

### **2.3 Conclusion**

This chapter has shown what can be gained in the field of community care from the application of the methods brought together in POW studies.

Focusing on intermediate outputs, utilisation functions were suggested as the tools for investigating the ‘who gets what’ question, and thus the degree to which the resource allocation process responds to the NRCs traditionally associated with entitlement for publicly brokered social care support, such as levels of physical disability, mental and physical health problems, social isolation and levels of caregiver burden. Consequently, an important focus of the analysis derived from utilisation functions would be the care system’s degree of targeting efficiency.

The chapter then specified a general form of production function, which adapted traditional microeconomic specifications to account for the idiosyncratic nature of the social care context. In particular, the specification was selected in order to control for the fundamental role of NRCs as direct influences on final outputs and as mediating factors in the relationship between levels of services and final outputs.

Finally, drawing on the results from utilisation and production functions, optimisation analysis was suggested as the analytical tool to explore (i) shortfalls in the system's efficiency with respect to the production of outcomes and (ii) the equity-related implications of the valuations of outputs and user groups implied by the comparison of the patterns of outputs achieved and those that could be achievable.

Considering the heavily quantitative nature of the methods postulated, it is important to finish the present chapter with a note of caution about their appropriate interpretation. Taken at face value, the range of methods proposed could appear to oversimplify the complicated patterns of interrelationships between the key stakeholders involved in the production of welfare process, and particularly to imply an overly mechanistic process linking the provision of formal resources, the characteristics of cases and the achievement of welfare outcomes for service users and their carers. It is therefore important to remember that 'we are arguing by analogy, that we are discussing a 'quasi-technology' based substantially on perceptions and assumptions of actors, and not a true technology based on machines' (Davies and Knapp 1981, p.13).

Arguably, the POW approach responds to the complexity of the production of welfare process by postulating a framework of analysis which urges the researcher to recognise explicitly all relevant factors and the intricacy of their relationships, while achieving a degree of clarity about the interpretation of the patterns found. Indeed, in the early 1980s, Goldberg and Connelly (1982) had pointed out that the main reason for the failure of early evaluative efforts in social care had been the lack of clarity in the specification of inputs (services), outcomes, and hypotheses about the nature of the relationship between the two (p.17).

### **3 POST-REFORM COMMUNITY CARE IN ENGLAND AND WALES: THE ECCEP STUDY**

#### **3.1 Overall study design and historical precedents**

Having described the policy and methodological background for this thesis in Chapters 1 and 2 respectively, Chapter 3 introduces the Evaluating Community Care for Elderly People [ECCEP] study, funded by the English Department of Health. This provides the data on which the subsequent analysis is based.

##### ***3.1.1 Historical background***

The ECCEP project represents the natural continuation of a stream of studies looking at the production of welfare process in the field of social care for the elderly (Challis and Davies 1986; Davies and Challis 1986; Davies and Knapp 1981; Ferlie, Challis and Davies 1989; Knapp et al. 1992; Qureshi, Challis and Davies 1989). In particular, ECCEP represents the post-reform replication of the Domiciliary Care Project [DCP], funded in the mid 1980s by the English Department of Health to investigate equity and efficiency in the allocation of community care resources (Davies et al. 1990).

Amongst other conclusions, the DCP study had pointed out the worryingly poor matching of services to needs, which translated into negligible service contributions to the welfare of users and carers (Davies et al. 1990). A critical aim of the reform efforts, it followed, would be to achieve significant improvements in service productivities. As the authors warned, failure to do so would result in the withdrawal of valued services to large numbers of recipients without any real gains in key policy outcomes (Davies et al. 1990).

Hence, one of the main ambitions for the ECCEP study was to provide a platform from which to evaluate the relative changes in the community care system associated with the implementation of the reforms in 1993. Data collection was started in 1995,



in order to allow sufficient time for the post-reform picture to begin to be clearer at the ground level. It is important to note, however, that other than referencing evidence from publications derived from the DCP study, this thesis does not seek to relate patterns in the ECCEP sample directly to those in the DCP sample. In other words, it does not aim to utilise the common features of the two sets of evidence to test changes in the care system following the reforms. Despite substantial common features across the two data collections, such a focus would impose severe restrictions in the range of evidence available, as it would force the analysis to operate solely with the set of indicators common to the two studies.

### ***3.1.2 ECCEP as a POW study***

As a 'production of welfare' study, ECCEP was designed to collect data relating to each of the boxes defined in the Production of Welfare Diagram (see Figure 2.1), so as to address the '*what*', '*how*' and '*why*' questions introduced in Section 2.1. That is, the aim was to gather

- (a) the information necessary to describe service inputs, costs, need-related circumstances and outcome indicators, and to analyse the interrelationships between variables of these types;
- (b) information about immediate influences on the patterns of resources, risk factors, and welfare states; and
- (c) information about more general influences on the production of welfare process - for instance, general resource levels and policy priorities.

The main design features of the ECCEP study are outlined in Inset 3.1. It highlights the 'bottom-up' approach of the evidence collection for the project and its emphasis on capturing the interactions between the three key stakeholders during the setting up of care packages.

### 3.1.3 The participating authorities

The need for broad comparability between the DCP and ECCEP projects had important implications for the design of the study. In particular, the 10 local authorities collaborating in the ECCEP study were selected to be the same as those chosen 10 years earlier by the DCP study (nine out of the ten local authorities were located in England, and the remaining one in Wales). At the time, these locations had been found to be broadly representative of the national picture, with significant variability between them in terms of rurality, geographical location, population density, deprivation and other such socio-economic characteristics (Davies et al. 1990).

Table 3.1 compares key expenditure data in 1995 for the ECCEP areas and all areas in England and Wales (as a condition for taking part in the study, local authorities were guaranteed anonymity in the publication of results). The table indicates broadly similar expenditure levels between the study areas and all Councils with Social Services Responsibilities [CSSRs].

**Table 3.1 Comparison of ECCEP Authorities' Annual expenditure with expenditure across all local authorities**

Indicator	SSDS				ECCEP			
	Min	Max	Mean	CV	Min	Max	Mean	CV
Gross expend. per capita	108.4	382.0	172.3	35.0	116.0	370.0	180.9	49.0
Gross expend. per capita on elderly	612.0	2872.0	1228.3	36.0	862.0	2722.0	1295.7	45.0
Home help in a sample wk	245.0	1635.0	749.9	39.0	409.0	1194.0	774.4	35.0
Provision of meals in a sample week	51.0	597.0	232.0	52.0	163.0	491.0	261.5	47.0
Day care for elderly in a sample week	1.0	157.0	28.9	91.0	6.0	71.0	26.5	80.0
All charges	0.7	21.4	10.5	47.0	2.6	19.8	9.0	59.0
Elderly charges	1.0	31.0	8.9	61.0	1.0	27	10.4	89.0

Notes: SSD expenditure obtained from 1995 performance indicators.

Source: (Bauld et al. 2000)

### **Inset 3.1 ECCEP design features**

#### **Foci**

- Who gets how much of what service and informal support at what costs and with what effects on whom.
- Description of utilisation patterns, average and marginal productivities, costs and outcomes and benefits.
- How the patterns of needs, resources and outcomes occur; influences of structures and policies, procedures, assumptive worlds perceptions and practice.

**Before-after study:** Cohorts of new users of community social services in 1984/85 and 1994/95 in 10 authorities in England and Wales.

#### **ECCEP data collections**

Interviews with key field level actors for the set-up stage: the triadic design.

- Initial survey firm interviews with 419 community-based users (response rate 82 per cent) and their 238 'principal informal caregivers' (PICs); and in-house team interviews with 425 workers performing the core care management tasks immediately after the conclusion of the set-up phase of care management.
- Follow-up survey firm interviews with 299 users surviving in the community and their 186 PICs, and in-house interviews with 418 persons performing core care management tasks six months after the first interviews.

#### **Other collections include**

- Continuous data on service utilisation, changes in need-related circumstances, location
- Interviews with 150 managers at all levels of the SSDs about policy and implementation in policy and practice discussions, with scaling of their perceptions of their authority's priorities for 133 managers.
- Interviews with managers of health, housing, provider, and other agencies.
- Supplementary collection on health service utilisation and health service organisation and policies.

### ***3.1.4 Sampling process***

The sampling process began with users, with an objective to achieve a representative sample of the mix of new cases receiving community care support in each of the 10 authorities. Users were considered to be eligible for inclusion in the study if they were expected by care managers to be in receipt of social services for a period longer than two months. In order to ensure the inclusion of sufficient numbers of poorly represented case types, the sampling process was planned around a multi-cell sampling matrix, based on such factors as physical disability, the expected intensity of service provision and living arrangements. Despite an initial aim of 760 interviews, by the time of the first wave of data collection in July 1995, the total number of elderly people identified as eligible for inclusion was 597. This meant that all cases assessed by social services for receiving continued assistance were considered to be eligible for the project, and the stratification process abandoned. Of those eligible, interviews were achieved with 491 users: a response rate of 82 per cent. However, a small number of users were triaged following assessment into residential care. The analysis in the thesis is therefore based on the remaining 425 cases assessed to receive community services. Data obtained from these interviews have been weighted using information gained during the screening process to achieve population representativeness where appropriate<sup>16</sup>.

Users who agreed to be included in the study were asked to identify whether they received regular assistance from a friend or relative, at least once a week. Those principal informal carers [PIC] were then asked to take part in the study, making up the ECCEP carer sample. Users and carers were interviewed approximately 14 weeks following their referral or major review by social services, in order to coincide with

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<sup>16</sup> Differences between the characteristics of the sample and the totality of the cases referred to the social services departments during the time of the design of the sample were tested on the following factors: gender, confusion, living arrangements, dependency, incontinence and presence of anti-social behaviour. Almost no differences were detected using Chi-squared tests, apart from slightly higher proportions of women interviewed, and lower proportions of cases with behavioural disturbances or confused.

the end of the setting up of the care plan by the care manager<sup>17</sup>. The care manager of each user was also interviewed, with approximately 95 per cent of their interviews held just after the termination of the set-up phase.

It is important to stress that the selection of cases was designed to recruit users at the time of referral to social services (or coinciding with a major review of their case, prompted by a significant change in their circumstances). In other words, ECCEP cases entered the sample at a time of crisis. The ECCEP sample should therefore be viewed as a cohort of new users of services, rather than as a cross-sectional sample of recipients of community care.

This cohort nature of the ECCEP sample is reflected in the comparison of the characteristics of ECCEP cases with those of the sub-sample of the 1994/95 GHS respondents in receipt of standard community care services. As noted in Bauld et al. (2000), the characteristics of the two samples are on the whole fairly similar in terms of age, gender, living arrangements and housing tenure. However, ECCEP cases appear to be more dependent in terms of the number of problems with activities of daily living (ADLs) and instrumental activities of daily living (IADLs).

### **3.2 Nature of the evidence**

The core of the ECCEP evidence originates from two rounds of extensive interviews with service users, their informal caregivers and the care manager in charge of the case. As mentioned above, the first round of interviews was timed to coincide with the end of the setting-up of the care plan. A second round of interviews was undertaken with each triad member around 10 months after the first. Table 3.2 summarises the number of interviews achieved by interview type and round of collection.

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<sup>17</sup> One important focus of analysis for the ECCEP study is the study of care management arrangements and processes.

**Table 3.2 Number of user, caregiver and worker interviews**

	<b>Time I</b>	<b>Time II</b>
<b>Users</b>	419	308
<b>Caregivers</b>	236	189
<b>Workers</b>	425	414

Following the two main rounds of evidence collection, every four months the study tracked key information relating to location, service inputs, costs, and broad need-related circumstances. For the analysis in this thesis, these tracking data were used for calculating the length of stay in the community (the indicator used data up to two years following referral). The tracking of social care resources was undertaken in a separate exercise from the collation and tracking of data on health services. The latter were focussed on health care agencies, and was undertaken by a researcher who was a highly qualified and experienced registered nurse and nurse manager.

The following subsections provide a brief account of the ECCEP database indicators used in the analysis.

### ***3.2.1 Risk factors, need-related circumstances, and other non-resource inputs***

The fact that the assessment framework advocated by central government through the Single Assessment Process recommends exploring no less than 34 sub-dimensions of need for designing care packages testifies to the complexity and heterogeneity of the characteristics of older people in receipt of social care (Department of Health 2003a). Thus, the ECCEP collection has gathered a wealth of indicators relating to the NRCs of cases from the perspective of users, PICs and worker in charge of the case. Such information relates to the following dimensions of need

- Physical disability
- Mental health
- Other health problems
- Informal care related factors
- Poverty and other socio-economic circumstances
- Environmental factors

- Other mediating variables (gender, age, living arrangements...)

It is not possible to provide here a detailed account of all the information relating to the NRCs of cases in the sample. The complete list of individual NRCs indicators used in the analysis is presented in Appendix Table 3.1, together with information about the nature of their distribution. Some key features of the ECCEP sample at the time of the first round of data collection include:

- Approximately one quarter of cases recruited in the ECCEP sample are referred directly from hospital.
- The average (and median) age of the users in the sample is 81 years.
- Approximately 35 per cent of the users are classified as belonging to the critical interval need category, that is as in need of significant and frequent assistance at unpredictable times of the day (Isaacs and Neville 1976)<sup>18</sup>. Approximately 27 per cent of users are classified in the short interval need category (need assistance several times a day but at longer, usually predictable intervals) and 38 per cent in the long interval need category (requiring assistance with several activities but usually less than once in twenty-four hours, and predictably).
- In the region of two-fifths of users suffer from mild or severe cognitive impairment, as measured by the Katzman cognitive impairment scale (Katzman et al. 1983)<sup>19</sup>.

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<sup>18</sup> The full algorithm for the derivation of the three Interval Need groups is summarised in Appendix 3.1.

<sup>19</sup> It is interesting to note the significant divergence between the description of cognitive impairment in the ECCEP sample based on the 'objective' measurement indicator (the Katzman score) and that based on the care manager's perception of the proportion of cases for which cognitive impairment was an significant issue during the design of the care package. For instance, in almost two fifths of the cases classified as severely confused in terms of their Katzman score, the case managers did not identify cognitive impairment as a relevant factor for the arrangement of the care package.

- Approximately 14 per cent of the sample are perceived by care managers to suffer from depression.
- One fifth of the sample have suffered a stroke, approximately one half have muscular and/or skeletal problems, and one fifth suffer from coronary problems. Overall, the average user in the sample has just under three non-mental-health-related health problems.
- Approximately 61 per cent of users live alone.
- More than three quarters of users receive support from an informal caregiver. Of these, approximately half reside in the same household as the user.
- Approximately 60 per cent of informal caregivers are close female relatives of the service users. The mean (and median) average age of informal caregivers in the sample is 61 years.

### *3.2.2 Intermediate outputs (formal services)*

The analysis of intermediate outputs focuses on the six main types of community care services: home care, home-delivered meals, day care, respite care, social work and community nursing inputs. Aggregated, these services cover over 94 per cent of the total social care costs observed in the sample, and approximately 86 per cent of the overall health and social care costs. In addition, the analysis will use an indicator of total package costs, which also includes the costs of sitting services, occupational therapy, day hospital, GP visits, chiropody, physiotherapy, speech therapy and outpatient visits. The distributions of the different service indicators are described in Appendix Table 3.1. To facilitate the comparison of intensity of provision across services, inputs are measured in weekly costs<sup>20</sup>.

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<sup>20</sup> In the derivation of the input index for each service, the national average unit costs for 1995 given by Netten and Dennett (1997) have been used as weighting factors for the number of units of inputs. As



**Home care:** The home care service is the foundation of most community care packages. In the ECCEP study, four fifths of users in the sample receive some home care assistance. Amongst recipients, the average intensity of provision is approximately 7 hours per week.

**Day care:** The second most prevalent service in the sample, day care inputs is provided to one third of the users in the sample. The average intensity of provision is slightly below 2 sessions per week, and ranges between one and 5 sessions per week.

**Meals on wheels:** 30 per cent of cases receive meals on wheels. On average, recipients of meals services are provided 14 weekly meals, 4 of them hot and the rest frozen.

**Respite care:** One quarter of the sample benefit from respite care services. Mainly targeted as a means of supporting informal caregivers, the prevalence of respite care services drops to 12 per cent among users without informal support. On average, recipients benefit from approximately one day a week of the service.

**Social work inputs:** Less than a fifth of users benefit from therapeutic social work inputs on a regular basis<sup>21</sup>. Even amongst those that do, levels provided are very low, with the average weekly contact with users being 6 minutes.

**Nursing visits:** Nursing visits represent the main community health care input provided to older disabled people. Historically, the coordination of the provision of nursing inputs and other community social care services has proven difficult, with continuous shifts in the definition of what constitutes health care and what social care (Lewis 2001). In particular, heated arguments have arisen about the sharing of responsibilities between community nurses and home care workers with respect to assistance with personal care tasks (Twigg 1997). In the sample, one third of users

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indicated by the authors, such unit costs aim to approximate the long run marginal opportunity costs of services.

<sup>21</sup> These inputs refer to inputs provided by qualified social workers in charge of the case, and exclude inputs related to case management related activities.

receive regular nursing inputs, with the average level of provision being 1.7 visits per week.

Whereas the ECCEP dataset measures in detail the intensity in the provision of services, it was not able to collect indicators relating to process characteristics of services, such as the degree of continuity of care, intrusiveness, competence, punctuality, kindness, and timing of care. Therefore, the analysis cannot capture the impact of differences in such characteristics on outcomes, which have, however, been identified as important by service users (Donabedian 1980; Henwood, Lewis and Waddington 1998). In addition, the analysis will not differentiate services by provider sector.

### ***3.2.3 Final outputs (outcomes)***

The ECCEP project was to a degree constrained in its selection of outcome indicators by the need to create sufficient continuity with the DCP study. However, the main concern was to reflect aims related to policy and practice discourse during the reforms, both at national and local level.

#### ***Difficulties in the specification of outcomes***

Chapter 1 discussed the special role of reducing institutionalisation and providing support for informal caregivers as policy goals of the 1990 Community Care Act. In fact, supporting users in the community has enjoyed a longstanding pedigree as the main statement of purpose associated with community care services. Already in 1958, the Health Minister of the day stated that ‘the underlying principle of our services for the old should be this: that the best place for old people is their own homes, with help from the home services if need be’ (in Walker 1981).

However, time after time, government policy statements have been careful to reflect the heterogeneity of circumstances faced by services by broadening their scope of action, placing them within wider (and rather more fluid) aspirations, such as maximising independence or promoting empowerment and choice. This vagueness in the specification of final outputs has also been reflected in policy statements about

performance, with assertions such as the ‘scope for many authorities to get more for what they spend’ (Department of Health 1998, para. 1.4) or the need ‘to maximise the benefit to service users’ (Department of Health 1998, p.111) sidestepping altogether the crucial issues of ‘more of what’ and ‘what benefit’, respectively.

The (largely understandable) lack of specificity in statements about goals, linking characteristics of users to quantifiable objectives is cause and consequence of what Goldberg and Warburton have termed the ‘general haziness and indeterminateness surrounding the whole concept of social work and social services’ (Goldberg and Warburton 1979, p.6). The implications for research, however, are important. Nowhere to be found are explicit statements about service goals which would translate into unambiguously measurable impacts on user and caregiver welfare states. This is in part due to the problems involved in deriving precise indicators relating to outcome goals. That is, it is partly due to measurement issues. But even for the more easily quantified and most central of outcome indicators, such as preventing institutionalisation, there exist no clear policy statements specifying how long services should support users in the community or in what circumstances, let alone statements relating desirable outcome levels to the characteristics of individual users.

In the light of the general lack of statements about specific output targets, the thesis will structure its treatment of outcomes by measuring them from a series of perspectives:

- The level of *cover of the productivity effects*, that is the proportion of users in the sample benefiting from improvements in their welfare related to the effect of services
- the *proportional service input contributions*, that is the proportion of observed welfare levels related to the beneficial effect of services (for example, the number of days spent in the community because of the support of services relative to the overall length of stay in the community)
- the *potential for improvement* of performance, that is the observed service contribution to outcome levels relative to the maximum contribution levels achievable, as suggested by optimisation estimates (see Chapter 2).

### *The choice of outcome indicators*

The question remains, however, of which dimensions of outcomes should be explored, an issue which is further complicated by the multiplicity of stakeholders whose perceptions should arguably be taken into account when defining service goals. At a minimum, such a list would encompass local and central government policies, service users, informal caregivers and front-line staff. For the thesis to provide a sensible account of post-reform productivity patterns, it ought to operate with a set of indicators which cover the range of perspectives from which performance is likely to be judged.

As discussed in Chapter 1, two service goals appeared first and second on the 1989 White Paper's list of key objectives for the reforms: to enable people to live in their own homes wherever feasible and sensible; and making practical support for carers a high priority. These were not, however, the only White Paper statements relevant to the specification of dimensions of output for the thesis. Another two important sets of statements for the choice of outputs were

- supporting individuals so as to allow them to achieve 'as much independence as possible', assisting them in 'reacquiring living skills' — including improvements in users' perceptions of their capacity to cope with the tasks of daily living (Department of Health 1989, para. 1.8);
- 'to give people a greater individual say in how they live their lives' and to procure 'services that respond flexibly and sensitively to the needs of individuals and their carers'- felt empowerment over their whole life, and felt empowerment over the processes of service provision (Department of Health 1989, para. 1.8).

Despite differences in emphasis between key stakeholders, the literature suggests broad support for the above set of outcome dimensions from users, carers and care staff (Clark, Dyer and Horwood 1998; Netten et al. 2002; Qureshi et al. 1998). In addition, the same literature has identified additional relevant goals, such as reducing anxiety and depression, achieving opportunities to socialise and to relate to family members, and insuring personal safety and security. Indicators of general lack of morale, for instance, have been extensively treated as a final output in evaluation

studies, including production of welfare evaluations from the 1970s onwards (Davies and Challis 1986).

One of the most contentious issues regarding the specification of outcome goals refers to the desirability for social care services to provide support with instrumental activities of daily living, and in particular with housework tasks. In contrast with historical precedents, by the time of the 1990 Community Care Act the large majority of local authorities no longer regarded providing basic cleaning services as a priority. This has often been found to be in sharp contrast with the views of services users, who are strongly attached to this type of service (Clark, Dyer and Horwood 1998; Netten et al. 2002; Qureshi et al. 1998).

In terms of service outcomes for informal caregivers, an extensive body of (US dominated) literature has promoted the development of indicators of caregiver burden and stress, predominantly of a psychological nature (Zarit 1997). The intention behind the development of such measures has been conveying as reliably as possible the 'personal costs of caring, and partly developing objective measures of the impact of different interventions' (Pickard 2004, p .64).

In view of the above, the thesis will define its analysis of outcomes along the following dimensions

***User's length of stay in the community.*** The indicator (DAYS) measures the number of days prior to admission to an institution for long-term care, during the period between referral and the tracking collection made around two years following referral. The variable is censored, since a proportion of users remained in the community at the end of the period.

***User satisfaction with service.*** A general indicator of user satisfaction with the service and support (USATISF), ranked along a five point scale from very dissatisfied to very satisfied.

***Perceived improvement in user functioning.*** The analysis will consider users' perceived improvements in functioning related to the effect of care services separately

for two types of task: (a) personal care tasks of daily living, indicated by IMPADLS, and (b) 'instrumental' (household and other) tasks of daily living, indicated by IMPIADLS.

***User empowerment, choice and control.*** The indicator closely reflects Weber's concept of power: the probability that someone would be in a position to impose their will in the framework of the social relationship in question (Weber, Gerth and Mills 1948). The impact indicator for users, IMPEMP, is based on three items, relating to the user's perceived capacity to run their life the way they desire, their perceived helplessness, and anxieties regarding future loss of independence.

***User's general psychological well-being.*** The analysis will explore three indicators. The Philadelphia Geriatric Center - Morale Scale (PGC) (Lawton 1975), designed to capture agitation, attitude toward own aging, and lonely dissatisfaction; and two indicators derived from a subset of items from the PGC schedule

- *General Dissatisfaction with Life (GDL)* relating to negative perceptions of the present, lack of family contact, being easily upset, and taking adversity badly and
- *Dissatisfaction with Life Development, (DLD)* relating to the idea that life satisfaction diminished with age.

***Reduction of social exclusion and improvement of relationships.*** The analysis will explore two indicators: an indicator of the user's assessment of the degree to which social services improved the quality of relationships with the family and friends (IMPREL); and a more general indicator of satisfaction with the opportunities to meet people and socialise (SATSOC).

***Informal caregiver well-being (KOSBERG).*** In terms of informal caregivers, the ECCEP study collected data on the Kosberg Cost of Care Index (Kosberg and Cairl 1986; Kosberg 1996; Kosberg, Cairl and Keller 1990). Based on a general population of elderly people, the Kosberg Cost of Care Index was designed for use during the setting up stage of the care planning activity, and aims to capture the potential and actual impact on informal caregivers of looking after an older person. That is, it provides a direct link to the malaise related to caregiving.

***Worker perception of impact.*** In order to compare perceptions of outcomes of care between users and front line staff, the analysis will use a general indicator of the extent to which the care manager considered the community services to have improved the welfare of the user (WKSAT).

Whereas the eight outcome domains defined above arguably cover the large majority of outcomes commonly ascribed to community care services by users, carers and professionals, it does not contain a direct indicator relating to issues of safety and security. However, the latter was one of the components contributing to the indicator of lack of morale (PGC), and would be expected to contribute to other outcomes, such as the length of stay in the community.

Appendix Table 3.2 indicates the derivation of the output variables in greater detail, and provides information about their distributions. Except for DAYS, which used two years of tracking data, all outcome indicators were measured based on the second round of interviews.

### **3.3 Additional collections**

Because of the wide range of factors involved in the production of welfare process, the main collection of evidence from users, caregivers and case managers has been complemented with additional collections of evidence:

- Interviews with managers of social services departments and health related professionals. These interviews included structured and open-ended interviews, and the collection of quantitative data about the priorities given to different policy objectives and means of achieving them related to the 1989 White Paper. Overall, 132 managers of all levels in social services departments and other health professionals were interviewed. A summary of the questionnaires used is presented in Appendix 6.1.
- Collection of administrative material on charging policies, eligibility criteria, care management arrangements, local authority structure, etc.

- Additionally, contact with the local authorities has been constant throughout the development of the study, with meetings with representatives of the local authorities every four months.

### **3.4 Missing values**

In order not to lose degrees of freedom and to avoid unnecessary loss of efficiency in the estimates, cases with missing values will not be excluded from the analysis (Rubin 1976). Given the relatively small proportion of missing data in the variables contained in the analysis, missing values will be simply replaced with sample means. In general, although mean replacement methods leave sample averages unchanged, they can be expected to reduce the variance in the data and to bias towards zero somewhat the patterns of correlations in the sample. Other methods for imputing values, such as synthetic estimation methods, would be likely to bias away from zero the correlation patterns (Schafer 1997).



## **PART TWO**

### **PATTERNS OF UTILISATION AND SERVICE PRODUCTIVITIES IN COMMUNITY SOCIAL CARE**

## 4 WHO GETS WHAT

Chapter 4 describes two features of patterns in the allocation of community care resources. First, it depicts the nature (and strength) of the relationship between needs-related circumstances of users and carers and the utilisation of six main services (home care, day care, respite care, meals-on-wheels, social work and community nursing visits) which together account for approximately 86 per cent of the average costs of the community care packages in the sample. Secondly, it describes the association between need related factors and the overall intensity of the care packages provided (i.e. the total weekly cost of care packages).

### 4.1 Rationale for the analysis

The rationale for Chapter 4 is two-fold. First, it provides important evidence for judging the extent of horizontal and vertical target efficiency in the allocation of services. Secondly, it depicts key patterns for interpreting the results of the analysis of productivities and subsequent optimisation, by describing the current benchmark against which to compare optimum allocations of resources.

#### 4.1.1 *Horizontal and vertical efficiency in the allocation of resources*

As indicated in Chapter 2, the existence of a strong relationship between needs and service use is important from an equity perspective. In an ideal world, the allocation of most social care resources would correspond with clear and explicit targeting criteria related to individual circumstances. Whether services were 'needs-led' would be reflected in regression models predicting service utilisation in the extent that they find correlations between services and need related factors at the individual level. The existence of such relationships would denote levels of *horizontal* and *vertical* targeting efficiency, as they would demonstrate that service users in similar

circumstances received equivalent packages of care and that users in greater need received higher levels of care, respectively.

As mentioned in Chapter 1, the striving to improve the targeting of services was epitomised in the reform discourse by the slogan "*needs-led services, not supplied-driven*" (Department of Health 1989). Originally developed in the context of studies of poverty and social security in the US (Weisbrod 1970), improvements in targeting efficiency in social care services had begun to be strongly advocated by official bodies such as the Audit Commission and the Social Services Inspectorate from the mid 1980s (Audit Commission 1985; Bebbington and Davies 1983; Social Services Inspectorate 1987).

Of course, the precise nature of the relationship between aspects of need and the provision of services would be expected to vary between services according to their objectives. For instance, given that the main aim of home care services is arguably to support older people with the tasks of personal care, an important objective of the utilisation analysis will be to examine whether the allocation of home care services varies with the levels of users' physical dependency and, in particular, with problems with ADL activities.

With respect to informal carers, the analysis will aim to provide evidence for judging the nature of the relationship between them and formal services, following the categorisation developed by Twigg (1989) and discussed in Chapter 1. Two general types of relationships could be expected. First, a substitution relationship, whereby lower formal services are allocated to users who enjoy high levels of informal care assistance, other things being equal. Second, an increase in the levels of formal care inputs (and particularly of day and respite care services) for cases where informal carers are subject to high levels of stress.

#### **4.1.2 *Current versus optimum care packages***

The first aim of Chapter 4 is therefore to confirm the extent to which the *a priori* expectations described in Chapters 1 and 2 about the nature of the relationship

between services and service recipients are borne out by the evidence. In addition, such evidence will be used as a benchmark for subsequent analyses and, in particular, for depicting differences between current and optimum packages of care in terms of the maximisation of welfare outcome.

Indeed, strong correlations between services and user need-related circumstances do not represent by themselves unequivocal proof of the optimal allocation of resources, although they are a necessary condition. In addition to obtaining information about patterns of targeting, judging the optimality of allocation patterns also requires knowledge about the nature of service productivities, and information about the relative prioritisation of welfare outcome goals for clients in different circumstances. In the social care context, Davies (1994) has argued that good targeting should imply 'allocating resources at the margin to those for whom the value of benefits are greatest, and that this is not necessarily synonymous with allocating resources proportionally to the diswelfares of the state' (p.896). Such statement is consonant with the economists' interpretation of need as a cost-benefit concept (Culyer, Lavers and Williams 1971), whereby the targeting criterion effectively becomes an investment appraisal.

In that sense, the results set out below represent the first stone in the structure of evidence required to understand equity and efficiency in the allocation of community care services in the ECCEP sample.

## **4.2 Methods**

### ***4.2.1 Econometric methods***

In order to test the relationship between need related factors and services, the analysis estimated multivariate regression models for the six services mentioned above, and for the indicator of weekly total care package costs. Because significant proportions of cases did not receive all six services, and because of the consequently high prevalence of zero values in the indicators of individual service utilisation, the analysis was carried out in two steps, as suggested in Mullahy (1998). Therefore, the analysis

explored, first, the relationship between need factors and whether services were received; that is, the impact of need indicators on the probability of receipt of services. Secondly, the analysis explored the impact of need-related factors on the intensity of service provision among recipients of the services.

Models looking at the probability of receipt of services were estimated using logistic regression models. Models exploring the intensity of provision were estimated using either an OLS regression model or GLM models, depending on the distributional properties of the dependent variable.

Manning and Mullahy (2001) have demonstrated the general superiority of GLM models for fitting regressions of resource utilisation indicators characterised by a significant level of skewness. In order to select the variance function for the GLM estimator, the analysis implemented the Park-based test of the variance of the model proposed by the authors. In addition, the analysis tested for the presence of significant levels of skewness in the log-scale residuals, a circumstance in which it is advised to adopt OLS-based models with a log-transformed dependent variable instead of the GLM estimators (Basu, Manning and Mullahy 2004; Manning and Mullahy 2001).

#### ***4.2.2 Interactions between cognitive impairment and physical disability***

*A priori*, it would be expected that cognitive impairment and physical disability would be two of the main factors influencing the nature and intensity of care packages utilised. However, identifying their effects in a multivariate regression model can be difficult because of the effect of cognitive impairment on physical functioning. As a consequence, including unadjusted indicators of mental health problems and physical disability simultaneously in a model can be problematic because of multicollinearity (Greene 2000). In the ECCEP sample, for instance, indicators of physical disability used in the analysis showed correlations with cognitive impairment scores ranging from 0.16 to 0.40, significant at the 1 per cent level.

In order to disentangle the respective effects of physical dependency and mental health, the analysis sought to separate the levels of physical functioning linked to

mental health problems from others, using a methodology later replicated in Nelson, Fernandez et al. (2004). This was achieved by regressing the Katzman cognitive impairment score and the indicator of care managers' perception of cognitive impairment on the indicators of physical functioning (see Appendix Table 4.1).

Based on the equations in Appendix Table 4.1, a new set of 'non-mental-health-related' indicators of physical disability was created by subtracting from the observed indicators their variation linked to dementia. The new indicators thus obtained were by definition independent of the measures of mental health problems, and could therefore be included jointly into the models without danger of multicollinearity.

### **4.3 Results**

Table 4.1 presents the results of the models predicting the probability of receipt of care for the following services: home care, day care, respite care, meals-on-wheels, social work and nursing visits. The intensity of the impact of the explanatory variables on the probability of utilisation is expressed through odds ratios (OR). In turn, Table 4.2 reports the results of the modelling of the intensity in the allocation of services. This analysis, restricted to users receiving the service, is not carried out for social work inputs, given their negligible impact on overall resources.

**Table 4.1 Factors associated with variations in the likelihood of service receipt**

	Home care		Day care		Respite care		Meals on wheels		Social work		Nursing visits	
	OR	Prob.	OR	Prob.	OR	Prob.	OR	Prob.	OR	Prob.	OR	Prob.
<b>Functional impairment due to other than cognitive deterioration **</b>												
CANTLHWK	1.96	0.05										
CANTTOIL	2.51	0.04										
UADLS					1.19	0.00					1.50	0.00
WADL_IAD							1.27	0.00				
WIADLS												
<b>Physical Health</b>												
WINCONT											2.76	0.00
WSKEL	1.78	0.04									9.07	0.00
WULCER			2.41	0.04								
<b>Mental Health</b>												
KATSCORE											1.03	0.03
WCOGIMP	0.58	0.08	4.73	0.00	3.65	0.00						
WDEPR	0.30	0.00			3.00	0.00					2.40	0.01
WLOWMORA			3.79	0.00								
<b>Informal care factors</b>												
CEMPLOY									4.65	0.01		
INFMED	0.96	0.04										
WCSTRESS	2.09	0.01			2.43	0.00						
WPICLIVI	1.85	0.03										
WSPOUSE	4.57	0.01										
<b>Mediating circumstances</b>												
DETERISK							1.22	0.00				
FROMHOSP					0.48	0.02			17.02	0.00		
MALE	0.27	0.00										
UALONE	5.92	0.00										
WHEATPB			0.06	0.02					3.88	0.00		
WPERSREL					1.21	0.05						
<b>Pseudo R<sup>2</sup>; Number observations</b>	16%	403	21%	407	20%	401	11%	404	24%	125	17%	354

Notes: Logistic regressions; OR= odds ratios; \* factor as perceived by the case manager; \*\* These disability indicators do not reflect variations due to cognitive impairment.

**Table 4.2 Factors associated with service levels among service recipients**

	Home care <sup>1</sup> Coeff. Prob.	Day care <sup>1</sup> Coeff. Prob.	Respite care <sup>1</sup> Coeff. Prob.	Meals <sup>2</sup> Coeff. Prob.	Nursing visits <sup>1</sup> Coeff. Prob.	Total package cost <sup>1</sup> Coeff. Prob.
<b>Functional impairment due to other than cognitive deterioration **</b>						
CANTBED User is bed-bound		0.288	0.02			0.417
CANTEAT User cannot eat by him/herself						0.288
CANTLHWK User cannot perform light housework tasks						0.01
CANTMEAL User cannot prepare meal by him/herself	0.362	0.00				
CANTTOIL User cannot use toilet by him/herself	0.320	0.00				
UIADLS Count of problems with IADL activities				0.514	0.05	
WADL_IAD* Count of problems with ADL and IADL activities	0.088	0.00				
WADLS* Count of problems with ADL activities			0.092	0.08	0.160	0.090
<b>Physical Health</b>						
WCANCER* User suffers from cancer		0.414	0.01			0.286
WSKEL* User suffers skeletal problems						0.07
WULCER* User has ulcerated legs or pressure sores	0.337	0.00			0.709	0.505
<b>Mental Health</b>						
KATSCORE Katzman cognitive impairment score	0.008	0.03	0.018	0.00		0.444
WCOGIMP* User is cognitively impaired			-0.305	0.05		0.00
<b>Informal care factors</b>						
INFHWK2 Hours/week informal care with housework (squared)						-0.001
INFSHOP Hours/week informal care with shopping						0.05
KOS2 Kosberg carer stress score (squared)	-0.036	0.04	0.002	0.03		0.309
WCUPOOR* Poor care/user relationship						0.06
WPIC* User receives assistance from PIC						
WPICLIVI* User lives with PIC			-0.403	0.01		
<b>Mediating circumstances</b>						
DETERISK Risk of deterioration						0.076
FROMHOSP User discharged from hospital						0.01
WUSERISK* Level of risk to user	0.087	0.00	-0.251	0.03		
<b>Constant</b>	3.577	0.00	3.810	0.00	4.245	0.00
<b>Pseudo R<sup>2</sup>; Number observations</b>	37%	333	24%	101	11%	139
			12%	123	11%	117
			27%	416		

**Notes:** <sup>1</sup> GLM model; <sup>2</sup> OLS model; \* factor as perceived by the case manager; \*\* These disability indicators do not reflect variations due to cognitive impairment.



### **4.3.1 Home care**

Home care services constitute the backbone of community care packages. Their significance is reflected for instance in SSI inspection reports, which state that ‘the home care services [are] of vital importance to service users and their carers and perhaps the most important and significant support many received’ (Department of Health and Social Services Inspectorate 1997, p. 9). As a result, it is not surprising that only a minority of cases in the sample (less than 20 per cent) did not receive some level of the service.

- ***A service targeted on the most disabled.*** Tables 4.1 and 4.2 indicate a strong and significant correlation between physical disability indicators and the allocation of home care inputs. For instance, the odds of receiving home care for users who cannot perform light housework tasks (approximately 60 percent of the sample) and who cannot use the toilet by themselves (approximately 18 per cent of the sample) are estimated to be approximately 2 and 2.5 times respectively those of other users. Users with muscular or skeletal problems also have significantly higher chances of receiving home care.
- The effect of physical disability is also strong on the *levels* of home care provided. In particular, the number of problems with ADL and IADL activities (as perceived by the care manager), and whether users have problems with meal preparation and/or with using the toilet, are factors significantly associated with an increase in the number of hours of home care allocated. Moreover, an indicator of physical health problems - whether users suffer from ulcerated legs or pressure sores - is also positively associated with a higher number of hours of home care.
- Finally, users perceived by care managers to be at greater risk receive more intensive home care packages.
- ***An ambiguous relationship between home care and mental health problems.*** Users suffering from mental health problems (indicated by the care manager’s perception that the user is cognitively impaired or depressed) are found in Table 4.1 to be less likely to receive home care inputs. However, the number of hours of home care allocated increase significantly with the level of cognitive impairment (as measured by the Katzman cognitive impairment score – see Table 4.2).

- *A degree of substitution between informal inputs and home care.* Two of the effects indicate that home care services are targeted less intensively to users with informal support. Users who live alone are much more likely than others to receive home care, and the intensity of provision decreases with the intensity of informal care support with shopping.
- Nevertheless, the results also suggest that, in some cases, informal carers may act as co-clients of the services. In particular, users whose main carer is their spouse (and therefore themselves likely to suffer from some degree of dependency) are significantly more likely to receive home care services.
- Finally, male users appear significantly less likely to receive home care.

Overall, the models predicting receipt and intensity of home care accounted respectively for approximately 16 and 38 per cent of the variation in the dependent variable, as measured by the pseudo-R<sup>2</sup>.

#### 4.3.2 *Day care*

The nature of the indicators associated with the allocation of day care is, in important respects, different from that of indicators predicting home care use, Tables 4.1 and 4.2 suggest.

- *Users with mental health problems are more likely to receive day care services, other things equal.* Users perceived by care managers as cognitively impaired or as suffering from low morale have odds close to 5 and 4 times respectively greater of receiving day care services than other users. Also, the cognitive impairment score is found to have a positive correlation with the intensity of provision of day care inputs. These findings, which are in sharp contrast with the results described above for home care services, lend support to the thesis in Levin, Moriarty et al. (1994) which describes day care as the main community service for people with dementia.

- ***Problems with physical functioning are not found to increase the probability of receipt of day care.*** This is again in contrast with the patterns for home care services. Only one indicator of physical health problems - whether users suffer from ulcerated legs or pressure sores - is associated with greater chances of receiving day care (this finding is likely to reflect the fact that day care services can provide personal care and some nursing inputs).
- Probably a reflection of the fact that many day care centres provide luncheon services, Table 4.2 shows that day care users who cannot eat by themselves receive more sessions of the service.
- The results indicate a higher intensity of allocation among day care users suffering from cancer.
- ***A service for informal carers.*** Day care services are often targeted to carers so as to provide respite for them, for instance enabling them to do their shopping or to run small errands. This supporting role is manifested in the number and nature of informal carer related factors associated with the receipt and intensity of day care services in Tables 4.1 and 4.2. Thus, cases where the principal informal carer and the user cohabit, or where the care manager has identified a significant level of informal carer stress, are significantly more likely to receive day care services (odds ratios of approximately 2.1 and 1.9 respectively). Cases where the principal informal carer is under significant levels of stress are also found to receive greater levels of day care services, as shown in Table 4.2. The quadratic nature of the carer stress effect indicates that it is for carers experiencing the highest levels of stress that the increase in services is particularly significant.
- As described above in the home care case, the results suggest some degree of substitution between day care and informal inputs, when carer stress levels are accounted for. In particular, users receiving higher levels of informal support with medication are less likely to attend day care. However, the fact most users receiving informal care support suffer from cancer indicates that the effect may also be capturing unaccounted for variations in need rather than the substitution of informal for formal inputs.
- Users referred to social services following their discharge from hospital are found to be significantly less likely to receive day care services, as well as to receive a lower intensity of provision.

- Finally, users for whom heating problems was one of the care manager's concerns during the setting up of the care package are found to be significantly less likely to attend a day care centre.

Approximately one fifth and one quarter of the variation in the probability and intensity of receipt of day care services is explained by the models in Table 4.1 and 4.2, respectively.

#### 4.3.3 *Respite care*

Overall, about quarter of cases in the sample received some level of respite care services. Despite this being the service for which most carers express a need (Banks and Cheeseman 1999), it has recently been found that only a minority of English carers receive it (Longshaw and Perks 2000).

- ***Significant impact of physical dependency.*** Table 4.1 indicates a marginal relative increase in the odds of receiving respite care of 0.19 for every additional problem with ADL and IADL tasks as perceived by the care manager. In addition, levels of physical disability (the count of problems with ADL tasks) appear to increase the intensity of respite care.
- ***The relationship between cognitive impairment and the allocation of respite care is ambiguous.*** As was found in the day care equation, the probability of receipt of respite care services is significantly positively associated with cognitive impairment and depression (both indicators are defined in terms of the care manager's perception of the problems). However, recipients of respite care services who suffer from cognitive impairment tend to use the service less intensively.
- Just as for day care, the effects in Tables 4.1 and 4.2 reveal an ***important role of respite care in providing support for informal carers.*** Hence, the count of personal and relational problems and whether the principal informal carer is perceived by the care manager to be under significant levels of stress appear positively related with the chances

of receiving respite care services. However, surprisingly, users of respite care services who co-reside with their principal informal carer are found to receive lower levels of the service, other things equal. The likely explanation for this finding could lie in the following quote:

‘Respite presents more sharply than any other service the potential conflict of interest between the carer and cared-for person. The idea of going into an institution, however temporarily, is disliked by many disabled people, and carers, understandably, do not want to force the issue. As a result respite is relatively rarely taken up where the cared for person is mentally alert, or where he or she is cared for by a spouse.’ (Twiggy 1992b: 85-6)

- Also as found for day care services, users referred to social services following a hospital stay appear to be significantly less likely to use respite care services than other users in identical circumstances.

Overall, the two respite care models achieve modest fits of the observed data, capturing approximately 20 and 11 per cent of the variation in the probability and intensity of receipt, respectively.

#### **4.3.4 Meals-on-wheels**

Very few indicators appear significantly correlated with the probability or the intensity of receipt of meals-on-wheels.

- ***Problems with functioning***, and in particular the number of problems with IADL tasks, appear to increase significantly both the probability and the intensity of receipt of meals-on-wheels.
- ***Meals on wheels appear to compensate for the lack of informal support with meal preparation***. Hence, whereas users living alone show close to 4 times the odds of receiving meals-on-wheels, users who benefit from informal care support are found to receive a significantly lower number of meals.

- Finally, users whose welfare is perceived by care managers as likely to deteriorate in the future are more likely to receive meals on wheels, and users referred to social services following their discharge from hospital are found to receive significantly higher levels of the service than other users, *ceteris paribus*.

Overall, the power of prediction of the two meals on wheels equations in Tables 4.1 and 4.2 are low, with only 11 and 12 percent of the variation in the probability and intensity of receipt captured within the models' specifications, respectively.

#### 4.3.5 *Social work inputs*

As in the case of the meals-on-wheels equation, very few indicators of need appear significantly correlated with the provision of social work inputs (these are inputs in addition to those provided as part of care management tasks). However, the two indicators included in the model account for 24 per cent of the variation in the dependent variable, that is the highest proportion of overall variance in the probability of receipt explained for any of the services explored in the analysis.

- ***Whether the informal carer is employed*** appears associated with much greater chances of receiving social work inputs. This finding may relate to the role played by social workers in providing counselling to square the needs and demands of users and carers. Indeed, Twigg and Atkin (1994) have noted how social workers are more aware 'of potential conflicts of interest between the carer and the cared-for-person than other practitioners' (p.50).
- ***Whether users are referred to social services following an inpatient care episode*** appears to play a key role in determining whether they receive social work inputs. The model estimates that the odds of receiving social work inputs for users discharged from hospital are seventeen times greater than for other users. The indicator of hospital discharge was selected among the set of potential covariates in order to take into account the different needs of users referred for social services following an inpatient episode, and in particular the fact that, for them, needs can fluctuate significantly more in the short-term. For instance, need levels following a stroke or a hip operation tend to improve or deteriorate quickly after the intervention (Rudd, Irwin and Penhale 2000). Such results,

taken with others described for other services, seems to indicate that services respond to hospital discharges by modifying input mixes. Other things equal, care packages for users discharged from hospital contain relatively less day care and respite care (arguably more long-term types of care), and more meals-on-wheels and social work inputs, perhaps with the aim of monitoring users' progress, advocating for or prescribing services and arranging packages, as well as providing support with IADL tasks.

- It could also be, however, that the effect of the hospital discharge indicator relates to differences in working practices between care managers dealing with hospital cases and care managers primarily dealing with people in the community.

#### **4.3.6 Community nursing inputs**

- ***A service focussed on physical and mental health problems.*** Tables 4.1 and 4.2 show a positive effect of the number of problems with ADL tasks (user self-rated) - and of whether the user suffers from ulcerated legs or pressure sores - on the probability and intensity of allocation of nursing care services. Users suffering from incontinence are also found to be more likely to receive nursing inputs.
- In addition, two indicators of mental health problems - whether the user is perceived by their care manager to be suffering from depression and the level of cognitive impairment as measured by the Katzman cognitive impairment score - are also positively associated with the provision of nursing care.

As in the case of respite care and meals-on-wheels, the nursing inputs models in Tables 4.1 and 4.2 achieve a relatively poor fit of the data, with pseudo-R<sup>2</sup> values approximately of 16 and 11 percent respectively.

#### **4.3.7 Total package costs**

An indicator of overall intensity of provision was constructed by aggregating at the case level the cost of the six services analysed so far plus the cost of sitting services, occupational therapist, day hospital, GP, chiropodist, physiotherapist, speech therapist and outpatients services. As mentioned above, the main services analysed individually made up over 80 percent of the total care package cost in the community. Overall, *at least one indicator for*

*each of the dimensions of need defined in the analysis is found to significantly affect the total cost of care packages.*

- *In terms of physical disability, it is particularly ADL related indicators which are found to have the strongest impact* on the intensity of care packages. Hence, the count of problems with ADL activities, and indicators of whether users cannot perform housework tasks or are bed bound are all positively associated with more expensive care packages.
- *Indicators of both mental and physical health problems are also positively correlated with the cost of care packages.* In particular, whether users suffer from cancer or from ulcerated legs or pressure sores and whether the care manager perceives the user to suffer from cognitive impairment are factors found to increase the intensity of the support allocated.
- Reflecting some of the patterns explored above for individual services, *the relationship between informal care factors and total package costs indicates the presence of both substitution and support effects.* Hence, whereas the level of informal support with housework tasks is found to be negatively associated with total package costs, cases where the care manager perceives a poor relationship between the user and the informal carer are allocated, other things equal, higher levels of resources.
- Finally, care package costs are also found to increase with the care manager's perception of the risk of deterioration in the user's welfare.

Even though it does not achieve as high a value as the home care intensity model, a pseudo  $R^2$  of 27 percent suggests that the model is capable of predicting a significant proportion of variation in total package costs.

#### **4.4 Policy implications**

In Section 4.1, we stated the objectives of the chapter to be:

- testing the degree to which the allocation of community care services was significantly needs-led, and
- collecting evidence about the relationship between needs and services which would inform the analysis of targeting and service productivities in later sections of the thesis.



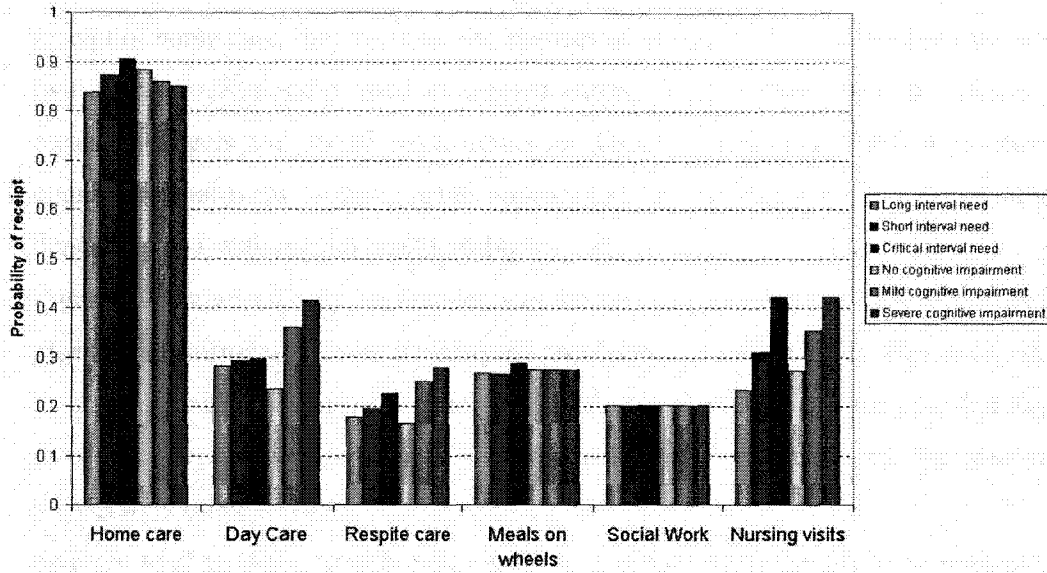
We now review the evidence relating to the two objectives, focusing in particular on four topics of significant policy relevance: the overall impact of need-related factors on the allocation of services; the implications of the results for the relationship between informal and formal services; the balance between the provision of personal care support and support with housework and other domestic tasks; and the lessons for judging the system's degree of horizontal and vertical targeting efficiency.

#### **4.4.1 *Need factors and the allocation of services***

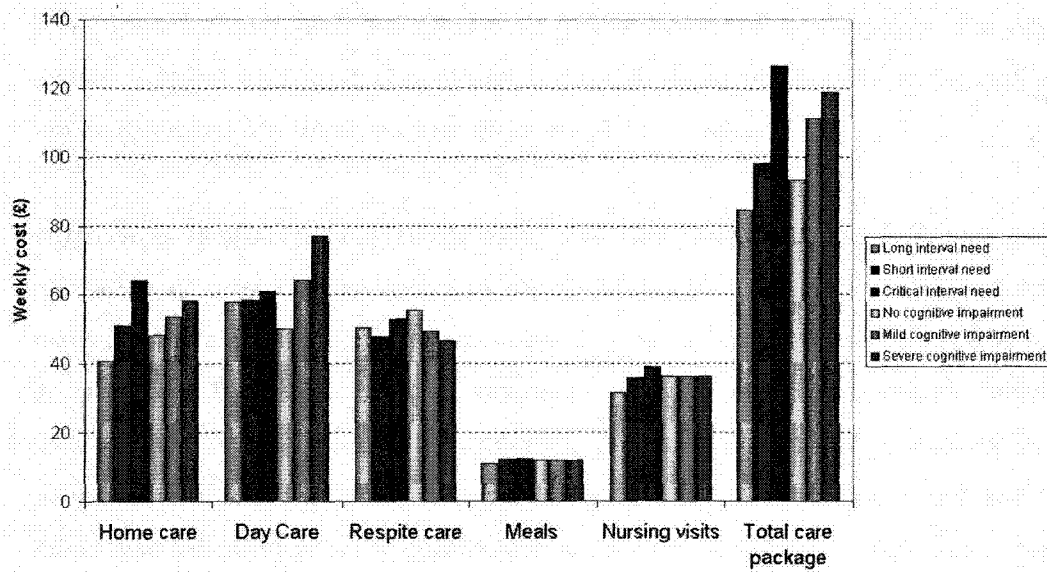
- Overall, all of the dimensions of need tested for in the analysis appear to influence significantly the allocation of the services explored, particularly of home care, the largest component of care packages. They also influence significantly the total weekly cost of services. As such, the results support other analyses in suggesting a general move in the allocation of services towards more needs-led and more flexible services than in the pre-reform system (Henwood 1995; Warburton and McCracken 1999).
- As would be expected *a priori*, ***functional ability and mental health (and in particular cognitive impairment) are two of the dimensions which appear to influence most strongly*** whether services are allocated and with what intensity. The extent to which this is the case varies, however, across services.

For each of the services explored, Figures 4.1 and 4.2 illustrate the impact of physical disability and cognitive impairment on the probability and intensity of receipt of the services. They do so by portraying the predicted values based on the equations in Tables 4.1 and 4.2 for six user case types whose characteristics are fixed to the average characteristics observed in the sample, except for either their level of dependency (set to either long, short or critical interval need level) or their level of cognitive impairment (set to either 'no cognitive impairment', 'mild cognitive impairment' or 'severe cognitive impairment' based on the Katzman cognitive impairment score).

**Figure 4.1 Impact on probability of receipt of interval need and level of cognitive impairment**



**Figure 4.2 Impact on intensity of receipt (among service recipients) of interval need and level of cognitive impairment**



- Figure 4.1 illustrates that whereas mental health problems decrease the probability of receipt of home care, they increase the chances of receipt of day care and respite care, the two services traditionally used to support carers. Also, it shows that the allocation of meals-on-wheels and social work inputs are largely insensitive to either functional or cognitive impairment. Nursing inputs appear to be targeted consistently on users of higher dependency or with mental health problems.
- Figure 4.2, estimated only for recipients of the services, shows positive gradients between physical impairment and the intensity of provision of most services. However, whereas levels of cognitive impairment increase significantly the level of home care and day care provided, they show no gradient or even a negative gradient with the intensity of provision of other services.
- Overall, total package weekly costs are found to vary substantially with both levels of dependency and cognitive problems.
- For two services, the results indicate *differences in the way cognitive impairment impacts the likelihood of service receipt and the intensity with which inputs are provided*. Hence, cognitive impairment is found to decrease the chances of receiving home care, but to increase the intensity of provision among its recipients. The opposite pattern is found for respite care, which is more likely to be provided to the cognitively impaired and yet less intensively so, other things being equal.
- *Differences in perception between users and care managers and influence over the allocation of services*. The design of the data collection was such that information on many need-related characteristics was collected from several sources, including indicators as perceived by users, by care managers, and as measured through "objective" measurement scales. During the modelling process, indicators as perceived by care managers were found generally to be more likely to show a greater and better determined effect than indicators either as perceived by users or as measured through scales. Whereas this is partly because questions were phrased differently - users were questioned about the existence of the problems and care managers were questioned about the existence of

problems relevant to the design of the care package - this finding may also reflect the stronger position held by care managers during the setting up of the care package.

- In addition, the dominance of indicators as perceived by care managers is important because of the traditional *problems experienced by health and social care professionals in identifying and diagnosing health problems, and in particular mental health problems* (Department of Health 2001). In the sample, for instance, in 37 per cent of the cases where the user was classified as severely confused using the Katzman cognitive impairment scale, cognitive impairment was not perceived by care managers as a significant factor to be taken into account during the setting up of the care package.

#### **4.4.2 Formal services and informal care**

Chapter 1 noted the prominence of supporting informal carers as a goal of the reforms and of subsequent significant policy documents, such as the Report of the Royal Commission on Long Term care and the National Carers Strategy (Department of Health 1999; Royal Commission on Long Term Care 1999). This new recognition has been such that, in the words of Twigg (1998) “carers have become recognised as one of the building blocks of community care” (p. 133). But what do the results above tell us about the way in which services interact with informal care networks?

Overall, the evidence suggests that community care services have moved on from a pre-reform system where, as Pickard (2001) notes, local authorities ‘tended to treat carers as a resource and to assume that the social care system need only intervene when informal support was not available’ (p.442). In the ECCEP sample, for instance, in 10 per cent of the cases where informal carers are present, care managers state the carer to be the primary beneficiary of the package of care provided and in 48 per cent of the cases, they are seen as joint beneficiaries. Furthermore, in 21 per cent of the cases, care managers affirm the aim of care packages to be to replace, at least partially, some of the inputs provided by informal carers.

The equations in Tables 4.1 and 4.2 corroborate such aims. In particular, the findings appear to reflect a desire by formal agencies to support most intensively those carers enduring the greatest levels of carer burden, those providing the greatest levels of support and those most

likely to be suffering from some level of dependency themselves. Hence, factors such as the co-residence of users and carers, whether the informal carer is the user's spouse and levels of carer stress are found to increase, other things equal, the likelihood and intensity of receipt of many services.

By service type, day care and respite care are clearly the two services whose allocation responds most strongly to informal care related factors, and in particular to levels of carer stress. This is hardly surprising, as both services have been hailed as the principal means of relieving carer burden (Department of Health 1999; Levin, Moriarty and Gorbach 1994; Pickard 2004).

Using the terminology employed by Twigg (1992a) in her classification of carers, it thus seems carers are no longer perceived purely as 'resources' or 'co-workers'. Instead, the results of the modelling suggest that there are circumstances in which carers are treated almost as 'co-clients' of the services.

Still, despite the evidence suggesting that resources are being targeted for supporting carers, Tables 4.1 and 4.2 also reveal that lower levels of services are provided, other things equal, to cases benefiting from substantial amounts of informal support. In other words, the evidence does not support the hypothesis of carer-blind services, put forward by the Report of the Royal Commission on Long Term care, in which carers are superseded by formal services (Pickard 2001; Royal Commission on Long Term Care 1999). Weekly package costs and the number of home care hours are estimated to fall significantly with the amount of informal support with housework tasks and shopping, respectively. Also, fewer meals-on-wheels are found to be provided to users who receive support from informal carers.

Overall, a question remains about the fate of carers of older people outside the system, given that, as some observers have pointed out, community social services are directed primarily at unsupported older people living alone, rather than at those with informal carers (Wright 1999).

#### **4.4.3 Assistance with instrumental activities of daily living versus personal care: home care and nursing visits**

In the past, the home care service has concentrated on providing housework services to elderly people in their own homes. However, over the last fifteen years the policy drive has been to increasingly focus support on the provision of help with personal care. Hence, by the time of the reforms, home help services had been redesignated 'home care' services in many authorities (Sinclair and Williams 1990). The equations in Tables 4.1 and 4.2 provide evidence for judging whether the change in the designation of the service has been accompanied by changes in working practice.

Clearly, the results suggest that the relationship between home care and need related circumstances is strong (see Figures 4.1 and 4.2). Overall, the nature of such a relationship conforms with *a priori* expectations, with greater levels of home care allocated to the more dependent and those suffering from cognitive impairment. In addition, an analysis of the nature of the indicators of dependency, correlated with the receipt and intensity of home care services, suggests that:

- **Home care workers do provide support with personal care tasks.** In particular, the analysis identifies a positive correlation between health problems, such as ulcerated legs or pressure sores, and indicators of problems with the performance of ADL tasks and the levels of home care services provided.
- However, **there are also signs that home care services may still be assisting service users with non-personal care related tasks.** Hence, limitations in the performance of IADL tasks such as meal preparation or housework - and the lack of informal support with shopping - are also found to increase the probability and level of home care services allocated.
- The reticence of home care services to concentrate exclusively on personal care tasks may be related to the fact that assistance with housework activities is often the most valued type of support by users and carers. For instance, evidence from focus groups used by the Royal Commission on Long Term Care has pointed out that users and carers of home care services were consistently astounded by the refusal of home care staff to give practical housework assistance. (Wright 1999: 263)

The move towards a more personal-care-focused home care service was to a large extent designed to fill in the gap left by the 'retrenchment' of community nursing services away from providing personal care support, and particularly assistance with bathing (Lewis 2001; Twigg 1997). It is therefore interesting to explore the nature of the need related factors associated with nursing inputs, and the extent to which, following the reforms, their allocation responds primarily to medical conditions.

- As could be expected, *variations in nursing care inputs are associated with physical and mental health problems*, and in particular with the presence of ulcerated legs or pressure sores.
- However, the fact that higher levels of nursing inputs seem to be allocated to users experiencing problems with ADL activities could suggest that at the time of the data collection, *community nurses were still providing some assistance with personal care tasks*.

#### ***4.4.4 Implications for horizontal and vertical targeting efficiency***

So what can be inferred about the system's performance in terms of vertical and horizontal targeting efficiency?

The evidence in previous sections has pointed to the existence of a well defined correlation between key indicators of need-related-circumstances and formal inputs, and hence to improvements in vertical targeting efficiency relative to the pre-reform system (Davies et al. 1990). The allocation of services has been found to respond significantly to levels of physical and mental health, and to the presence and nature of informal care networks. Nevertheless, only about a quarter of the variance in total weekly package costs is explained by the model in Table 4.2. This suggests that a significant proportion of the variation in the targeting of services cannot be explained in terms of indicators of need, and thus there may still be a long way to go for services to be truly '*needs led*'.

Still, in order to judge the system's degree of targeting efficiency from the regressions results, one ought to consider several additional factors. Some relate to the technicalities of fitting models in the social care context and others to the influence of local characteristics on the allocation of resources to individuals.

- ***The complicated nature of the relationship between needs and services.*** Replicating the complex nature of the relationships between all factors involved in the care system so as to understand fully the causal processes by which resources are allocated is a lost cause by definition. The multidimensionality of need, the interdependence between the different dimensions, the presence of a multitude of key stakeholders etc, are such that regression models can aim to present only a simplified picture of reality, and so to replicate within their specification only a limited proportion of the variation observed (Davies and Knapp 1981; Fernández and Knapp 2004). Thus, in the fields of health and social care, it is rare to observe micro level regression models exploring the relationship between services and needs which account for a majority of the variation in the data.
- ***Measurement limitations.*** The quantitative implementation of any theoretical model of community care is constrained by limitations in the definition and measurement of indicators, which are unlikely fully to capture all the relevant nuances in the need related circumstances of individuals. Consequently, the effects established within the models cannot always be taken at face value, and require careful interpretation. For instance, whereas it is likely that the finding that users with problems with meals preparation receive higher levels of home care indicates that home care services are supporting some users with meals preparation, it could also be that the indicator is acting as a general proxy for levels of dependency (Knapp 1984).
- ***Numbers of cases in the analysis.*** From the point of view of multivariate regression analysis, the ECCEP sample contains a relatively small number of observations, a factor which limits the goodness of fit and statistical significance of models (Greene 2000). Furthermore, there are large differences in the number of cases receiving the different services explored. As a result, it is difficult to compare the power of prediction of the different models, as they are based on unequal numbers of observations.

In addition to the previous *technical* points, there are at least two policy-related factors which could help to explain the relatively low coefficient of determination of the models estimated, and hence their implications for judging the system's degree of targeting efficiency. One relates to the influence of supply side factors on the allocation of services. The second relates to local variations in the prioritisation of resources.

- While commentators seem to agree that in the post-reform system 'care packages for older people living at home are more efficiently meeting needs' (Warburton and



McCracken 1999: p. 25), there is also a great deal of evidence of shortages, limited availability and rationing (Henwood 1995). Variations in local markets, housing prices, and local resources are therefore likely to play a significant role in determining who gets what services.

- Partly a reflection of differences in local supply factors, but partly also a reflection of genuine differences in value systems, local authorities may seek to prioritise competing objectives differently. As a result, for instance, some authorities may set eligibility criteria or cost ceilings so as to provide highly intensive care package to the neediest clients, or, conversely, to distribute their resources amongst as many clients as possible. Equally, authorities may differ in their preference over the utilisation of particular services.

Due to a lack of degrees of freedom (there are only 10 local authorities in the sample) and of appropriate indicators, the analysis could not test effectively for the effect of local authority specific characteristics. Therefore, the influence of such factors was not accounted for within the models and remained 'hidden' in the models' error terms. Nevertheless, by including Local Authority dummy indicators in the total package cost equation in Table 4.2, the analysis attempts to capture a general measure of the degree of variation in local service provision. Figure 4.3 depicts predicted weekly care package costs in the 10 Local Authorities in the analysis, for the average client type in the sample.

**Figure 4.3 Variations in weekly package costs across local authorities for the average case type in the sample**

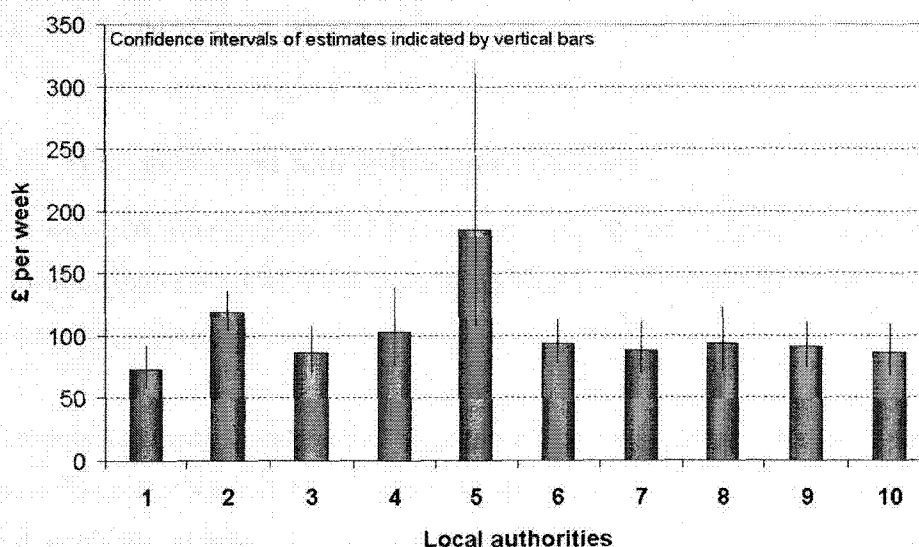


Figure 4.3 indicates a moderate degree of variability in the intensity of care packages, with 7 out of the 10 Local Authorities providing care packages of similar intensity (costing approximately £90 per week at 1995 prices). Slightly surprisingly, the authority providing (other things equal) the most intensive care package corresponds to a socially deprived Inner London borough, characterised by per capita older people social care expenditure levels in 1997 (the earliest year for which data could be obtained) below 60 per cent of the English average. Compared to the English average, this Authority provides approximately 50 per cent of the number of contact hours of home care per 10,000 households, concentrated on approximately 40 per cent of the rate of households receiving home care per 10,000 households (1997 HH Tables, Community Care Statistics, Department of Health). In other words, despite significantly lower rates of expenditure and home care provision than the average English authority, this authority manages to provide on average 25 per cent more intensive home care packages by concentrating its limited resources on a small proportion of households.

Differences in local authority targeting policies will translate into differences in local relationships between services and needs, hence reducing the explanatory power of the models in Tables 4.1 and 4.2. It could be argued, however, that such heterogeneity in targeting, in as far as it reflects 'defensible' variability in local priorities or the impact of local supply factors outside the control of Local Authorities, should not be considered as evidence of poor targeting efficiency. Other than acknowledging improvements relative to the pre-reform era, it is therefore difficult to judge conclusively the system's degree of horizontal and vertical targeting efficiency.

#### **4.5 Who gets what and subsequent chapters**

The *who gets what* analysis has focused on 'intermediate outputs', with the aim of mapping allocation patterns for the main community care services and establishing the system's degree of targeting efficiency.

Whereas achieving high levels of targeting efficiency, defined in terms of providing 'more to those in greater need and the same to those of equal need', is generally equated with a fair and equitable system, it does not necessarily result in a system which maximises the

aggregate welfare of service users. Amongst other things, this is because of the interdependence between the effect of services on the welfare of users and carers and the need-related characteristics of cases, the diversity in social care services, and differences in the prioritisation of welfare goals between cases (Fernández and Knapp 2004).

The need to go beyond intermediate outcomes, and to analyse the system's performance mainly in terms of its effects on the welfare of its users has been noted by researchers and service users alike (Davies et al. 1990; Davies and Knapp 1981; Knapp 1984). For instance, Nocon et al. (1997) point out that users and carers believe focusing on final outcomes provides the means for 'checking whether agencies meet users' needs' and 'to inform the continuing development of services' (p. 5). The following chapters explore the relationship between services and 12 indicators of final outcomes. Chapters 7 and 8, therefore, shall revisit the results in Chapter 4 in order to contrast observed patterns of targeting with those compatible with the maximisations of the different welfare goals explored. First, however, Chapters 5 and 6 will present the results from the production function analysis, which investigates the degree to which variations in service levels provided do translate into variations in key indicators of users and carers' welfare.

## 5 COMMUNITY CARE SERVICE PRODUCTIVITIES

### 5.1 Introduction

Chapter 5 tackles the core production of welfare analysis in the thesis, focused on final outputs. Overall, it aims to derive a broad quantitative understanding of service productivities for the outcome indicators defined in Section 3.2.3. In other words, the objective of the present chapter is to map the way in which services contribute to improvements in welfare outcomes for users and their caregivers, applying the general specification of production functions derived in Section 2.2.2.

In order to maximise clarity, given the large quantity of results, the analysis will

- employ diagrams to illustrate the nature of the productivity effects estimated
- use case types to summarise broad patterns of results
- follow a common structure for the treatment of the results for each outcome indicator, discussing sequentially the impact of NRC indicators, service productivities, and an overview of the general patterns.

#### 5.1.1 *Service productivity diagrams*

The chapter will illustrate the productivity effects identified in the modelling by plotting 'productivity curves'. These curves indicate the increase in output levels associated with different intensities of service provision, conditional on the characteristics of cases. As mentioned in Section 3.2, levels of services are expressed in cost terms (£ per week) in order to facilitate comparisons of the intensity of provision across services. Also, the input levels for which the curves are plotted correspond to the range populated by significant numbers of cases for the model in question.

Productivity curves will be particularly effective for illustrating three phenomena:

- *Levels of service contributions.* That is, the improvement in outcome levels related to variations in the level of inputs. Service contributions can be inferred directly from the level of services and outcomes shown by the productivity curve.
- *Marginal productivities;* that is the marginal increase in output expected from a marginal increase in a service at a given level of provision. In the diagrams, the marginal productivity of inputs is indicated by the slope of the curve. Hence, increasing, constant and decreasing slopes relate respectively to increasing, constant and decreasing marginal productivities of inputs (see Section 2.2.2.).
- *Levels of cover of the productivity effect.* It has been hypothesised in previous chapters that services are likely to have different effects in different circumstances, with service productivities likely to vary by user groups. The productivity curves will show whether service effects refer to particular subgroups of cases, and if so the proportion of service recipients to which they refer.

### **5.1.2 Analysis by case types**

The reporting of results by broad case type is useful on two counts. First, it displays the pattern of results from a perspective more easily related to policy discourse than the direct inspection of tables. Thereby it allows the analysis to explore questions such as the optimal balancing of resources between more and less dependent users and the comparison of patterns for users with and without informal support. Secondly, at least as important, it provides an aggregated (and arguably more robust, although less detailed), view of the relationship between risk factors and productivity effects. This is important because the equations and productivity curves show productivity effects which can be found in combination, but which are in many cases correlated.

In terms of typologies, the analysis will offer two sets of templates based on three of the factors shown in Chapter 4 to explain most significantly service utilisation patterns. The first template will differentiate cases by their general dependency (as indicated by interval need) and the presence of informal support. The second template will group cases by their levels of cognitive impairment (as defined by the Katzman scale). Although cognitive impairment is broadly positively correlated with levels of physical disability, it is not explicitly a part of the definition of interval need groups.

For each outcome indicator, a figure will therefore summarise the productivity results, indicating predicted contributions to outcomes from NRCs and services, for the following 10 case types:

- Interval need (Long, Short, Critical) by presence of informal caregiver (yes, no)
- Cognitive impairment: Low, Mild, Severe.
- Overall

### ***5.1.3 Common structure of subsections***

The discussion of the productivity results will follow a three-part structure, focusing sequentially on i) the impact of NRCs, ii) service productivities, and iii) a discussion of broad patterns of results by case types.

#### ***NRC-related contributions***

The text will first provide a brief commentary on the nature of the impact of NRCs on outcome levels. Given the 'reduced-form' nature of the effects identified in the models, the discussion will not aim to locate each effect precisely within the gerontological and other relevant literature. Instead, the account will offer likely rationales for the patterns found. Indeed, many of the effects identified are likely to act as markers for complex relationships between combinations of factors and so may be open to multiple interpretations. For instance, the interpretation of hypothetical effects related to whether users live alone could be linked to differences in informal support networks or to the user's determination/capacity to preserve his/her independence and thus to live alone.

#### ***Service productivities***

The analysis of individual service productivities will focus on the following features of the patterns found.

- The interdependence between case characteristics and service effects. That is, the prevalence of user-subgroup productivity effects
- The interdependence between service productivities (the presence of service complementarity effects);
- The nature of the scale effects: whether increasing, decreasing or constant returns to factor are observed;

- The cover of the productivity effect. The tables summarising results will present two measures for each productivity effect: i) the proportion of service recipients influenced by the productivity effect and ii) the proportion of the entire group of cases (on which the equation is based) influenced by the effect.

### *Overall patterns by case types*

Finally, the analysis will examine broad patterns of productivities based on the case typologies discussed above. Of particular importance will be the relative contribution of services to total outcome levels, the comparison of proportional contributions between services, and the patterns of average productivities by case type.

Two diagrams will be used to illustrate the case typology analysis. One will distinguish predicted levels of outcomes per case type between NRC-related effects and individual service-related effects. The second will show the average productivity of service packages (the total service-related outcome contributions divided by the cost of the care package) by client types.

The following subsections introduce, successively, the productivity results for each of the 12 outcome indicators investigated<sup>22</sup>.

## **5.2 Users' length of stay in the community (DAYS)**

The model explores DAYS, an indicator for the number of days users live at home, from the time they are referred to social services to the time they are admitted to an institution for long-term care. As mentioned in Chapter 3, this indicator was constructed using tracking data over two years, by which time approximately 57 per cent of the sample remained in the community. Therefore, in order to deal with the censoring in the indicator of length of stay in

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<sup>22</sup> Detailed results of the production function estimations, and of alternative model specifications, are presented in Appendix 5.1.

the community, the analysis estimated the production function using a Tobit model (Tobin 1958)<sup>23</sup>.

### ***5.2.1 The model and the impact of risk factors***

The equation results are summarised in Table 5.1.

*Goodness of fit.* Tobit analysis does not yield a coefficient of variation. The value in the table is based on OLS estimates, and represents only a crude indicator. Nevertheless, the model appears to explain a significant proportion of the variance in the dependent variable.

#### *Physical dependency and health problems*

As in many other studies, the results set out in Table 5.1 confirm the impact of physical disability on the risk of institutionalisation (Bowling, Farquhar and Grundy 1993; Grundy and Glaser 2000; Hancock et al. 2002; Wittenberg et al. 1998; Wolinsky et al. 1992). In particular, other things being equal, users with high levels of need (*bed bound, unable to undertake light household tasks* and in the *critical interval need* and targeted to receive respite care) are associated with significantly shorter lengths of stay in the community. In contrast, users in the *long interval need* category<sup>24</sup> are found to experience over three extra months in the community.

Two indicators of physical health conditions (*cancer* and *incontinence*) and two indicators related to the user's mental health status (the *Katzman cognitive impairment* score and the care manager's perception that the user is *cognitively impaired* amongst those receiving respite care) also appear to be positively associated with quicker institutionalisation. Again, similar effects have been widely quoted in the literature (Greene, Lovely and Ondrich 1993;

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<sup>23</sup> The Tobit model was favoured over other alternatives because of its linear additivity properties. However, it is worth mentioning that Tobit models have been criticised in the past for implying normality of the unobservable non-censored error term in the model (Duan et Al, 1984). As a test of the consistency of the patterns identified, the model was also estimated using a Cox survival model, widely used to model time to event processes. As is shown in Appendix 5.1, the nature of the results yielded by the Tobit and Cox regression models appears almost-identical.

<sup>24</sup> Users requiring assistance with several activities but usually less than once in twenty-four hours, and predictably.



Greene, Ondrich and Laditka 1998; Hancock et al. 2002; Montgomery and Kosloski 1994; Pruchno, Michaels and Potashnik 1990; Scott et al. 2001).

**Table 5.1 Production function for days living at home prior to entering institutions (DAYS)**

PREDICTORS BY DOMAIN		Coef.	Prob.	% Recipients <sup>2</sup>	% Users <sup>3</sup>
<b>RISK FACTORS AND OTHER NEED-RELATED CIRCUMSTANCES</b>					
<i>General effects</i>					
<i>Physical disability</i>					
User is bed-bound - Cantbed		-202.66	.004		
User cannot do light housework - Cantlhwk		-142.58	.013		
User belongs to long interval need level - Intlong		98.09	.081		
<i>Mental health</i>					
Katzman's cognitive impairment score - Katscore		-8.66	.007		
<i>Other health problems</i>					
User has cancer - Wcancer		-268.40	.016		
User has continence problems - Wincont		-157.36	.009		
<i>Informal care related factors</i>					
Poor PIC/User relationship - Wcupoor		-258.01	.006		
User feels embarrassed by PIC caring - Cupbemb		-547.39	.003		
<i>Other</i>					
User against residential care - Upercent		73.38	.002		
User's age - Age		-10.86	.002		
User is vexed by charging - Vexed		207.08	.044		
User lives alone - Walone		-127.13	.037		
Count of number of user's risk as perceived by CM - Wuserisk		-20.67	.045		
<i>Targeting-captured need effects</i>					
User cognitively impaired targeted for day-care - Dc_cog		-241.28	.009		
User without PIC targeted for day-care - Dc-npic		-286.87	.005		
User living alone targeted for respite care - Re_alon		-123.21	.094		
User in critical interval need targeted for respite care - Re_crit		-209.33	.028		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>					
<i>Home care</i>					
User cannot do heavy housework tasks - Lhc_hhwk (log)		33.73	.017	93.0	77.8
<i>Day care</i>					
User has mild/severe cog impairment - Ldc_katm (log)		65.29	.010	43.1	17.3
User not cognitively impaired - Ldc_oth (log)		32.61	.066	56.9	22.5
<i>Respite care</i>					
Users with personal relational problems - Rec_hrel		-6.25	.002	26.1	8.4
Users over-reliant - Rec_reli		-5.19	.001	15.9	5.1
Users with high no of probs with IADLs - Lre_hiad (log)		67.72	.012	29.5	9.3
Users with behavioural problems - Rec_beha		8.53	.001	23.9	7.6
Users that cannot wash - Lre-wash (log)		55.84	.018	58.0	18.8
<b>CONSTANT</b>		1558.6	.000		
Adj. R <sup>2</sup>	.40 <sup>4</sup>	Prob.	.00000	No of cases	274

Notes: Tobit model; <sup>2</sup> Proportion of recipients of the service to whom the effect applies; <sup>3</sup> Proportion of the sample to whom the effect applies; <sup>4</sup> From OLS version.

Likely to reflect general frailty, a *user's age* often enters equations predicting admission to institutions (Boult et al. 1994; Bowling 1991; Dening et al. 1998; Grundy and Glaser 2000; Hancock et al. 2002; Lawrence and Jette 1996). In the model, other things being equal, differences of ten years of age between users are associated with approximately 100 days of difference in the timing of residential care admission.

### *Informal support*

The nature of the significant effects of *informal support* factors illustrates the importance of incorporating subtle measures of *relationships* and attitudes into the analysis. Here, cases where the user feels *embarrassment* about receiving care or where the care manager perceives the *user/carer relationship as poor* are associated with a significant decrease in the number of days in the community. The same indicators of user/carer relationships were also shown to be important in influencing whether people immediately entered residential institutions, rather than received services at home after first assessment (Davies, Warburton and Fernández 1996).

Although a more ambiguous indicator of informal support networks, the finding that users living alone are more likely to enter residential care has generally been linked to the 'buffering effect' of co-resident support (Grundy 1992; Scott et al. 2001; Wolinsky et al. 1993). In the study, users living alone are estimated to remain in the community, *ceteris paribus*, 127 days less than other users (250 days less for those targeted to receive respite care).

### *Other effects*

The *strength of the user's opposition to the idea of ever entering a home* appears to have a powerful and significant effect on the timing of admission. Hence, the equation predicts a difference in the timing of institutionalisation between those least and most strongly against admission to residential care of approximately one year.

This finding is significant from a policy perspective. Indeed, an earlier analysis of the probability of recipients of community social services entering residential care in the mid 1980s, using the DCP sample, showed that once other influences were controlled, the degree

of unwillingness to enter residential care did not have a significant effect on the actual probability, whether during the first six months after referral, or over the subsequent two years (Davies and Baines 1994).

### 5.2.2 *Service productivities*

The results show clear productivities for all or most of the recipients of three services. These are described in Figure 5.1 and Figure 5.2.

- Table 5.1 indicates a clear marginal productivity of *home care* for the vast majority of recipients of the service<sup>25</sup>, those with trouble undertaking heavy housework tasks. Figure 5.1 illustrates how the marginal productivity of home care falls with the intensity of provision. That is, the figure indicates decreasing returns to home care.

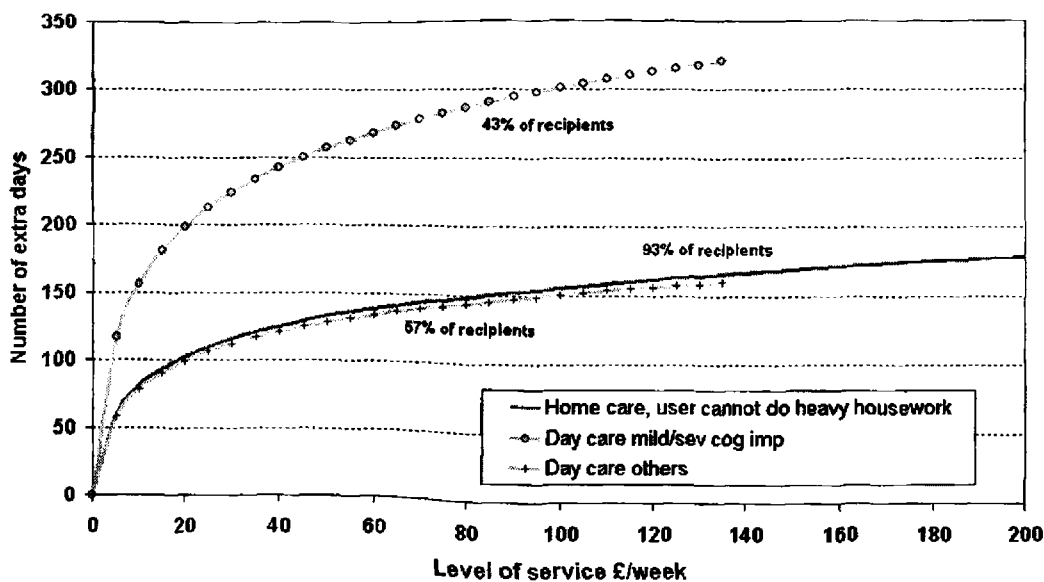
*Day care* extends the length of stay for all recipients; but most strongly and clearly for those who are cognitively impaired. Again, Figure 5.1 reveals strong diminishing marginal returns to day care.

- The estimated effect for respite care inputs confirms the ambiguous nature of previous evidence concerning its impact on institutionalisation. Indeed, whereas there is evidence of its preventive effect (Donaldson and Gregson 1988), several studies have indicated that higher levels of respite care can lead to the acceleration of the process of admission (Levin, Sinclair and Gorbach 1989; Scharlach and Frenzel 1986; Zarit and Leitsch 2001). Generally, this latter effect has been linked to the use of overnight respite care as a transitional step towards permanent institutionalisation, and to its ability for 'making more acceptable for some caregivers ... to turn the care of their relative to someone else' (Pickard 2004, p.35). In the results in Table 5.1, respite care inputs are associated with longer stays for users with *high levels of physical dependency* or with *behavioural problems*. In contrast, levels of respite care for recipients *heavily reliant* on others or with *personal relationship problems* (both factors associated with breakdown of caregiving) are found to decrease the time spent in the community to a substantial extent. The productivity curves in Figure 5.2 show how two out of the three positive effects indicate decreasing returns to respite care.

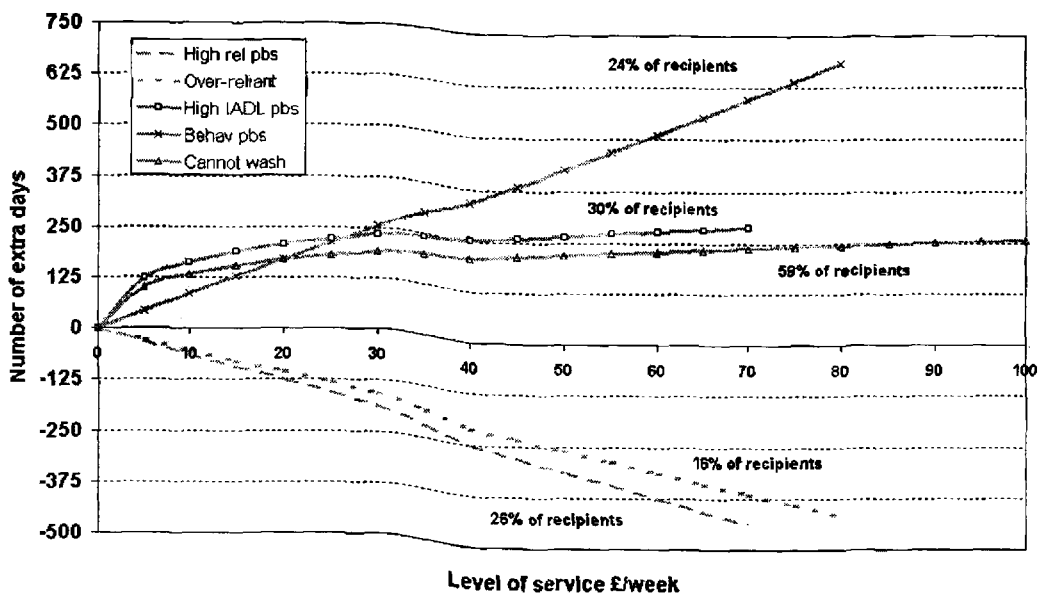
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<sup>25</sup> The last two columns of the table indicate respectively the proportion of service recipients and of users overall to which the productivity term relates.

**Figure 5.1 Productivity curves: home care and day care effect on days living at home prior to entering institutions**



**Figure 5.2 Productivity curves: respite care effect on days living at home prior to entering institutions**



### ***5.2.3 Overall service impact, impact for groups, and equity and efficiency***

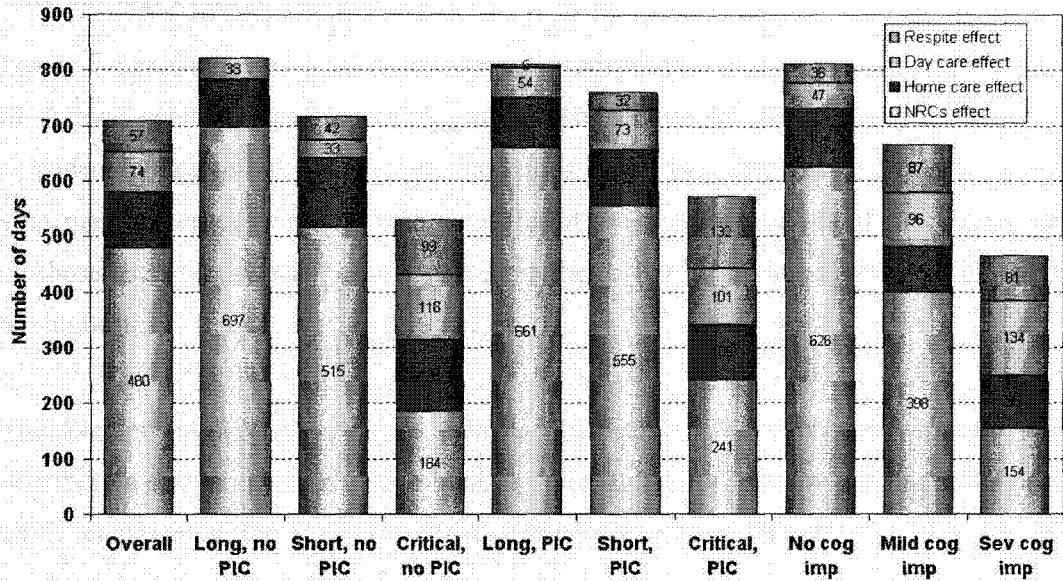
#### ***NRC and service contributions***

Figure 5.3 shows the mean impact of NRCs and the different services on DAYS for the average (overall) sample case and for each of the nine groups of users postulated in the analysis (see Section 5.1.2).

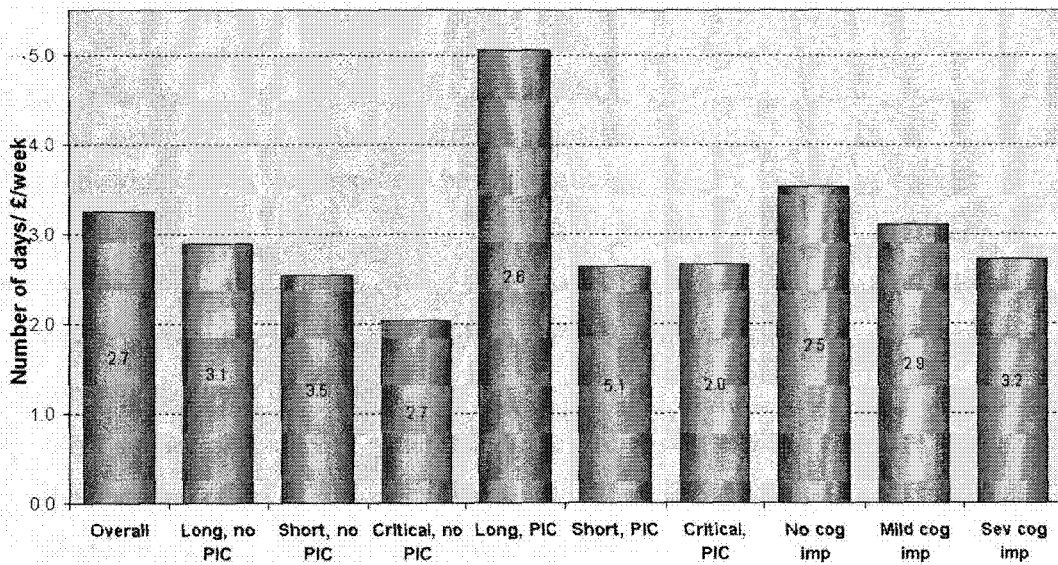
The figure illustrates the large impact of formal services on DAYS for all user groups, and in particular (both in absolute and relative terms) for the neediest users. Hence, Figure 5.3 indicates that service contributions account for approximately two thirds of the level of DAYS for severely cognitively impaired users and for less than one fifth for users with long interval needs and principal informal caregivers (PICs). The figure also confirms the predominant impact of NRCs on outcomes, as hypothesised in the POW propositions and in the specification of the production functions in Section 2.2.2. As a result, and despite greater service contributions for them, more physically dependent users and users suffering from cognitive impairment are predicted to stay in the community for significantly less time than all other users.

Disaggregating at the service level, Figure 5.3 reflects that only three of the six services explored delayed institutionalisation. Furthermore, the diagram suggests that whereas home care contributions remain fairly constant for all users, respite care and day care contributions are heavily focused on those in greatest need. This pattern appears to be related to the combined effect of the targeting of day and respite care services on very dependent users and those suffering from cognitive impairment (Figures 4.1 and 4.2) and to the higher productivities of the two services for such users ( Figure 5.1 and Figure 5.2).

**Figure 5.3 Contributions of services and risk factors to days living at home prior to entering institutions**



**Figure 5.4 Average total package productivity for days living at home prior to entering institutions**



### ***Care package average productivities***

Figure 5.4 explores variations in the average productivities of care packages, that is the ratio of service contributions to weekly care package costs for the different case typologies considered. Examining average productivities is of key importance because investment strategies concerned primarily with the efficient use of resources would concentrate services on those users who would benefit most from them; that is, on those for whom productivities are highest.

The average productivity patterns indicated in Figure 5.4 are in sharp contrast with the distribution of overall service contributions. Indeed, it is for users in greatest need, those who enjoy consistently the greatest service contributions to length of stay, that the average productivity of care packages appears to be lowest. At face value, it thus appears that maximizing the aggregate length of stay in the community would imply transferring resources from high to low dependency cases. The extent to which this is so will be further explored in the optimisation analysis in Chapter 7.

#### ***5.2.4 Overview***

The following conclusions appear to be important:

- *Evidence of service productivity.* Despite the overwhelming effect of NRCs for most cases, the results indicate clear productivity effects on the length of stay in the community for respite, home and day care.
- Most service productivity patterns indicate *decreasing returns to factor*, that is a fall in the marginal effect of services as the levels allocated increase. In addition, the modelling found *no evidence of significant service complementarity*.
- *Greater service contributions for those in greatest need.* Both in absolute terms and relative to the overall length of stay, the level of service contributions increase with increases in the level of dependency and cognitive impairment of users.

- *Care managers poured most water where the fire was fiercest.* Greater resources are invested on those in greatest need. However, in terms of overall care package costs, it is for the cases with highest need that average care package productivities are lowest.

### **5.3 Degree of satisfaction of user with the services received (USATISF)**

Using and interpreting quantitative indicators of satisfaction can be challenging (Sitzia and Wood 1997). It has been argued, for instance, that there are no strong theoretical frameworks within which to locate the concept and measurement of satisfaction (Locker and Dunt 1978). In particular, commentators have criticised their interpretation as expressions of the degree of fulfilment of users' expectations, given the difficulties experienced by users in developing prior expectations about care services (Williams, Coyle and Healy 1998).

In addition, the typically high levels of satisfaction reported in the majority of service user satisfaction surveys have been linked to a tendency for some elderly patients to provide the 'correct' answer, rather than describing their true feelings, out of loyalty to care staff or because of fear of losing a service (Owens and Batchelor 1996).

Taking into account such considerations, the study estimated a production function model for the indicator of satisfaction on the grounds of:

- its relevance to the concept of user-centred services, of salient policy importance;
- the long term nature of service provision, and the fact that by the time information was collected, users would have developed perceptions based on at least 10 months experience with services;
- the analytical focus on differences in satisfaction levels between users, rather than on the (potentially misleading) high satisfaction ratings achieved by services (approximately 78 per cent of users in the sample reported being either satisfied or very satisfied with services).

As shown in Appendix Table 3.2, the satisfaction indicator USATISF relates to a user's degree of satisfaction with the services received. Although originally expressed in a 1 to 5 scale, ranging from very dissatisfied to very satisfied, the indicator was transformed so as to



normalise its distribution by combining the 'very dissatisfied', 'dissatisfied', and 'neither satisfied nor dissatisfied' categories (selected by 2, 12 and 9 per cent of cases, respectively). The model was therefore estimated using the derived, three-level indicator of satisfaction<sup>26</sup>.

### ***5.3.1 The model and the impact of risk factors***

*Goodness of fit.* Table 5.2 summarises the equation. Despite a moderate fit, the model identifies a number of statistically significant associations between USATISF, NRCs and services.

*Risk factors.* General indicators of physical disability do not appear to affect users' satisfaction with services. However, USATISF seems greatly affected for the 11 per cent most disabled (who cannot feed themselves) and, to a lesser extent, for those with musculo-skeletal problems whose disability causes them to be allocated respite care.

An effect also identified in Cohen (1996), USATISF appears to reflect low morale (the PGC score being highly significantly correlated) and some causes of it, like cancer, the strain on relationships with caregivers amongst those offered day care, and the isolation and frailty which accompanies extreme old age.

The effects related to cognitive impairment are difficult to interpret, and might reflect a greater degree of unreliability of subjective evaluations by those who are confused or demented.

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<sup>26</sup> The model was estimated using OLS. Appendix 5.1 shows almost identical results based on an ordinal regression model (see McCullagh, P. 1980. "Regression models for ordinal data (with discussion)." *Journal of the Royal Statistical Society Series B* 42:109-142. ). The OLS estimator was preferred because of its linear properties.

**Table 5.2 Production function for user satisfaction with level of services (USATISF)**

PREDICTORS BY DOMAIN		Coef.	Prob.	% Reci- pients <sup>1</sup>	% Users <sup>2</sup>
<b>RISK FACTORS AND OTHER NEED-RELATED CIRCUMSTANCES</b>					
<b>General effects</b>					
<b>Physical disability</b>					
User has problems with feeding – Canteat		-0.561	0.04		
<b>Mental health</b>					
Lack of morale score – PGC		-0.047	0.00		
<b>Other health problems</b>					
User has cancer – Wcancer		-0.477	0.03		
User is cognitively impaired – Wcogimp		0.420	0.00		
<b>Other</b>					
User is over 85 years old - Over85		-0.395	0.00		
<b>Targeting-captured need effects</b>					
PIC health problems affect caring role, user targeted for day care - Dc_chaf		-0.639	0.04		
Housing problems, user targeted for home care - Hc_hous		-0.260	0.03		
Skeletal problems, user targeted for respite care - Re_skel		-0.341	0.05		
Mild/sev cog imp, user targeted for meals - M-katm		-0.374	0.04		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>					
<b>Home care</b>					
User lives alone - Hcc_wal2 (squared)		2.4E-05	0.01	100.0	84.1
User has PIC - Lhc_wpic		0.058	0.03	75.9	64.4
<b>Delivered meals</b>					
User cannot shop to buy groceries - Lm_groc (log)		0.083	0.08	73.3	62.2
<b>Day care</b>					
Weekly cost of day care - Dc_wcost		0.021	0.00	74.6	25.7
Weekly cost of day care (squared) - Dccst2		-1.8E-04	0.00	100.0	32.1
<b>Respite care</b>					
User is married - Rec_mar3 (cubed)		9.1E-07	0.06	100.0	32.1
<b>Nursing visits</b>					
Weekly cost of nursing inputs - Nv_wcost		-0.006	0.01	30.0	6.2
<b>CONSTANT</b>					
		2.461	0.00		
Adj R <sup>2</sup>	.28	Prob	.000	No of cases	197

<sup>1</sup> Proportion of recipients of the service to whom the effect applies

<sup>2</sup> Proportion of sample to whom the effect applies

### 5.3.2 Service productivities

The productivity curves for USATISF are depicted in Figure 5.5.

#### Home care

Whereas the results identify significant productivities for all users of *home care*, their nature depends on two need-related circumstances. For those living alone (75 per cent of home care users and 64 per cent of the sample), home care shows increasing returns to factor. That is, the initial effect of the service is small, and marginal productivities increase significantly with the level of the service provided. The nature of this effect, strongest for those receiving very

intense levels of provision, and the fact that it relates to those users living alone reflect relational aspects of the service. Indeed, the ranges of provision for which the effect is most noticeable are those in which close relationships between staff and the older person can begin to develop.

For users with principal informal caregivers, the nature of the home care effect is the opposite. That is, substantial productivities are achieved by the initial units invested, but marginal productivities fall rapidly thereafter.

### *Meals*

In contrast with the findings for DAYS, *home-delivered meals* are found to improve users' satisfaction with services. Not surprisingly, the effect of meals is found for the 76 per cent of recipients who cannot do their grocery shopping, and exhibits decreasing returns to factor.

### *Day care*

Figure 5.5 suggests *day care* to have a strong productivity effect, which reaches its maximum impact at £55 per week (corresponding to almost 2 attendances per week). But from that level, the overall impact on satisfaction diminishes with increases in the service. For users allocated over four attendances per week (over £120 per week), the overall day care effect becomes negative, and is therefore associated with a reduction in user satisfaction.

This finding is likely to reflect users' frustration when 'stuck' in day care facilities. Indeed, for cases where the amount of day care used is large, the main beneficiary is likely to be the caregiver, rather than the user. The conflict between older people and carers over the use of day care has also been widely discussed, for instance, in McLaughlin (1994), Pickard (2004) and Twigg (1992b). In the sample, care managers perceived the interests of caregivers and users to conflict for a substantial proportion of cases (the caregiver being the principal beneficiary of the care package in 12 per cent of cases, and an equal beneficiary with the user in another 35 per cent of cases).

An alternative explanation for this finding, however, could lie in the targeting of day care services on persons whose NRCs are not captured by the indicators present in the equation.

### *Respite care*

*Respite care* has a productivity effect only for users who are married. This may not be surprising, since it is for those that the service is less likely to be employed as a transition towards permanent placement in an institution, rather than as a means of providing a break for the caring spouse. However, the effects on satisfaction are negligible unless substantial levels of the service are provided. Beyond such levels, the increasing returns suggest significant marginal productivities.

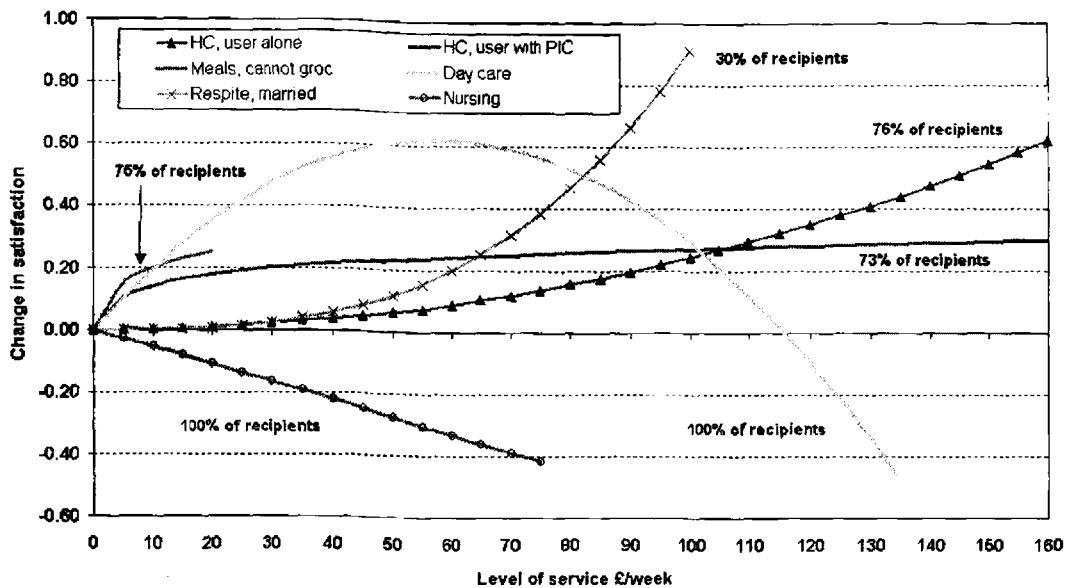
### *Community nursing inputs*

Rather than reflecting a genuine dislike for the service, the rationale behind the negative relationship between *community nursing visits* and levels of satisfaction relates most probably to the characteristics of clients receiving large nursing inputs which remain unaccounted for within the model specification.

However, other factors may also play a part. For instance, research has stressed the key importance for patients of the development of empathetic personal relationships between themselves and community nurses (Gilleard and Reed 1998). With increased nursing labour shortages, staff turnover, and the retrenchment of nursing care away from the non-strictly medical tasks discussed in previous chapters, developing such relationships has become increasingly unfeasible.

In addition, older people may associate a sense of frustration, derived from the chronic and long term nature of most health problems tackled by community nurses (for instance ulcerated legs or pressure sores), with nursing inputs themselves.

**Figure 5.5 Productivity curves: home care, meals, day care, respite care and nursing visits effect on satisfaction with level of services**



### 5.3.3 Overall service impact, impact for groups, and equity and efficiency

Figure 5.6 and Figure 5.7 shows NRC and service contributions to USATISF and average productivities for the overall packages, respectively.

#### *NRCs and service contributions*

Overall, Figure 5.6 suggests clear differences in patterns associated with the presence of informal caregivers. Hence,

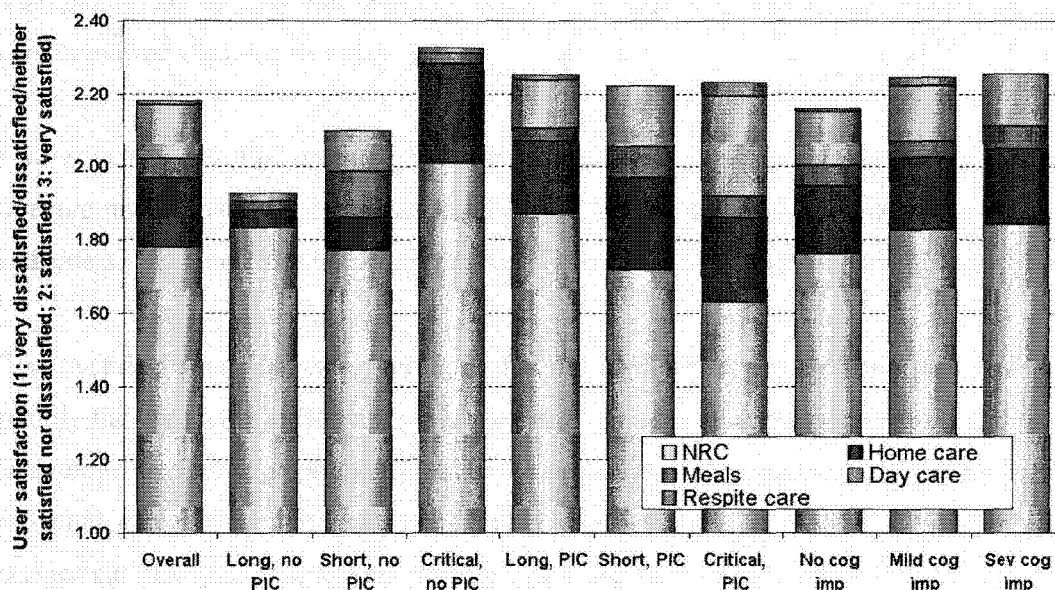
- Regardless of dependency, service contributions to satisfaction are greater for users with informal caregivers than for users without informal support.
- Service contributions increase with dependency levels, particularly for users with a carer.
- Whereas non service-related satisfaction levels decrease significantly with disability for users with informal support, they increase for those without informal carers.
- As a result of the combination of these effects, total levels of satisfaction increase with dependency for users without informal support, and remain constant for users with informal carers.

In terms of individual service contributions to satisfaction, Figure 5.6 again suggests significant differences between those users with and without informal support.

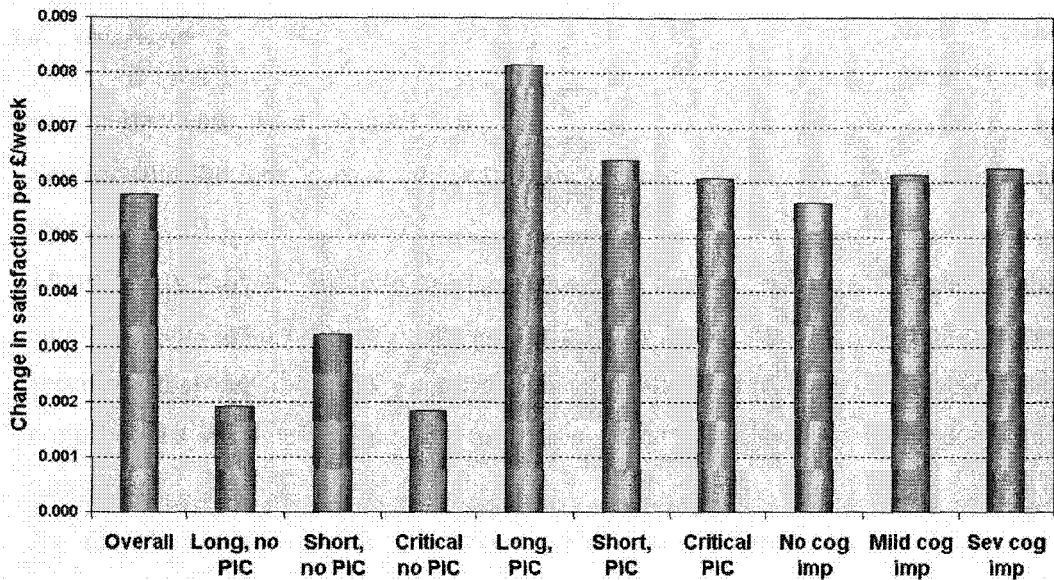
- Meals contribute significantly to satisfaction for users in the short interval need category without informal support (these are users likely to require assistance with meals preparation and yet not so disabled so as to require help with feeding).
- Day care inputs appear to contribute most strongly to the satisfaction of users with informal carers.
- For very dependent users without informal support, the vast majority of service contributions to satisfaction appear to be related to the receipt of home care (in the sample, critical interval need users without informal carers received an average of £100 per week worth of home care, about 70 per cent more than the level allocated to critical interval need cases with informal carers).

In contrast to the patterns by physical disability, Figure 5.6 reveals practically no differences in the intensity or composition of service contributions by level of cognitive impairment.

**Figure 5.6 Contributions of services and risk factors to user satisfaction with level of services**



**Figure 5.7 Average total package productivity for user satisfaction with level of services**



***Care package average productivities***

The pattern of service contributions is only partially reflected in the pattern of average productivities, depicted in Figure 5.7.

Overall, users with PIC enjoy significantly higher average productivities. Amongst these, the average productivity of care packages falls, the greater the level of dependency. The results indicate a slight increase in average productivities by level of cognitive impairment.

The overall picture suggests, therefore, that the level of service contributions observed are mainly the product of differences in the level of services allocated, rather than of differences in average care package productivities between groups. This is particularly true for users with informal caregivers, amongst whom higher dependency is related to significantly higher service contributions despite significantly lower average productivities.

Hence, as discussed in the context of DAYS, the pattern of resource allocation appears to be incompatible with allocation criteria strictly concerned with efficiency in the production of aggregate levels of USATISF.

#### **5.3.4 Overview**

Some important conclusions include that:

- Service contributions to user satisfaction are greatest for the most physically dependent users.
- There are significant differences in patterns between users with and without informal support. Users with informal caregivers are likely to be less satisfied before receiving services (that is, the NRC contributions for them are lower). However, service contributions are much higher, due to a large extent to higher average productivities for this group.
- As for DAYS, the higher allocations which are the basis for the bigger service contributions for certain groups must be justified by equity judgements, as they do not fully reflect productivity differences between groups.

#### **5.4 Improvement in number of personal care functions of daily living ascribed by the user to the social services (IMPADL)**

The modelling of IMPADL represents the first of two production functions linking variations in community care services to perceived levels of physical functioning (whereas the present indicator, IMPADL, focuses on personal care functioning, IMPIADL will focus on instrumental activities of daily living).

A substantial body of evidence has pointed out the relevance of social relationships as an important intervening factor in the experience of disablement (Mendes de Leon et al. 2001). Broadly, social services can be expected to influence functioning in two ways. First, in the narrow physiological sense, services may provide important inputs to enable users to recover from accidents, such as falls, or from medical interventions. Secondly, social care support may provide the catalytic supportive ingredient that narrows the gap between objective and subjective functioning, that is between an older person's capacity to perform daily tasks as



indicated by standard functional disability assessments, and the tasks which are actually performed at home (Glass 1998; Spector and Fleishman 1998).

The fact that IMPADL is based on users' perceptions, rather than derived from a test of functioning, therefore has important implications for the interpretation of the results. First, it means that variations in the dependent variable will relate more closely to actual performance than to objective ability to perform, so that the model should be able to capture the latter type of service effect, discussed above. Secondly, it means that the ratings of functioning may not relate exclusively to a user's (actual or hypothetical) ability to perform a task, but may also include the user's perception of the extent to which the task is actually performed, whether by the user, the informal caregiver or by services themselves. Thirdly, responses may reflect general morale.

#### ***5.4.1 The model and the impact of risk factors***

*Goodness of fit.* The model summarised in Table 6.1 accounts for a relatively low proportion of the variance, although its significance is high.

##### *Impact of risk factors.*

The most clearly determined relationships relate to the nature of informal networks. Hence, whereas the presence of a principal informal caregiver shows a clear buffering effect, users living alone (and targeted to receive day care) show, other things equal, lower levels of improvement with functioning. In addition, the buffering effect of informal caregiving is reduced when the PIC is in paid employment.

The negative correlation between the lack of morale (as perceived by the care manager and as indicated by the PGC score) confirms other findings in the literature (Bruce 2001; Penninx et al. 2000).

Finally, the indicator of receipt of nursing inputs among those being cared for by their spouse is likely to capture situations where the user is at high risk of physical deterioration.

**Table 5.3 Production function for improvement in ADL-related states due to services (IMPADL)**

PREDICTORS BY DOMAIN	Coef.	Prob. <sup>1</sup>	% Recipients <sup>2</sup>	% Users <sup>3</sup>
<b>RISK FACTORS AND OTHER NEED-RELATED CIRCUMSTANCES</b>				
<b>General effects</b>				
<i>Physical disability</i>				
User cannot shop to buy groceries – Cantgroc	-1.616	.010		
<i>Mental health</i>				
User is perceived to have low morale – Wlowmora	-1.139	.019		
PGC lack of morale score – Pgc	-.116	.068		
<i>Informal care related factors</i>				
User has PIC – Wpic	2.971	.000		
PIC is employed – Cemploy	-1.320	.088		
<i>Targeting-captured need effects</i>				
User lives alone, and targeted for day care - Dc_walo	-2.992	.000		
PIC is spouse, user targeted for nursing inputs - Nv_sp	-4.894	.006		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>				
<b>Individual input effects</b>				
<i>Home care</i>				
User lives alone – Lhc_ualo (log)	.330	.029	77.2	66.2
<i>Day care</i>				
<i>Respite care</i>				
User discharged from hospital - Rec_fh	.061	.041	31.8	5.5
<i>Nursing visits</i>				
Nursing visits - Lnv (log)	.353	.037	100.0	30.7
<b>Complementarities</b>				
Day care and respite care interaction – Ldr	.345	.005	100.0	14.4
CONSTANT	7.117	.000		
Adj R <sup>2</sup>	.32	Prob	.000	No of cases
				145

<sup>1</sup> Model estimated with robust standard errors <sup>2</sup> Proportion of recipients of the service to whom the effect applies; <sup>3</sup> Proportion of the sample to whom the effect applies

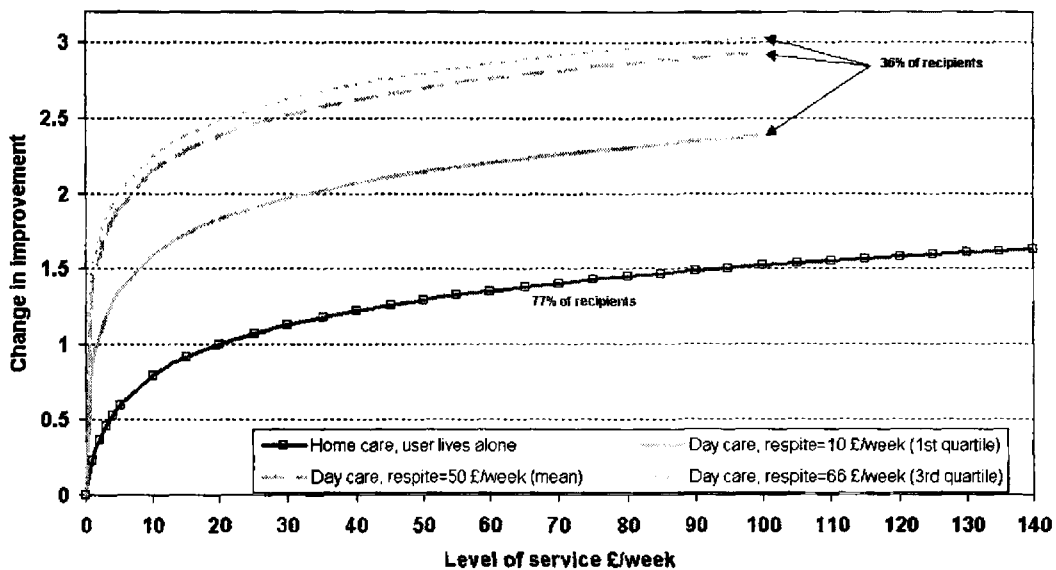
#### 5.4.2 Service productivities

The model identifies four services significantly related with improvements in users' perceived capacity to perform ADL tasks (see Figure 5.8 and Figure 5.9). These are:

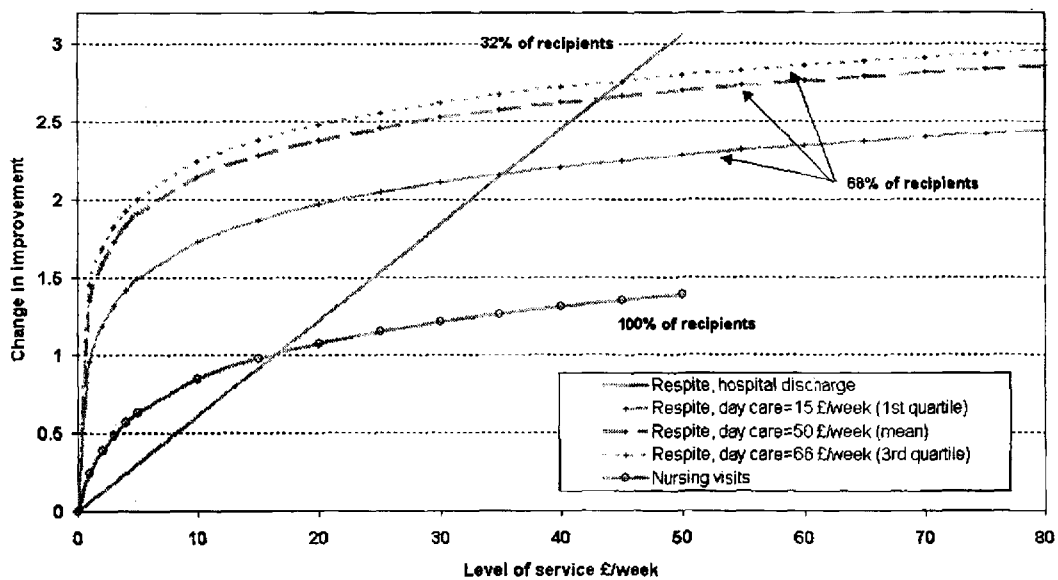
- *home care* for users living alone, characterised by decreasing returns to scale. This effect affects 77 per cent of the recipients of home care, and 66 per cent of the overall sample.
- *respite care* among people discharged from hospital. This effect is constant at the margins for all levels of the service, and refers to approximately one third of the recipients of respite care, and to a small proportion (6 per cent) of the overall sample.
- *nursing visits* for all recipients of the service (31 per cent of all cases in the sample), again marked by decreasing returns to scale.

- a complementarity effect between day care and respite care. The marginal productivity of this effect decreases as the levels of any of the two services increase. Overall, approximately 14 per cent of the sample in the model received both respite and day care inputs.

**Figure 5.8 Productivity curves: day care and home care effect on improvement in ADL tasks due to services**



**Figure 5.9 Productivity curves: nursing visits and respite care effect on improvement in ADL tasks due to services**



### ***5.4.3 Overall service impact, impact for groups, and equity and efficiency***

#### ***NRCs and service contributions***

Figure 5.10 indicates no clear patterns of overall service contribution by interval need or level of cognitive impairment. As for previous outcomes, the diagram reveals the overwhelming effect of NRCs on improvement levels.

The two groups enjoying the greatest service contribution are those for whom the risk factors predict the least improvement: short and critical interval cases without principal informal caregivers. In this respect, the service allocations contribute to a modest reduction in the inequality of improvement in perceived capacity to perform ADL tasks. Also, the size of the overall service contributions are greater for cases without informal support.

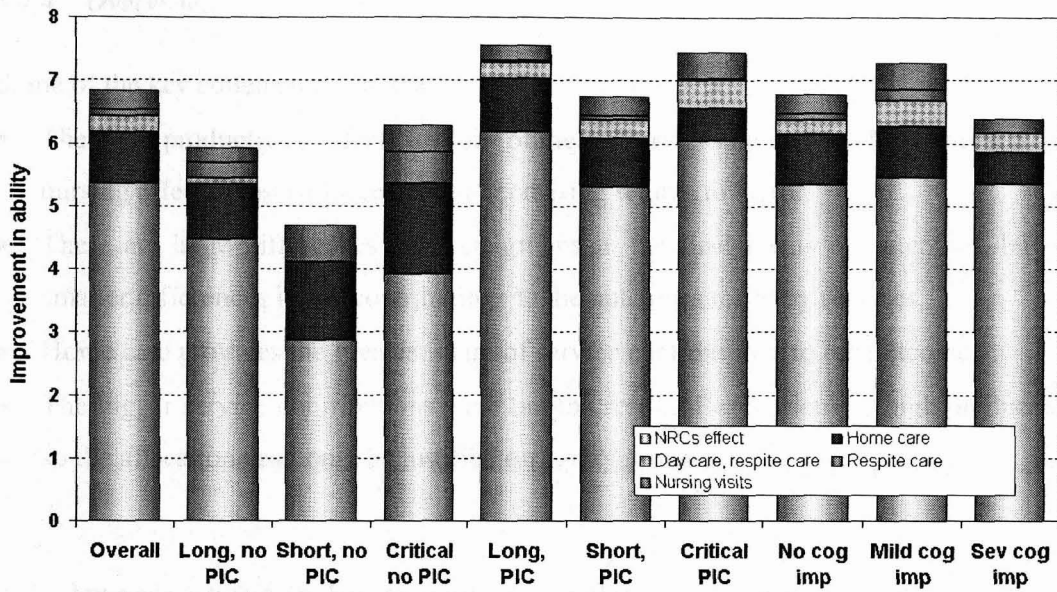
In terms of individual service contributions, home care inputs produce the largest contribution for most user groups, and particularly for those without informal support. Not surprisingly given their role, the complementarity effect of day and respite care services applies almost exclusively to users with informal support. Reflecting the homogeneous productivity effect described in Figure 5.9, nursing inputs are associated with improvements in ADL activity for all groups.

#### ***Care package average productivities***

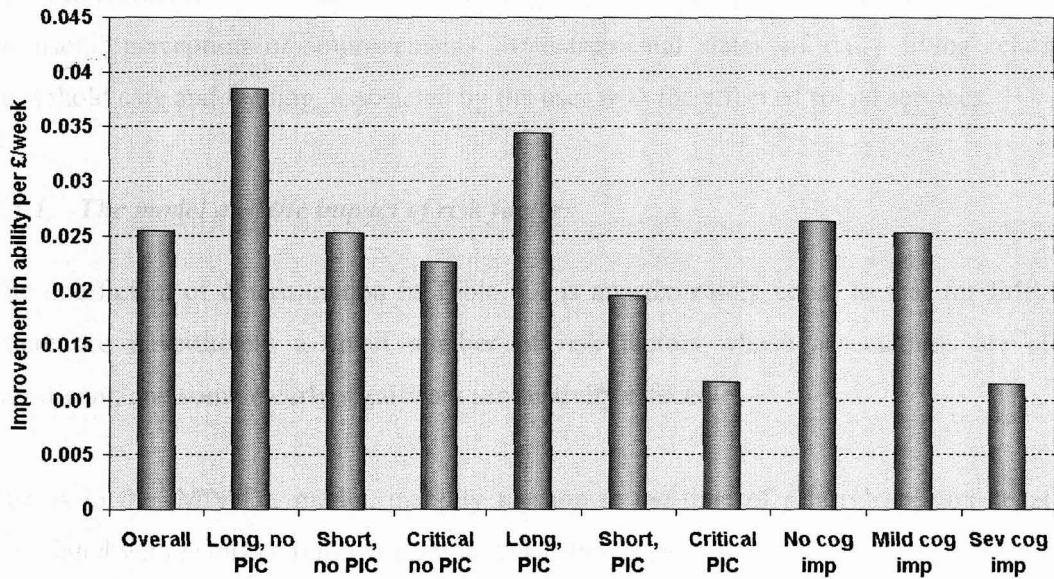
In contrast with the relatively even distribution of service contributions across groups depicted in Figure 5.10, Figure 5.11 indicates a clear negative gradient between physical disability and cognitive impairment and average productivities. As found in the context of previous outcome indicators, the evidence again suggests that the allocation of resources is incompatible with the maximisation of aggregate levels of output. Relative to such a criterion, too great a share of resources appears to have been allocated to the users in greatest need.

By dependency level, average productivities for users with PICs are lower than for users without PICs. This finding is likely to reflect the greater dependence on formal services of older people without informal support.

**Figure 5.10 Contributions of services and risk factors to improvement in ADL related states**



**Figure 5.11 Average total package productivity for improvement in ADL related states due to services**



#### **5.4.4 Overview**

Some of the key conclusions are that

- There are productivity effects for four of the six services investigated, including a district nursing effect. Most of these exhibit decreasing returns to factor.
- There are large differences between groups in the final levels of outcomes, but much smaller differences in the contributions to the outcomes made by services.
- Home care provides the greatest share of service contributions to the outcome.
- The bigger service contributions were not the result of exceptionally high productivities, so the allocations can only be justified on equity grounds.

### **5.5 Improvement in housework and other instrumental care functions of daily living ascribed by the user to the social services (IMPIADL)**

IMPIADL represents the second outcome indicator relating to physical functioning. It focuses on users' perception of improvements in instrumental states of daily living related to household care and feeding, associated by the user with the effect of social services.

#### **5.5.1 The model and the impact of risk factors**

The coefficient of determination in Table 5.4 is approximately equal to that for IMPADL. There are nevertheless a small number of risk factors whose associations are clearly significant, and some clearly significant productivity effects.

Just as in the IMPADL model, inability to shop at the time of referral appears negatively associated with levels of improvement in IADL functioning. This effect relates to 85 per cent of the sample, and so virtually distinguishes the vast majority of those with anything more than the lowest level of incapacity to perform tasks of daily living.

Again, in parallel with the patterns found for IMPADL, the nature of the NRC effects identified in Table 5.4 underlies the importance of social support networks in explaining self-perceived disability. Hence, whether users live alone and whether PICs have health problems which affect their caring roles are both factors associated with worse perception of capacity to perform IADL tasks. In addition, users living alone and targeted to attend day care centres are found to perceive lower level of improvements, other things equal. The fact that users living alone are targeted to receive day care inputs is likely to signal limitations in their ability to leave unassisted the home, and so to socialise, and probably the need for assistance with meals (often provided at day care centres), rather than the need for support for informal caregivers.

**Table 5.4 Production function for improvement in IADL tasks due to services (IMPIADL)**

PREDICTORS BY DOMAIN	Coef.	Prob.	% Recipients <sup>1</sup>	% Users <sup>2</sup>
<b>RISK FACTORS AND OTHER NEED-RELATED CIRCUMSTANCES</b>				
<i>General effects</i>				
<i>Physical disability</i>				
User cannot shop to buy groceries - Cantgroc	-3.002	.010		
<i>Informal care related factors</i>				
PIC health problems affect caring - Chaffect	-5.077	.004		
<i>Other</i>				
User is against residential care - Upercent	-.989	.026		
User lives alone - Walone	-2.075	.064		
<b>Targeting-captured need effects</b>				
User lives alone, and targeted for day care - Dc_alon	-5.075	.000		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>				
<i>Home care</i>				
User belongs to critical interval need - Hc2_crit (squared)	2.0E-4	.014	79.1	66.4
User has PIC - Lhc_wpic (log)	.694	.009	74.1	62.2
<i>Delivered meals</i>				
PIC is close female relative - Mc_clof	.276	.027	35.7	11.9
<i>Day care</i>				
User discharged from hospital - Dcc_fh	.120	.020	20.0	6.0
<i>Nursing visits</i>				
User has PIC - Nvc_upic	.088	.006	72.9	22.2
CONSTANT	19.848	.000		
Adj R <sup>2</sup>	.28	Prob	.000	Nbr of cases
				154

<sup>1</sup> Proportion of recipients of the service to whom the effect applies; <sup>2</sup> Proportion of the sample to whom the effect applies

### 5.5.2 *Service productivities*

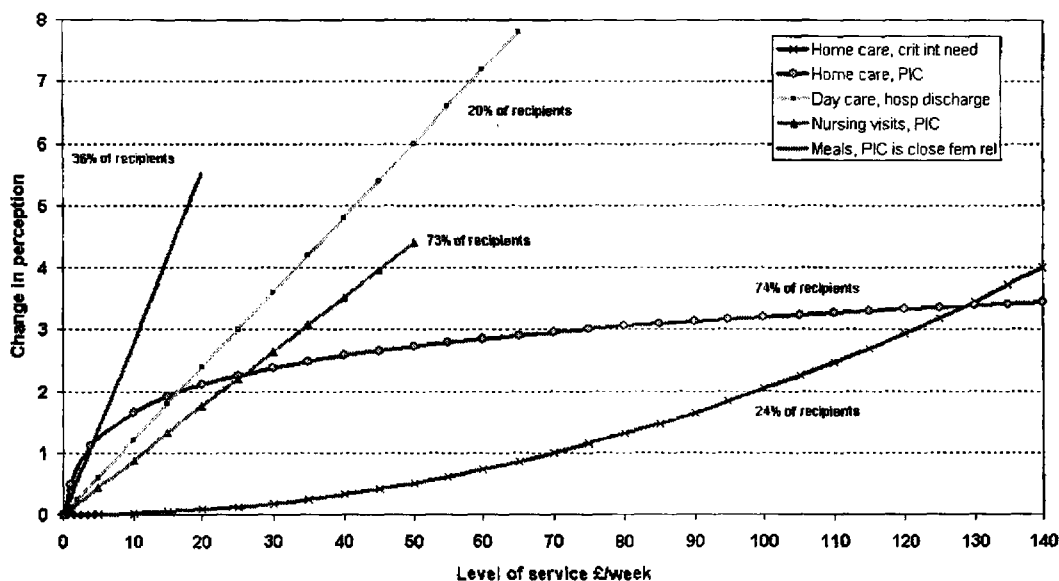
Figure 5.12 depicts the set of productivity effects identified for IMPIADL. Five different effects, relating to four services, are described.

- Home care inputs appear to improve self perceived disability for users with informal support, and for the very dependent (in the critical interval need category). Given that the vast majority of users in the critical interval need category have PICs, the home care effect for them amounts to the addition of the two effects in Figure 5.12. Overall, home care productivities relate to approximately 79 per cent of recipients of the service, and to 66 per cent of the sample.
- The highest service productivity identified in the model relates to *home-delivered meals* among users whose principal informal caregiver is a close female relative; that is for 36 per cent of the recipients of meals, 12 per cent of the entire sample. Investigating further the nature of these caregivers, it appears that almost none of the close female relatives of users receiving meals is the spouse. In other words, the effect relates almost exclusively to (non-coresident) daughters and daughters-in-law. For such cases, the provision of meals on wheels might therefore represent an important complement to the support received from informal caregivers.
- There are two main rationalizations for the strong *day care* effect for users recently discharged from hospital. In general, the provision of day care provides the caregiver with the opportunity to undertake some instrumental activities without distraction. More likely, given the nature of the effect, the effect may relate to the provision of rehabilitation inputs within the day care setting for users following acute care episodes. Overall, the day care effect affects only one fifth of its recipients and considerably less than one tenth of the sample overall.
- The productivity of *home nursing visits* for 72 per cent of recipients, more than one fifth of the entire sample, may reflect similar causal mechanisms to those discussed above. Again, closer inspection of the sub-group effect reveals that it relates almost exclusively to non-spouse PICs, mainly non-coresident. Thus, the effect could amount to a combination of a complementarity effect with informal support, and to the genuine rehabilitative effect of medical inputs provided by district nurses.



Three out of the five productivity effects indicate constant returns to factor. Of the remaining two (home care) effects, one exhibits increasing returns and the other decreasing returns to factor.

**Figure 5.12 Productivity curves: day care , home care, meals and nursing visits effect on improvement in IADL tasks due to services**



### 5.5.3 Overall service impact, impact for groups, and equity and efficiency

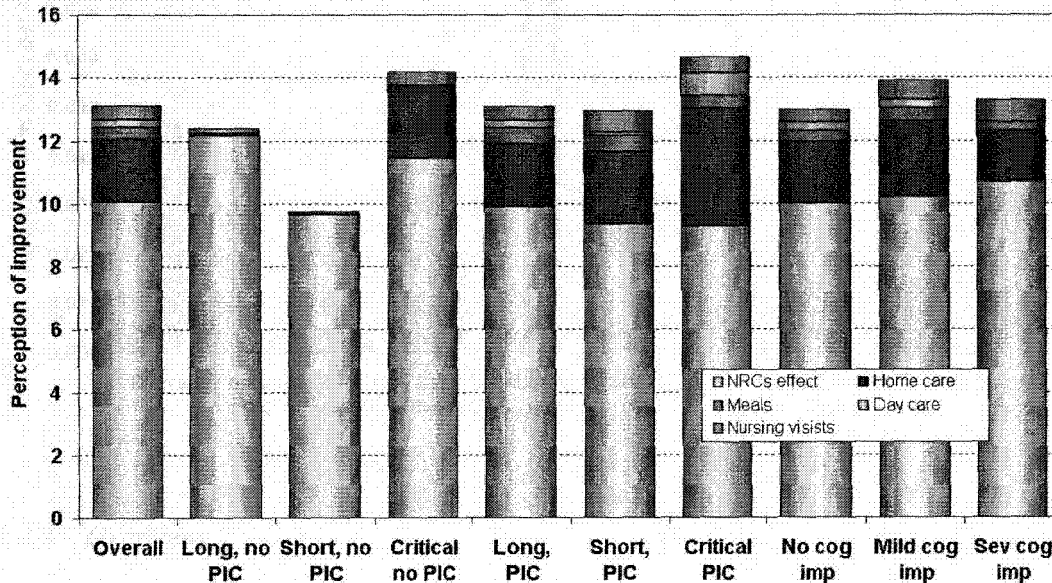
#### *NRCs and service contributions*

Figure 5.13 shows large differences between groups both in final output levels and in the contribution of service inputs, compared with that of the risk factors.

- In contrast with the patterns for IMPADL, users with PICs benefit from much higher service contributions to levels of IMPIADLs. In fact, Figure 5.13 indicates that hardly any service contributions are achieved for users without PICs in the long and short critical interval need categories.
- By level of dependency, the picture suggests greater service contributions to IMPIADL the greater the level of need of the case.
- In terms of differences between services, home care and to a lesser degree nursing inputs provide the largest gains in IMPIADLs. For those with PICs, meals also contribute significantly to self-perceived improvements in IADL functioning.

- As with the patterns for all previous outcome indicators, service contributions are small compared to the variation in IMPIADL related to differences in NRCs.

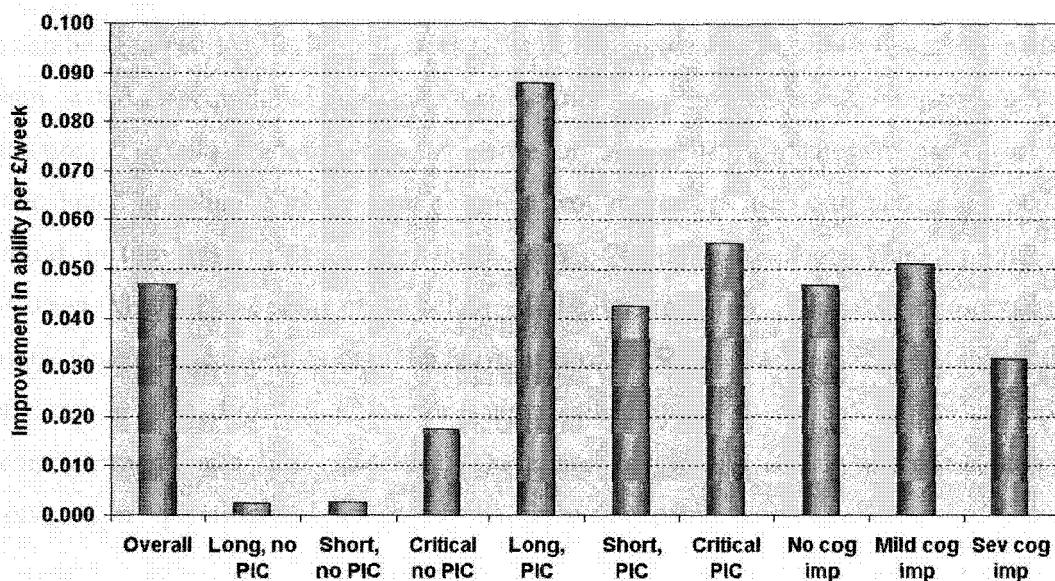
**Figure 5.13 Contributions of services and risk factors to improvement in IADL related states**



### *Care package average productivities*

Figure 5.14 shows that the average productivities of care packages for users without PICs are much lower than for other groups. This is important in two ways. First, it suggests that the pattern of service contribution, although potentially inequitable, reflects differences in service productivities of the services, rather than relative levels of care packages. Second, it suggests that the observed allocation of resources to users without PICs is likely to have been intended to achieve other outputs. The combination of service contributions to the different outcome indicators will be tackled in detailed in later chapters by the optimisation analysis.

**Figure 5.14 Average total package productivity for improvement in IADL related states due to services**



#### 5.5.4 Overview:

Conclusions are that:

- Four services are found to significantly improve self-perceived IADL functioning: home care, meals on wheels, day care and nursing visits.
- Overall, service contributions appear small relative to the impact of NRCs.
- There are big differences in service contributions between user types. In particular, those without principal informal caregivers do not benefit significantly.
- Differences in service contributions between users appear to be primarily due to differences in the effectiveness of care packages to improve IMPIADL.

## 5.6 User felt control over own life score (IMPEMP)

The production function for IMPEMP explores the extent to which services are able to contribute to a user's felt degree of independence and control over important aspects of life. The indicator is thus constructed as the aggregation of three questions: whether users feel free

to run their life the way they want; whether they feel helpless; and whether they ever worry about losing their independence and other people making decisions for them.

It can be seen that IMPEMP influences some of the outcomes for which results have already been stated. It could be expected, for instance, that greater levels of physical I/ADL functioning would lead to a greater sense of independence, that care packages which contributed to enhancing user empowerment would increase user satisfaction and that they would, in turn, result in reductions in the risk of institutionalisation. There are also links between IMPEMP and some of the outcome indicators to follow, particularly those relating to users' psychological well-being. The usefulness of exploring IMPEMP lies in the fact that it provides a more direct indicator for gauging the impact of services on the concepts of 'empowerment' and 'independence'. These are key to the reform discourse, and very prevalent in both current policy documentation and academic literature.

#### *5.6.1 The model and the impact of risk factors*

*Goodness of fit.* As in the previous model, Table 5.5 indicates a moderate or low coefficient of determination, whereby approximately one third of the variation in the dependent variable is explained within the estimated model.

*Need-related circumstances and risk factors.*

Clearly, the extent of physical disability is very important in determining a user's sense of independence. Hence, interval need, ability to go out to buy groceries, muscular and skeletal problems, and being bed-bound (amongst users targeted for respite care) are all factors negatively associated with IMPEMP.

As might be expected, low morale at the time of assessment also appears very significantly correlated with users' perception of control over their own life. However, contrary to the pattern in previous outcomes, only one indicator related to informal care appears significantly correlated with IMPEMP. Hence, users whose carers are observed by care managers to be under significant stress (and who are targeted to receive respite care) perceive themselves, other things being equal, to be less in control over their own life. Clearly, in such situations, one of the important issues faced by the care manager when arranging the care package will

be the appropriate balancing of improvements in the welfare of users and their informal caregivers.

**Table 5.5 Production function for user felt control over own life score (IMPEMP)**

PREDICTORS BY DOMAIN	Coef.	Prob.	% Recipients <sup>1</sup>	% Users <sup>2</sup>
<b>NEED-RELATED CIRCUMSTANCES</b>				
<b>General effects</b>				
<i>Physical disability</i>				
Interval need level – Intneed <sup>3</sup>	.379	.000		
User cannot buy groceries - Cantgroc	-.333	.037		
<i>Mental health</i>				
PGC lack of morale score – PGC	-.082	.000		
<i>Other health problems</i>				
Skeletal problems – Wskel	.333	.000		
<i>Poverty and material environment</i>				
Wide environmental problems - Wwidenv	-.222	.044		
<b>Targeting-captured need effects</b>				
User is bed-bound and targeted for respite care - Re_bed	-.978	.041		
PIC is perceived to be stressed and targeted for respite care - Re_cstr	-.502	-.019		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>				
<b>Individual input effects</b>				
<i>Home care</i>				
User is critical interval need - Lhc_crit (log)	.119	.014	27.6	23.1
<i>Delivered meals</i>				
User cannot go to toilet - Mc_toil	.067	.014	11.3	3.5
<i>Day care</i>				
Day care – Ldc (log)	.069	.042	100.0	31.1
<i>Respite care</i>				
User has high no. of ADL problems - Lre_had (log)	.316	.012	29.5	6.9
<i>Nursing visits</i>				
PIC health problems affect caring - Nvc_chaf	.016	.012	64.6	8.7
<b>Complementarities</b>				
Nursing visits, day care interaction, mild sev cog imp - Ndc_katm	8.7E-4	.016	20.0	5.2
<b>CONSTANT</b>				
	1.755	.000		
Adj R <sup>2</sup>	.34	Prob	.000	Nbr of cases
				197

<sup>1</sup> Proportion of recipients of the service to whom the effect applies; <sup>2</sup> Proportion of the sample to whom the effect applies; <sup>3</sup> Interval need represents a negative indicator of disability: 1=critical, 2=short, 3=long interval need category.

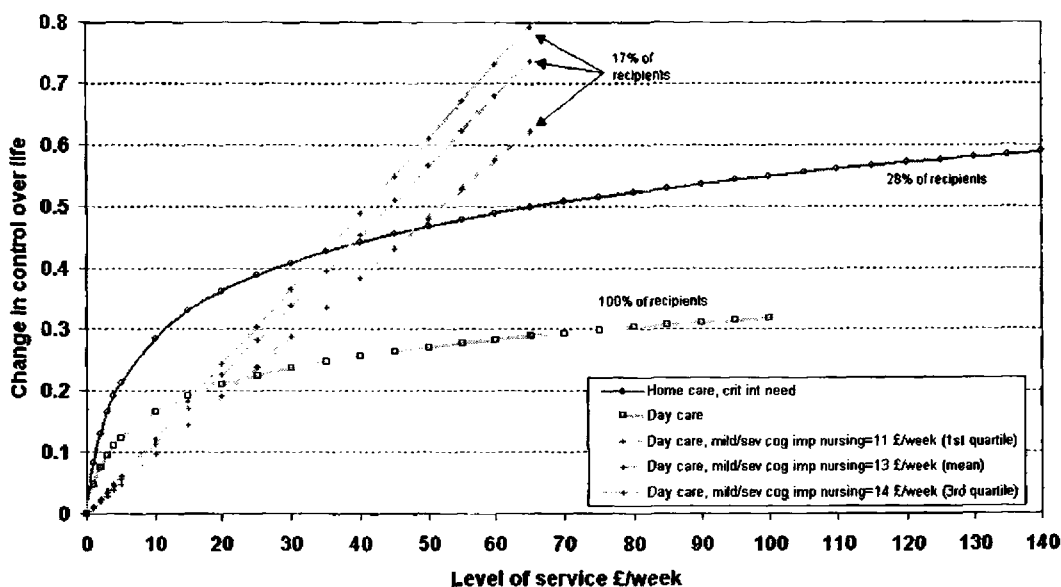
### 5.6.2 Service productivities

Figure 5.15 and Figure 5.16 depict the six productivity effects identified for IMPEMP, relating to five of the six services investigated. For many services, productivities are found exclusively for the most dependent cases, and so cover a limited proportion of the recipients of care. None of the effects is found to be significant at the 1 per cent level.

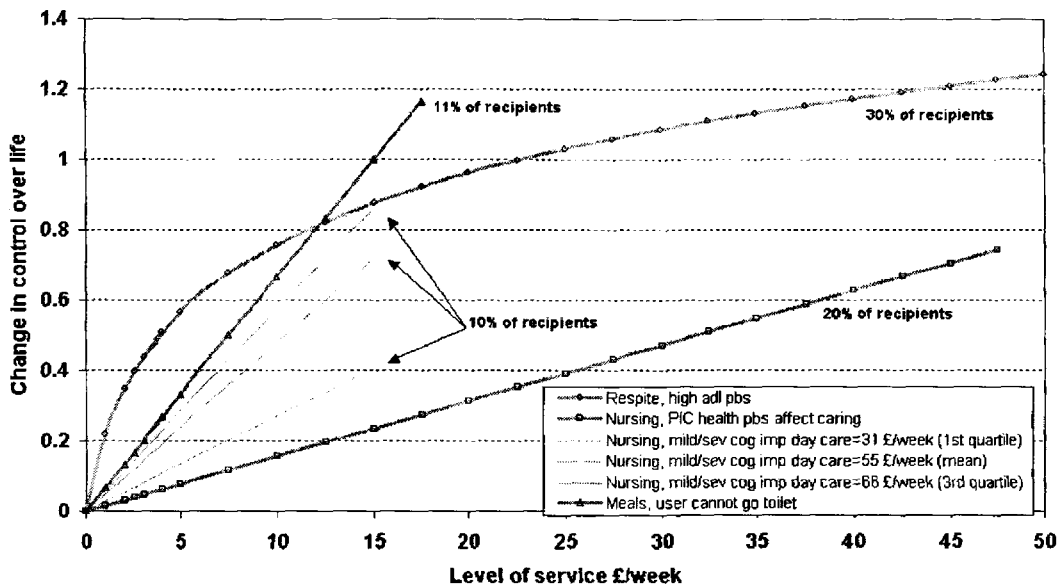
- Home care inputs are effective in improving IMPEMP for users with critical interval needs. The fact that a similar effect was described for IMPIADL confirms the expected links between the two outcome indicators.
- Day care inputs show a general beneficial effect on all recipients. However, when complemented by nursing inputs, they are found to be most effective for users suffering from mild or severe cognitive impairment (over half of recipients of the two services suffered from cognitive impairment).
- Like home care, respite care inputs improve IMPEMP only for the most physically dependent of users (those with problems undertaking many ADL functions).
- The biggest marginal productivity is found for *home-delivered meals* among users who cannot go to the toilet (see Figure 5.16).
- As for IMPIADL, the *community nursing* effect relates to a subgroup of users defined in terms of a feature of their informal care network. Hence, the service is found to significantly improve outcomes among the 20 per cent of recipients whose principal informal caregivers claim that their own health problems affect their caregiving.

Out of the six productivity effects, three were best described as indicating decreasing returns to factor, and the other three as showing constant returns to factor.

**Figure 5.15 Productivity curves: home care and day care effects on user control over life**



**Figure 5.16 Productivity curves: respite care, nursing and meals effects on user control over life**



### 5.6.3 Overall service impact, impact for groups, and equity and efficiency

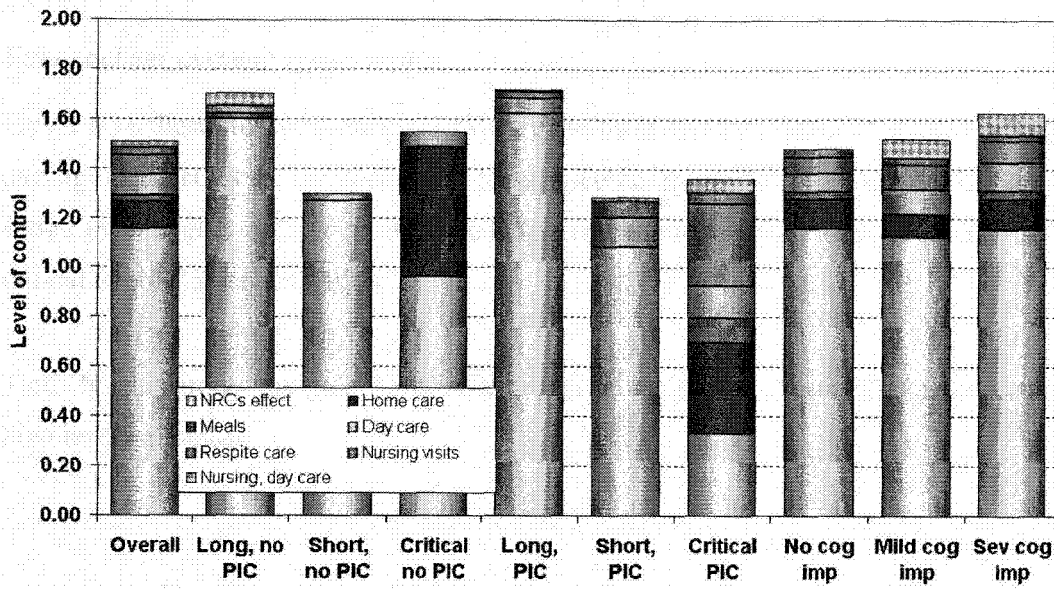
#### *NRC and service contributions*

Figure 5.17 shows the relative contribution of risk factors and service inputs to the average outcome for each of the groups.

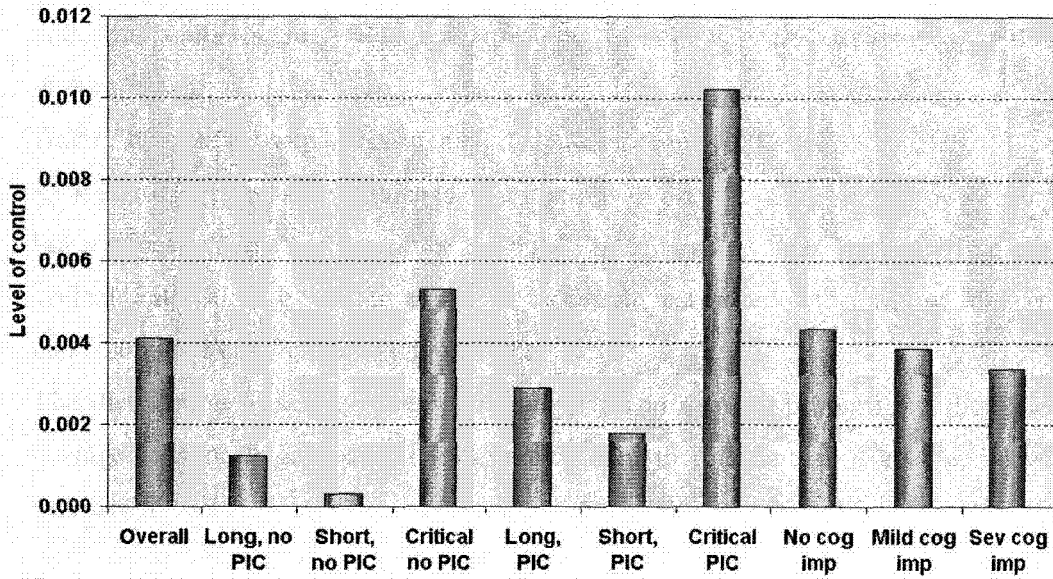
- By dependency level, service contributions appear almost exclusively concentrated on users in the critical interval need category, particularly those with principal informal caregivers.
- For the most dependent, the size of service contributions relative to the total levels of the outcome achieved illustrates the extent of their dependence on services.
- Interestingly, despite the considerable service contributions to those in greatest need, overall levels of IMPEMP are highest for the least dependent cases. In other words, the large effect of services for the most dependent is not enough to compensate for the overwhelming effect of NRCs on their feeling of control over their own life.

In terms of individual services, home care produces the greatest contribution for the two critical interval need groups, closely followed for the group with PICs by respite care inputs.

**Figure 5.17 Contributions of services and risk factors to user felt control over own life score**



**Figure 5.18 Average total package productivity for improvement in user felt control over own life score**





### *Care package average productivities*

Figure 5.18 illustrates the parallels between patterns of service contributions and average care package productivities. As was found for service contributions in Figure 5.17, Figure 5.18 shows much higher average productivities for critical interval need users, and particularly for critical interval cases with PICs.

Thus, for this group, the great gains reflect high productivities rather than disproportionately high levels of inputs.

#### **5.6.4 Overview**

The following results can be noted:

- The analysis identifies productivity effects for home care, meals, day care, respite care, and community nursing. However, most of the effects relate exclusively to those in greatest need.
- Half of the productivity effects exhibit decreasing returns to factor.
- Risk factors are the main influence on variations in users' feeling control over their lives, but services nonetheless contribute substantially for some groups, particularly those with critical interval needs and principal informal caregivers, for whom the service contributions were the dominant influence.
- The distribution of service contributions appears to respond primarily to the pattern of average care package productivities, rather than to differences in allocated levels of services.

## **5.7 Overall lack of morale: the PGC score (PGC)**

With a longstanding pedigree in evaluation of care services (Challis and Davies 1986; Davies and Knapp 1981; Walker and Warren 1996), the PGC lack of morale scale (Lawton 1975) is the first of three indicators to explore the impact of services on the psychological well-being of users. In addition, subsequent sections will explore two of its components, providing two perspectives on the process of self-adaptation by older people: an index of General Dissatisfaction with Life, and an index of Dissatisfaction with Life Development.

Improving users' morale appears less frequently in policy documents as a main goal for social services, compared to other objectives, such as user empowerment, improving independence or reducing caregiver stress. However, it is often related to issues such as social isolation, social exclusion and instrumentally to the promotion of independence. In addition, tackling issues around psychological well-being, for instance reducing user anxiety, low morale and caregiver stress, often constitutes part of the core 'social' objectives of the social care system for front line staff, particularly qualified social workers (Qureshi et al. 1998).

### ***5.7.1 The model and the impact of risk factors***

*Goodness of fit.* Table 5.6 summarises the results from the production function for PGC. It indicates an overall degree of fitness of the model comparable to that for previous models. Given that PGC scale constitutes an aggregate index (19 items) of *lack* of morale, the interpretation of the signs in Table 5.6 should be inversed, with improvements and deteriorations in the outcome signalled by negative and positive coefficients, respectively.

*Need-related circumstances and risk factors.*

Although the strongest influences relate to *dependency*, *informal care*, and *anxiety*, a wider range of NRC indicators show a significant influence on users' morale.

**Table 5.6 Production function for overall lack of morale (PGC)**

PREDICTORS BY DOMAIN		Coef.	Prob.	% Reci- pients <sup>1</sup>	% Users <sup>2</sup>
<b>NEED-RELATED CIRCUMSTANCES</b>					
<b>General effects</b>					
<i>Physical disability</i>					
Disability interval need – Intneed <sup>3</sup>		-2.55	.000		
<i>Mental health</i>					
User has behavioural problems – Wbehav		-5.99	.000		
<i>Informal care related factors</i>					
PIC is employed – Cemploy		1.83	.007		
Informal help hrs/wk with medical care - Infmed		.17	.001		
Personal care hrs/wk (log), User has high no of ADLs problems - Lip_had		-1.88	.002		
Personal care hrs/wk (squared), user short interval need - Ip2_sht		-.04	.035		
<i>Other</i>					
Count of user fears – Ufears		.86	.000		
User discharged from hospital – Fromhosp		-1.83	.002		
User is vexed by charging – Vexed		6.07	.000		
<b>Targeting-captured need effects</b>					
PIC is worried, user targeted for respite care - Re_wor		7.93	.019		
User is long interval need and targeted for social work input - Sw_long		2.02	.017		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>					
<b>Individual input effects</b>					
<i>Home care</i>					
PIC is close female relative - Hcc_clof		-.03	.001	31.2	25.9
<i>Respite care</i>					
User discharged from hospital - Re2_fh (squared)		-4E-4	.095	43.4	10.9
PIC loses sleep due to worry - Rec_sle		-.12	.020	24.6	5.7
<i>Social work</i>					
User lives alone - Swc_walo		-.88	.038	28.1	6.5
<b>CONSTANT</b>					
		9.95	.000	71.5	11.9
<b>Adj R<sup>2</sup></b>	<b>.34</b>	<b>Prob</b>	<b>.000</b>	<b>Nbr of cases</b>	<b>243</b>

<sup>1</sup> Proportion of recipients of the service to whom the effect applies; <sup>2</sup> Proportion of the sample to whom the effect applies; <sup>3</sup> Interval need represents a negative indicator of disability: 1=critical, 2=short, 3=long interval need category.

In total, five informal care-related effects show a significant effect on PGC. Broadly speaking, the nature of these effects associates levels of morale with the intensity/quality of informal care support. That is, they confirm the buffering effect of informal networks already observed in previous outcome indicators. For the first time, however, indicators of intensity of support appear significantly associated with the outcome variable. Hence, the level of informal support with personal care tasks for users of medium and high dependency (in the short interval need category or with a high number of problems with ADL activities) is found to improve levels of morale. In contrast, users whose PIC is in full time employment and users targeted to receive respite care and whose PIC are worried about the user exhibit, other things being equal, lower levels of morale.

Whereas the fact that the intensity of informal care support with medical tasks is negatively associated with morale may be explained by a genuine dislike by the user of the provision of such care by informal carers, it is much more probable that the effect instead captures the poor health state of the user. This is particularly so given that a significant number of users receiving high levels of informal support with medical care suffered from cancer.

Even though it is the only effect related to dependency to enter the PGC equation, interval need exhibits a highly significant effect on PGC. Similarly, mental health related indicators show a powerful (and unsurprising) influence over levels of morale. Hence, the general level of anxiety of users, as expressed by the number of user fears<sup>27</sup>, and particularly anxiety over their financial situation (indicated by the fact that a user feels vexed by the extent of service charges) contribute to lower morale. In contrast, users exhibiting behavioural difficulties showed, *ceteris paribus*, higher morale.

The fact that users referred to social care services following their discharge from hospital exhibit, other things equal, better morale, is likely to reflect the different nature of their needs. Also, users with long interval needs but targeted to receive social work - often targeted at depressed people with more complex problems than their dependency suggests – are found to suffer from lower morale.

### 5.7.2 *Service productivities*

There are few service productivity effects identified in Table 5.6. The majority of these effects, depicted in Figure 5.19 and Figure 5.20, are not highly significant statistically and refer to lower proportions of the cases in the sample.

- Within the range of service provision observed in the sample, *home care* shows a constant productivity effect for users whose principal informal caregiver is a close female relative. This effect may reflect a division of labour between formal and informal care which helps affect in relationships, in the sense that home care inputs are likely to transform the nature

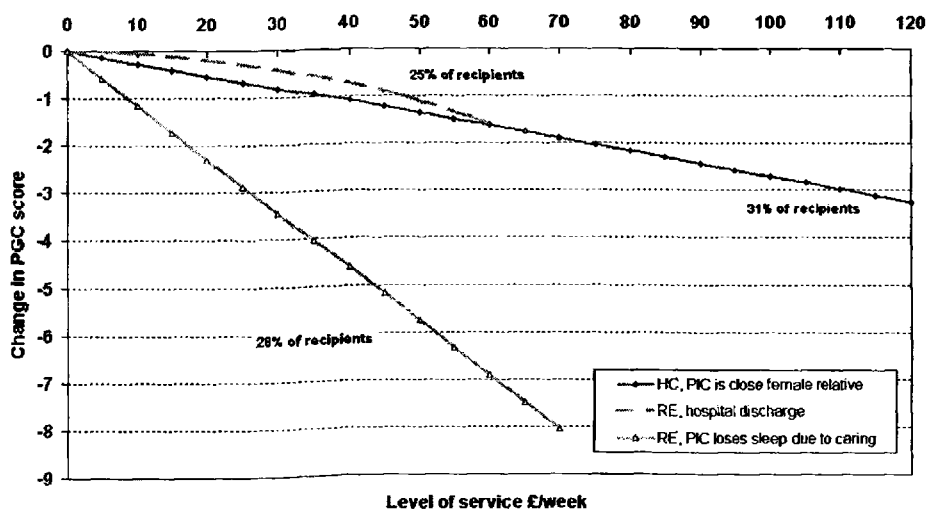
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<sup>27</sup> The items aggregated in the indicator of anxiety include: fear of becoming too ill; of suffering an accident; of losing independence; of putting too much of a burden on others; of not eating well enough; of not making ends meet; about personal safety.

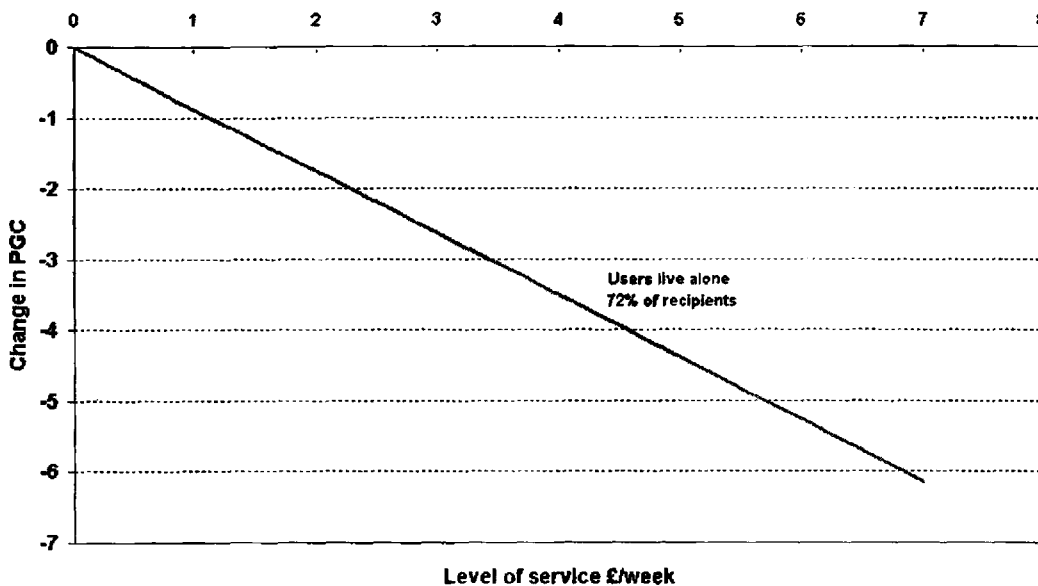
of the tasks performed by the PIC, potentially liberating some time for the provision of general companionship. The marginal productivity relates to approximately 31 per cent of users of home care, and so more than one quarter of the sample as a whole.

- Surprisingly perhaps, given the apprehension shown by some users about such services (Pickard 2004), *respite care* inputs are found to improve morale (although not highly significantly) for users discharged from hospital (constituting approximately 25 per cent of the recipients of the service). They show, however, much larger marginal productivity when the principal informal caregiver loses sleep with worry, probably a reflection of anxieties of both user and caregiver. This effect covers 28 per cent of users of respite care, but applies to only 6 per cent of the whole sample.
- For the first time, *social work* inputs (non-related to care management activities) exhibit a significant productivity effect. Compared to the rest of service effects, social work inputs appear to have a highly beneficial impact on users' morale per level of input invested. The effect exhibits constant returns to factor, and affects the 71 per cent of social work recipients who live alone (and therefore at higher risk of being socially isolated).

**Figure 5.19 Production curves: home care and respite care effect on overall lack of morale**



**Figure 5.20 Production curves: social work effect on overall lack of morale**



### 5.7.3 Overall service impact, impact for groups, and equity and efficiency

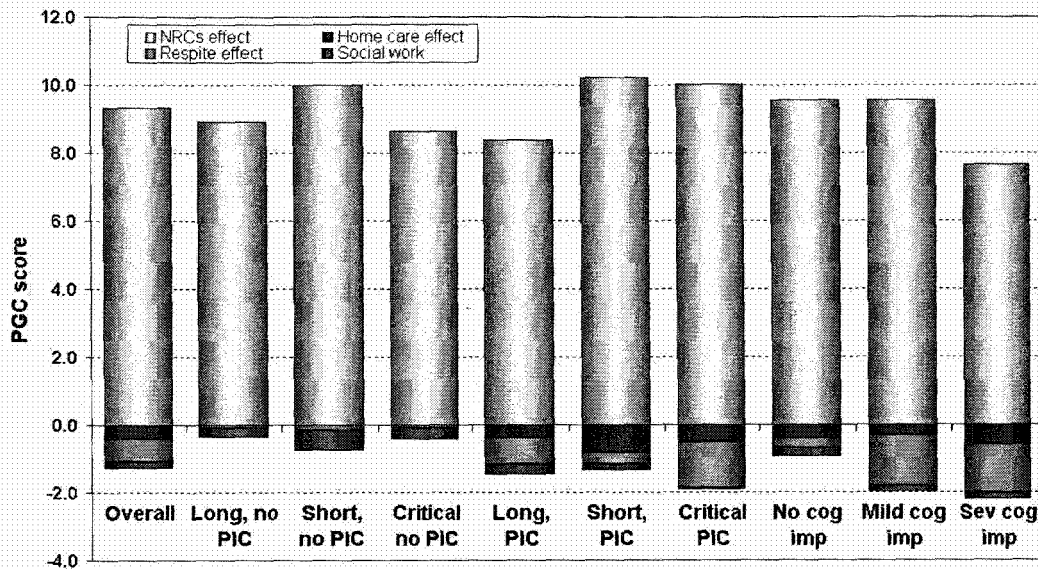
#### *NRC and service contributions*

- The size of service contributions, depicted by Figure 5.21, appears very small in comparison to the levels of PGC contributed by non-service related factors. Surprisingly perhaps, the model finds the lowest levels of morale (that is, the highest PGC levels) not for the most dependent users, but for users with short interval needs.
- Figure 5.21 indicates a positive correlation between users' lack of morale, their level of cognitive impairment and the size of the service contribution. However, the appropriate interpretation of such effect is complicated by the relatively low reliability of the measurement of the outcome variable for cognitively impaired users.
- Whereas there are no clear patterns by physical disability, Figure 5.21 illustrates the greater service contributions to PGC enjoyed by users with PICs, and particularly by those with critical interval needs.

In terms of the contribution of individual services, the picture varies depending on users' characteristics. For users without PICs, the majority of the contributions come from the effect

of social work inputs. In contrast, most of the package contributions in morale for users with PICs is produced by respite care and home care inputs.

**Figure 5.21 Contributions of services and risk factors to user overall lack of morale**

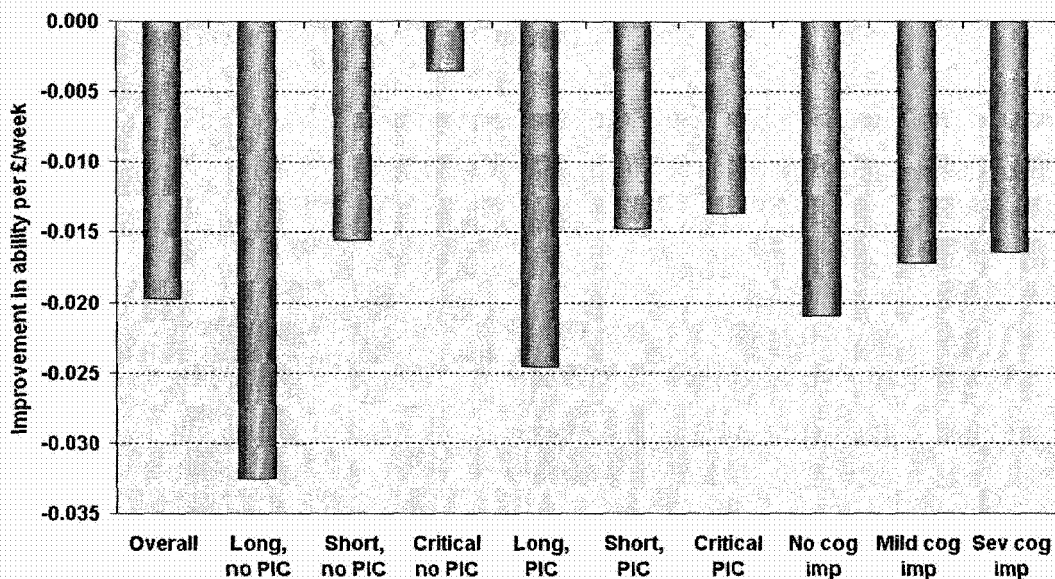


#### *Care package average productivities*

Overall, Figure 5.22 shows a clear negative correlation between the average productivities of packages of care and users' level of need. Therefore, the pattern of final package contributions reveals, from a strict aggregate efficiency point of view, and for this output, a clearly sub-optimal allocation of the resources.

Users without principal informal caregivers, particularly those with long interval needs, who enjoy the highest package average productivities, receive the smallest package contributions. It is likely that small investments in social work inputs would have improved greatly the outcome for these users, this being the input with by far the greatest average productivities. Although potentially justifiable in terms of the achievement of other competing goals, the greater improvement in morale for users with PICs is therefore to be explained by the disproportionately large allocation of resources to them, particularly of less productive inputs.

**Figure 5.22 Average total package productivity for user overall lack of morale**



#### 5.7.4 Overview

Results show that

- There are few clear productivity effects. Those identified relate to a small proportion of users in the sample.
- Out of the productivity effects identified, the effect of social work inputs appears to be by far the most cost-effective.
- Overall, the impact of service contributions is small in relation to that of risk factors, particularly for those without principal informal caregivers.

### 5.8 General dissatisfaction with life (GDL)

The GDL indicator was derived by aggregating items from the PGC score reflecting a negative evaluation of the present, including lack of family contact, being easily upset, and taking adversity badly (Davies and Challis 1986). Relative to the PGC scale, GDL therefore aims to capture more specific items relating to present features in users' lives contributing to



their morale. As with PGC, the GDL indicator measures *lack of* morale, so that the beneficial effects of services should appear in the model with a negative sign.

### **5.8.1 *The model and the impact of risk factors***

*Goodness of fit.* Table 5.7 summarises the results from the production function for GDL. As for the majority of production functions explored so far, the model explains approximately one third of the variation in the dependent variable.

#### *Need-related circumstances and other risk factors.*

A large number of NRCs appear to influence GDL. Overall, the main effects relate to (a) physical disability and illness, (b) users' anxiety, and (c) the buffering effects of informal care.

- Limitations in physical functioning clearly impact negatively on life satisfaction levels. Hence, inability to perform ADL and IADL tasks, whether the user has suffered a stroke, and whether the user belongs to the critical interval need category (and is targeted to receive day care) are all factors linked to increases in levels of GDL.
- The buffering effect of informal care is strongly suggested by three predictors: whether the spouse is the PIC; the level of informal support with personal care tasks for users with severe limitations with ADL activities; and the level of informal support with housework for users who live alone. Also, the lower levels of life satisfaction associated with users selected for nursing visits with worried PICs are likely to relate to the effect of breakdown in caregiving.
- Several results in Table 5.7 confirm the importance of anxiety in explaining GDL. Hence, the number of user fears, together with a care manager's view that the user is more reliant than others in the same circumstances, are both factors linked to higher levels of general dissatisfaction with life. More indirectly, the strength of the rejection of residential care and vexation about charges are also factors likely to reflect a user's feelings of anxiety over the prospect of institutionalisation and a difficult financial situation. Similar effects were identified in the PGC model.

As was found in the PGC model, users suffering from behavioural problems appear to enjoy, other things being equal, higher levels of satisfaction with life. However, the interpretation of

this finding is complicated by the high prevalence of cognitive impairment amongst people exhibiting behavioural problems.

**Table 5.7 Production function for general dissatisfaction with life score (GDL)**

PREDICTORS BY DOMAIN	Coef.	Prob.	% Recipients <sup>1</sup>	% Users <sup>2</sup>
<b>NEED-RELATED CIRCUMSTANCES</b>				
<b>General effects</b>				
<i>Physical disability</i>				
Count of problems with IADLs - Uiadls	.142	.009		
User cannot wash hands - Cantwhnd	-1.057	.005		
<i>Mental health problems</i>				
User has behavioural problems - Wbehav	-1.617	.000		
<i>Other health problems</i>				
User suffered stroke - Wstroke	.833	.002		
<i>Informal care related factors</i>				
PIC is spouse - Wspouse	-.806	.047		
Informal personal care hrs/wk, high no of probs with ADLs - lpc_had	-.038	.031		
Informal housework care hrs/wk, user lives alone - lhc_walo	-.242	.003		
<i>Other</i>				
Count of user fears - Ufears	.322	.000		
User is over-reliant - Wurelian	.411	.034		
User is vexed by charging - Vexed	1.224	.011		
User is against entry into residential care - Upercent	.242	.009		
<b>Targeting-captured need effects</b>				
Critical interval need, user targeted for day care - Dc_crit	1.503	.000		
User lives alone and targeted for meals - M_alon	.779	.002		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>				
<b>Individual input effects</b>				
<i>Home care</i>				
PIC is close female relative - Hcc_clof	-.0071	.029	31.0	25.6
<i>Meals</i>				
Long interval need - Mc_long	-.0565	.030	42.7	14.6
<i>Day care</i>				
User discharged from hospital - Ldc_fh (log)	-.248	.041	16.5	5.3
User has high no of probs with ADLs - Dcc_had (log)	-.0176	.064	22.8	7.5
<i>Respite care</i>				
User is married - Re2_marr (squared)	-2.1E-4	.045	25.5	5.9
<b>CONSTANT</b>				
	1.005	.021		
Adj R <sup>2</sup>	.36	Prob	.000	Nbr of cases 241

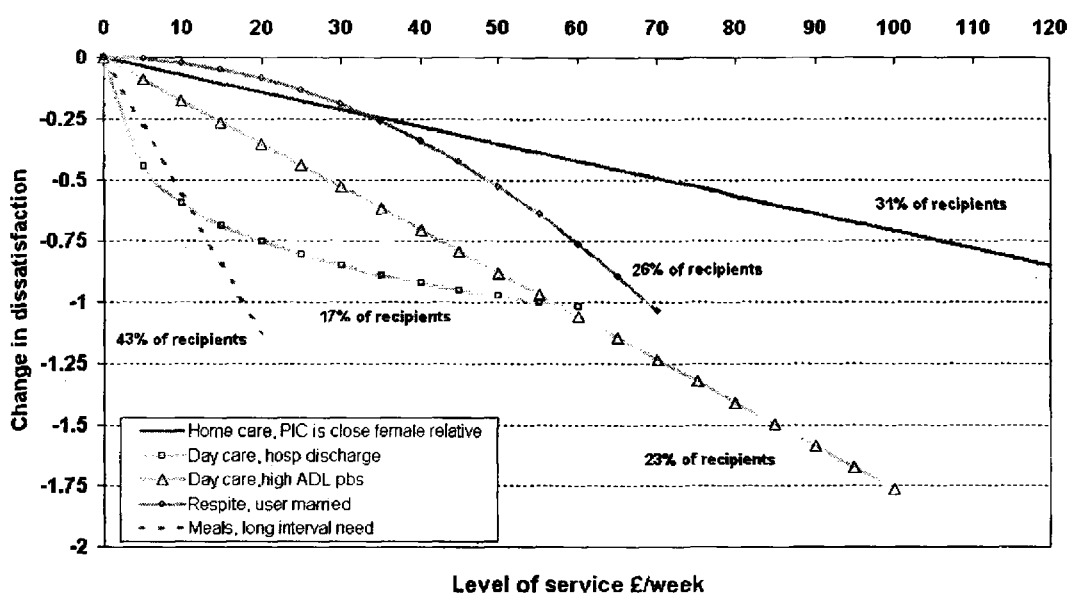
<sup>1</sup> Proportion of recipients of the service to whom the effect applies <sup>2</sup> Proportion of the sample to whom the effect applies

### 5.8.2 Service productivities

Overall, the patterns of service productivities parallel those identified for PGC: a small number of effects, not highly significant, and relating to a low proportion of cases in the sample. The effects are summarised in Figure 5.23.

- As was found for PGC, levels of dissatisfaction are reduced by the provision of home care inputs for users whose informal caregivers are a close female relative (about one third of recipients of the service). Again, this effect may relate to the division of tasks between informal and formal support.
- *Meals* are estimated to have a high and constant marginal productivity for the 43 per cent of recipients who are of long interval need.
- Whereas it was not found to have an effect on PGC, *day care* appears to reduce significantly GDL scores for two user groups: users with a high number of problems performing ADL tasks, and users recently discharged from hospital. Together, both effects cover approximately 38 per cent of the recipients of the service.
- Interestingly, the beneficial effect of respite care on GDL mirrors exactly its effect on user satisfaction, in that it relates to the 25 per cent of users who are married, and exhibits increasing returns over the range of inputs observed.
- Overall, three of the five service productivities identified showed constant marginal productivities over the ranges of provision observed.

**Figure 5.23 Productivity curves: day care, home care and meals effect on GDL general dissatisfaction with life**



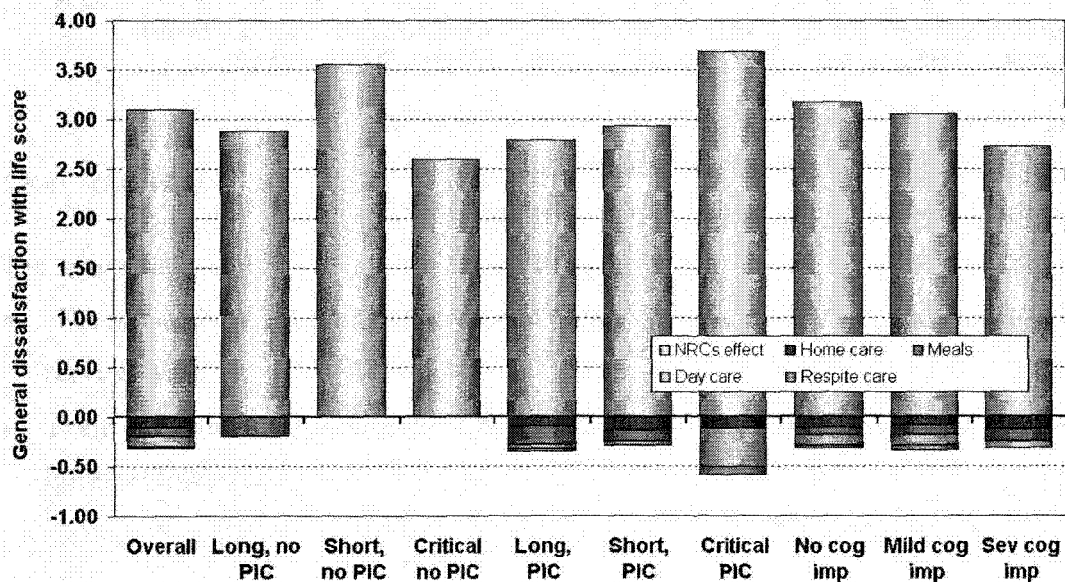
### 5.8.3 Overall service impact, impact for groups, and equity and efficiency

#### *NRCs and service contributions*

Figure 5.24 suggests that, overall, the contributions made by services are very limited, relative to the effect of NRCs.

- By case type, the largest service contributions are for users with PICs, particularly with critical interval needs. For users with informal caregivers, service contributions reduce to some extent the significant inequality in GDL related to differences in disability levels.
- Among users without PICs, only users with long interval needs enjoy any service contributions at all.
- Surprisingly, Figure 5.24 suggests that the lowest levels of dissatisfaction with life are among users with critical interval needs, and without informal support. This finding may be the product of a self-selection process by which the group of critical interval need users who manage to remain in the community without informal support do so only because they share particularly strong coping mechanisms which also provide them with a more positive outlook on life.

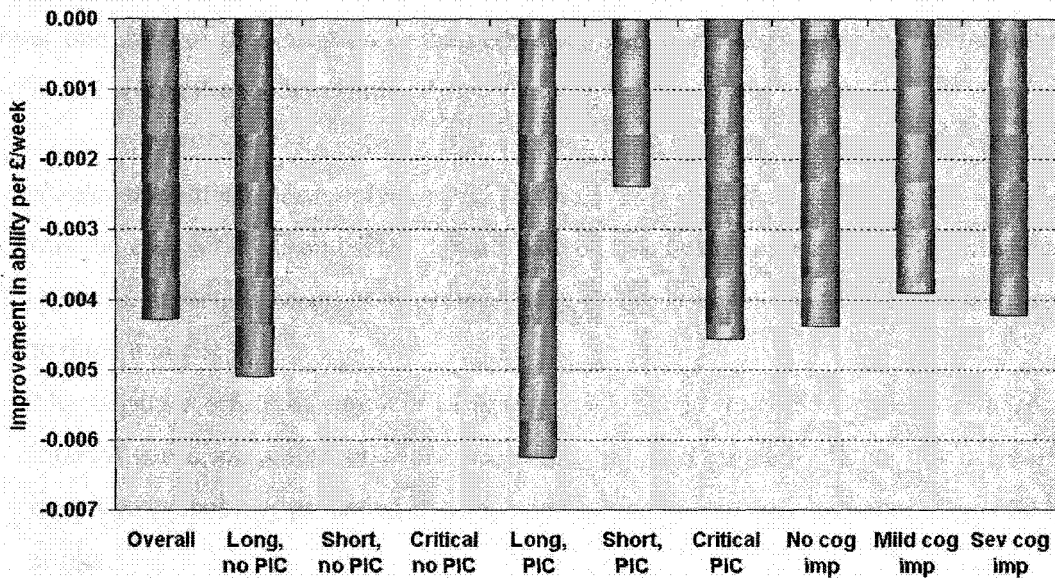
**Figure 5.24 Contributions of services and risk factors to user general dissatisfaction with life**



### Care package average productivities

Figure 5.25 shows the pattern of average care package productivities. First, the picture reflects the lack of service effects for short and critical interval need users without informal caregivers. In addition, it shows the highest average productivities to be for users with long interval needs and PICs. The observed service contributions are therefore far from those implied by efficiency criteria.

Figure 5.25 Average total package productivity for general dissatisfaction with life



#### 5.8.4 Overview

The results show that

- The productivity effects for GDL are not highly significant, and cover low proportions of service users.
- There are substantial service contributions only for critical interval cases with principal informal caregivers.

## 5.9 Dissatisfaction with life development (DLD)

The dimension corresponds to the dimension called Satisfaction with Life Progression identified by Morris and Sherwood (1975). It more explicitly compares aspects of quality of life with an earlier period than do some of the GDL items, which are focused solely on the current situation.

### 5.9.1 *The model and the impact of risk factors*

The results for the production function model for DLD are reported in Table 5.8. Again, about one third of the variation in the dependent variable is explained by the relationships embodied within the model estimated.

#### *Need-related circumstances and other risk factors.*

As was the case for PGC and GDL, a multitude of risk factors appear to drive differences in DLD levels. In fact, as could be expected, many of the NRCs effects identified are common to the three models.

- The negative effect of *physical disability* on DLD is reflected in the coefficients for interval needs, the count of health problems, and two targeted effects, for users of day care who cannot buy groceries, and for users of respite care among people who had had a stroke.
- As for PGC and GDL, the results in Table 5.8 indicate the strong positive effect of *informal care networks*, as indicated by the presence of a PIC and by the total level of support per week from informal caregivers. Two factors reduce the buffering effect of informal care: the full-time employment of the caregiver, and high levels of caregiver stress (among users attending day care).
- Anxiety appears as the third large influence on levels of dissatisfaction with life development. Hence, financial circumstances (indicated by the level of income, home ownership, and the feeling of vexation with service charges), the count of user fears, and the extent of feeling against residential care amongst those targeted to receive social work inputs are all factors identified as significantly affecting dissatisfaction with life development.

Again, users suffering from behavioural problems appear to experience lower levels of dissatisfaction.

**Table 5.8 Production function for dissatisfaction with life development score (DLD)**

PREDICTORS BY DOMAIN	Coef.	Prob.	% Reci- pients <sup>1</sup>	% Users <sup>2</sup>
<b>NEED-RELATED CIRCUMSTANCES</b>				
<b>General effects</b>				
<i>Physical disability</i>				
Interval need level – Intneed <sup>3</sup>	-.318	.000		
<i>Mental health</i>				
User presents behavioural problems - Wbehav	-.688	.018		
<i>Other health problems</i>				
Count user number of health problems - Wuhlthpb	.056	.121		
<i>Informal care related factors</i>				
Presence of PIC - Wpic	-.458	.000		
Informal help hrs/wk all tasks - Inft	-.005	.007		
PIC is employed - Cemploy	.338	.007		
<i>Poverty and material environment</i>				
User income level - Income	-.284	.022		
User owns home (alone or with others) - Uownshs	-.257	.022		
<i>Other</i>				
Count of user fears - Ufears	.153	.000		
User is vexed by charging - Vexed	.694	.003		
<b>Targeting-captured need effects</b>				
User cannot shop to buy groceries, and targeted for day care - Dc_groc	.306	.013		
PIC is stressed, user targeted for home care - Hc_cstr	.217	.058		
User had stroke and targeted for respite care - Re_strk	.415	.048		
User against residential care admission, targeted for social work input - Sw_prctd	.313	.001		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>				
<b>Individual input effects</b>				
<i>Home care</i>				
User has skeletal problems - Lhc_skel (log)	-.0739	.005	58.6	45.2
User cannot go to toilet by himself - Lhc_toil (log)	-.111	.011	24.2	8.3
<i>Delivered meals</i>				
			26.8	9.2
<i>Day care</i>				
PIC is close female relative - Dcc_clof	-.0083	.003	50.0	16.5
User has behavioural problems - Ldc_beha (log)	-.162	.069	44.3	14.4
<i>Respite care</i>				
User is married – Re2_marr (squared)	-1.3E-4	.007	12.7	4.2
User discharged from hospital - Rec_fh	-.0101	.010	64.9	10.7
			25.5	5.8
			25.0	5.7
<i>Social work</i>				
User cannot do heavy housework tasks - Swc_hhwk	-.210	.027	87.0	14.5
<b>Complementarities</b>				
Meals and nursing visits interaction, short interval need - Nmc_sht	-7.0E-4	.085	71.0	9.2
<b>CONSTANT</b>				
Adj R <sup>2</sup>	.35	Prob	.000	
		Nbr of cases	242	

<sup>1</sup> Proportion of recipients of the service to whom the effect applies <sup>2</sup> Proportion of the sample to whom the effect applies ; <sup>3</sup> Interval need represents a negative indicator of disability: 1=critical, 2=short, 3=long interval need category.

### 5.9.2 Service productivities

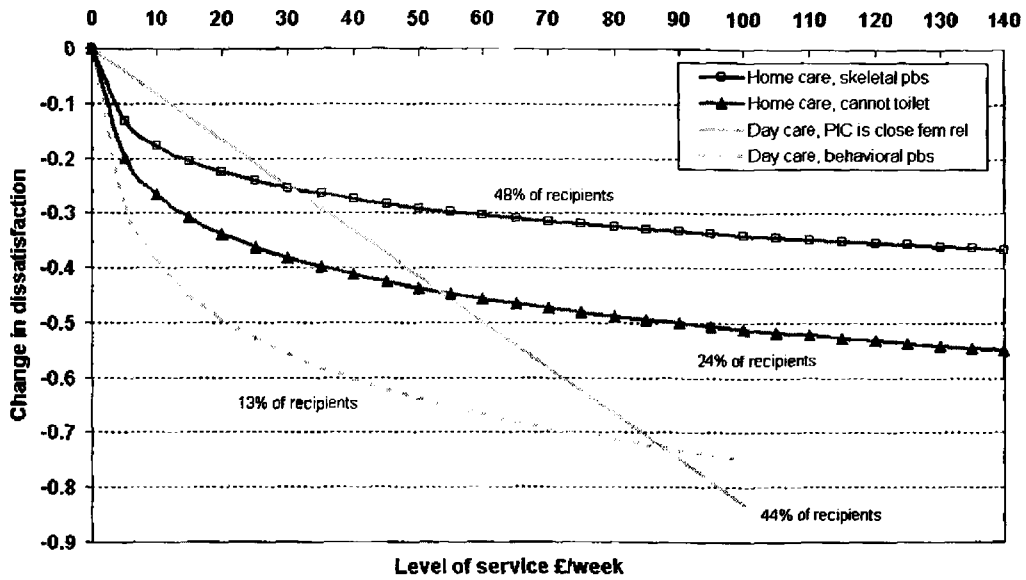
The productivity effects in Table 5.8 are more clearly established in terms of their significance levels, the number of services to which they relate and the proportion of service users covered than those found for either PGC or GDL. It thus appears that service inputs are more significant in influencing how users interpret their current situation in relation to their life span than the nature of their current situation itself.

Overall, productivity effects are identified for at least some user groups for all the services investigated.

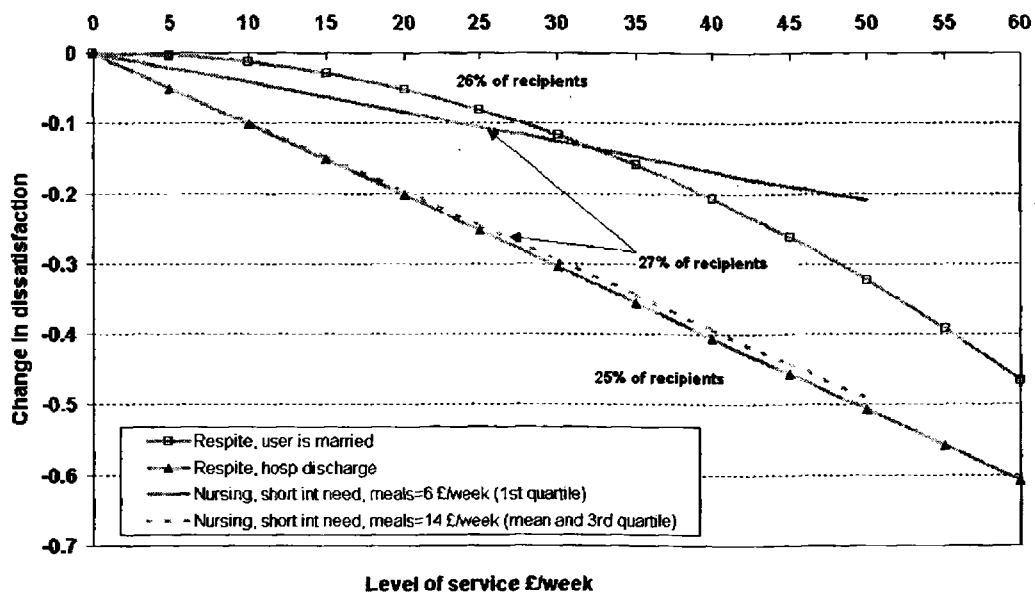
- Home care services appear to be most beneficial, in terms of improving DLD scores, for the physically disabled. Hence the two effects apply to the 48 per cent of home care users with musculo-skeletal problems, and to the 24 per cent unable to go to the toilet unaided (between them, the two effects cover 59 per cent of home care recipients and about 45 per cent of all cases in the sample). Figure 5.26 shows that both effects are characterised by decreasing marginal returns, and so progressively falling average productivities with higher input levels.
- *Home-delivered meals* and *nursing inputs* reduce dissatisfaction with life development only when provided jointly, as reflected in Figure 5.27 and Figure 5.28. Nevertheless, the effect applies to 27 per cent of recipients of meals, and to 71 per cent of nursing recipients.
- The main *day care* effect identified in Table 5.8 relates to the 44 per cent of the service's users whose principal informal caregiver is a close female relative, and exhibits constant returns to factor. The other day care effect, for users with behavioural problems, relates to a very small proportion of the sample, and is not highly statistically significant.
- The two effects for *respite care* shown in Figure 5.27 are highly significant. They each relate to approximately one in four of respite recipients. Interestingly, the factors 'user discharged from hospital' and 'user is married' were also found to define user subgroups productivity effects for respite care in a number of other outcome indicators.
- The effect for *social work* shown in Figure 5.28 applies to 87 per cent of its recipients, and is by far the largest in the model.



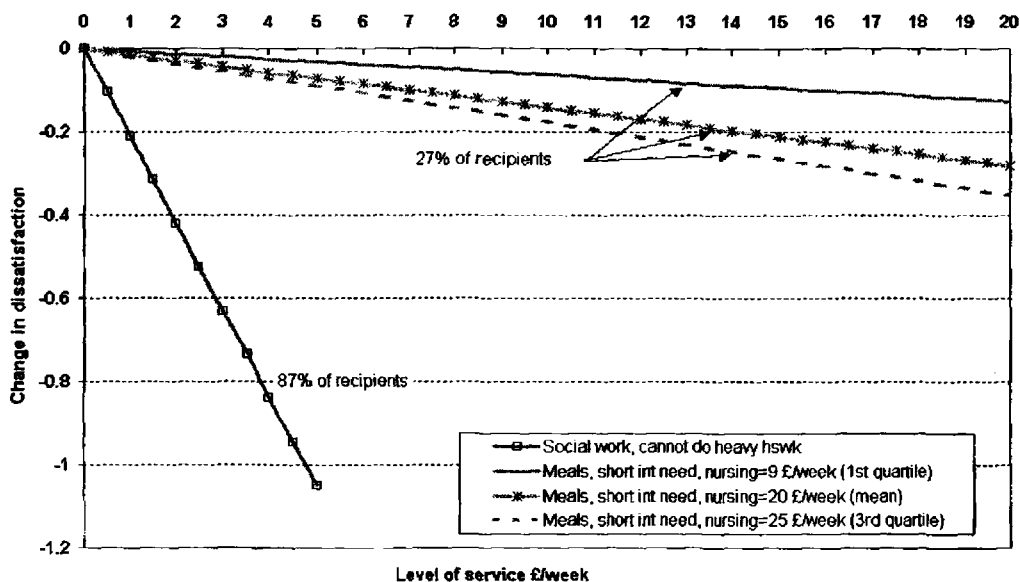
**Figure 5.26 Productivity curves: day care and home care effect on dissatisfaction with life development score**



**Figure 5.27 Productivity curves: nursing visits and respite care effect on dissatisfaction with life development score**



**Figure 5.28 Productivity curves: meals and social work input effect on dissatisfaction with life development score**



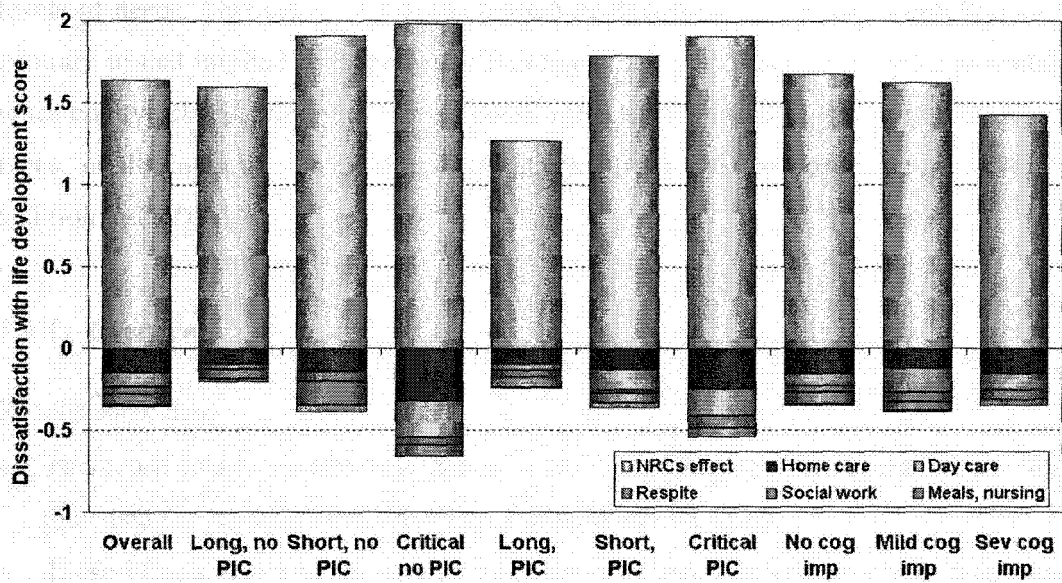
### 5.9.3 Overall service impact, impact for groups, and equity and efficiency

#### *NRC and service contributions*

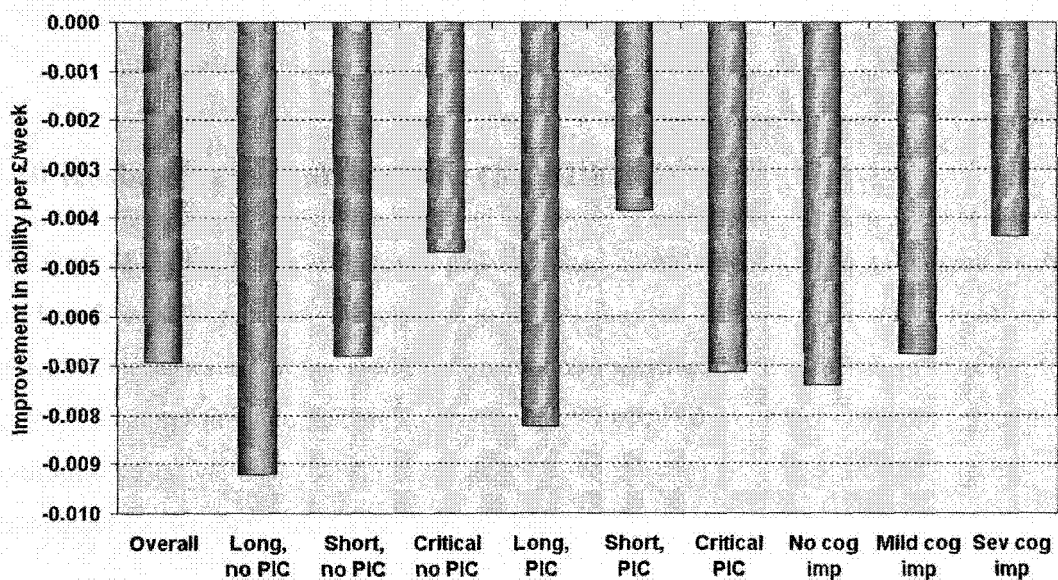
The pattern of service contributions to DLD is in stark contradiction to that for GDL, both in terms of the distribution of the service contributions and their size relative to the NRCs effects.

- As Figure 5.29 illustrates, there is a clear positive correlation between users' dependency level, their level of dissatisfaction, and the size of service contributions. As a result, the effect of services is to reduce very significantly the differences in the predicted DLD levels, by offsetting to a large degree the differences that would have emerged due to the effects of risk factors.
- Disaggregating between services, it is important to note that *home care* shows a significant contribution for all groups, which increases with a user's level of dependency. *Day care* inputs make a greater contribution for users with critical interval needs and those with PICs. Also worth noting is the large contribution achieved by social work inputs relative to the low levels of the service actually provided.

**Figure 5.29 Contributions of services and risk factors to user dissatisfaction with life development**



**Figure 5.30 Average total package productivity for user dissatisfaction with life development**



### ***Care package average productivities***

Figure 5.30 shows the package average productivities to be highest for users with lower levels of needs. This suggests that the pattern of distribution of service contributions to be contrary to that implied by aggregate efficiency criteria, and therefore driven potentially by other equity related principles. These could reflect differences in the prioritisation of user types, or the influence on service distributions of the need to achieve other outcomes in addition to *DLD*.

#### **5.9.4 Overview**

Results show that:

- There are more productivity effects - and more highly significant ones - for this dimension of morale than for morale in general and for GDL.
- These effects relate to all service types investigated, and cover greater proportions of service users than those identified for PGC and GDL.
- The two groups for whom the service contribution is greatest and the risk factors predict high dissatisfaction are those with critical interval needs.
- Overall, the packages show the highest average productivities for the user groups who experience the lowest service contributions.

### **5.10 Kosberg carer burden scale (KOSBERG)**

The Cost of Caring Index was developed as a case management tool to assist care managers to identify actual or perceived problem areas for families in the care of older relatives. The indicator measures 27 items along 6 dimensions identified by the literature to relate to the 'cost' of supporting dependent older people: social disruptions; personal restrictions; economic costs; value for care provision; care recipient as provocateur; and psychosomatic consequences (Kosberg and Cairl 1986, p.275).

The fact that KOSBERG measures stress specifically related to the activity of caring is important, as it is likely to improve its sensitivity as an indicator of the impact of social care services on the welfare of carers.

### **5.10.1 The model and the impact of risk factors**

*Goodness of fit.* Table 5.9 shows the results for the KOSBERG model, estimated exclusively for users benefiting from the support of a PIC. The model fits well, and accounts for more than one half of the variance in KOSBERG levels. There are a substantial number of predictor variables whose effects are well determined and stable.

#### *Need-related circumstances and other risk factors.*

Several NRC indicators are found to affect significantly the levels of caregiver burden. However, most of them are best defined in terms of targeting captured effects.

- Not surprisingly, the user's degree of *physical dependency* (captured by the number of IADL disabilities) is found to increase very significantly the burden associated with caring activity.
- Table 5.9 shows levels of stress to vary with the nature of the PIC/user relationship. Hence, close-female-relative caregivers (for users targeted to receive home care) and caregivers assisting the user with the preparation of main meals are found to suffer from significantly higher levels of stress. In part, these findings are likely to relate to the greater levels of support provided by such caregivers. Indeed, in the sample, the two types of caregivers were found to provide 50 per cent and 150 per cent more hours of informal support per week than other PICs, respectively. However, these trends also confirm other findings. In particular, co-residence between users and caregivers (a factor in two thirds of cases where the PIC prepares the main meals) has been associated with higher prevalence of caregiver depression and higher levels of stress (Lieberman and Fisher 1995; Twigg and Atkin 1994). Also, these results are compatible with American gerontological evidence that female caregivers are more liable to stress than males, other things being equal (Horowitz 1985; Stoller 1983).
- As found for previous indicators, the full time employment of the PIC (for cases where the user is targeted for respite care) is associated with worse outcomes, *ceteris paribus*.
- Although relating to a smaller proportion of the sample, cases where the user felt stressed by the informal caring activity were associated with higher informal caregiver burden.
- Perhaps reflecting tensions in the balancing of the interests of users and caregivers, cases where the user is perceived as the main beneficiary of the care package are also found to suffer from higher caregiver burden.

- Finally, two targeting-captured effects identifying highly difficult cases (users suffering from severe dementia and allocated home care, and users perceived to be at high risk and allocated respite care) are also associated with higher levels of caregiver stress.

**Table 5.9 Production function for Kosberg carer burden scale (KOSBERG)**

PREDICTORS BY DOMAIN	Coef.	Prob. <sup>1</sup>	% Recipients <sup>2</sup>	% Users <sup>3</sup>
<b>NEED-RELATED CIRCUMSTANCES</b>				
<b>General effects</b>				
<i>Physical disability</i>				
Count of number of problems with IADLs - Wiadls	.580	.000		
<i>Informal care related factors</i>				
User is stressed because PIC caring - Cupbstr	3.082	.006		
Main carer cooks meals - Mcmeal	1.610	.000		
<b>Targeting-captured need effects</b>				
User is main beneficiary of package and targeted for day care - Dc_uben	4.095	.000		
PIC is a close female relative and user targeted for home care - Hc_clof	2.670	.000		
User is severely cog imp and user targeted for home care - Hc_kats	2.473	.001		
User is perceived as at great risk and targeted for respite care - Re-hrsk	5.320	.000		
PIC is employed and user targeted for respite care - Re_cemp	1.590	.154		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>				
<b>Individual input effects</b>				
<i>Home care</i>				
For users with mild or sev cog imp - Hc2_katm (squared)	-1.6E-4	.038	66.1	48.9
For users with mild or sev cog imp - Hc3_katm (cubed)	4.7E-7	.037	47.1	34.9
<i>Delivered meals</i>				
<i>Day care</i>				
For employed carers - Ldc_cemp (log)	-.538	.009	38.9	17.8
For users sev cog imp - Dcc_kats	-.0791	.001	85.1	14.4
Dcc_kats - Dc2_kats (squared)	6.5E-4	.000	39.2	17.8
<i>Respite care</i>				
For over reliant users - Rec_reli	-.0216	.033	31.1	14.4
For cog. imp. Users - Lre_cog (log)	-.547	.028	65.1	25.3
<i>Social work</i>				
Social work - Sw_wcost	-.655	.000	19.0	7.4
<b>Complementarity</b>				
Day and home care interaction - Dh2 (squared)	-1.4E-8	.063	54.0	20.9
Day care and meals interaction - Ldm (log)	-.317	.008	100.0	18.2
CONSTANT	-.735	.178	100.0	12.7
Adj. R <sup>2</sup>	.56	Prob.	.0000	Nbr of cases
				161

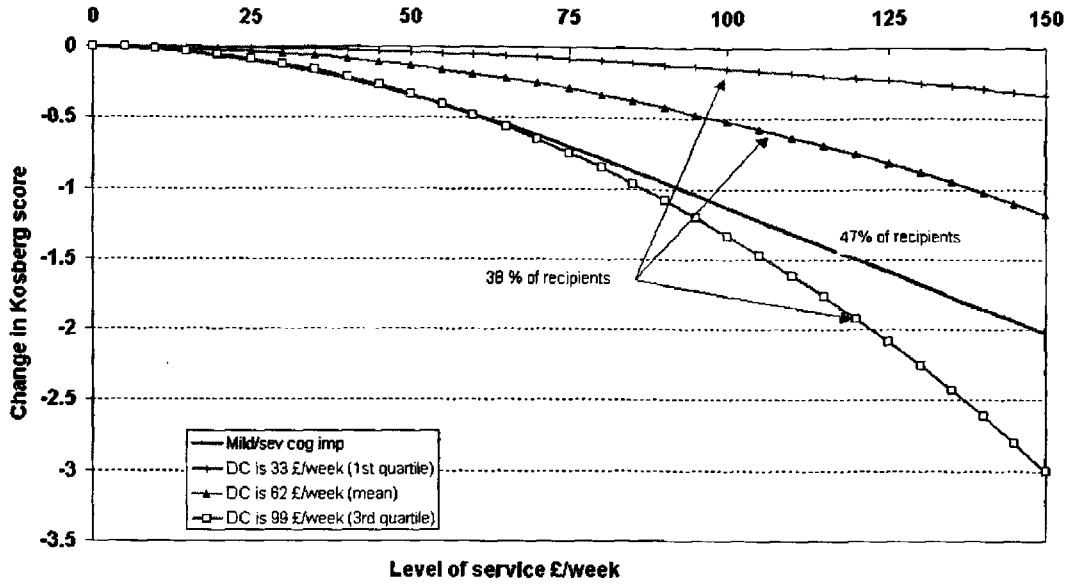
<sup>1</sup> Model estimated with robust standard errors. <sup>2</sup> Proportion of recipients of the service to whom the effect applies. <sup>3</sup> Proportion of the sample to whom the effect applies.

### 5.10.2 Service productivities

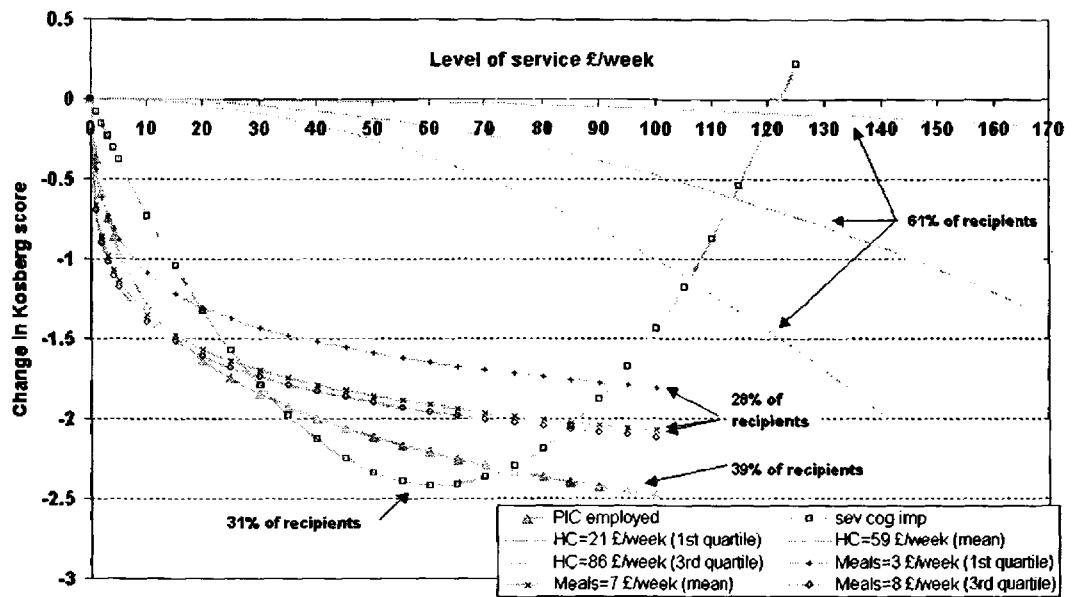
KOSBERG, as all indicators of psychological well-being in the thesis, represents a negative indicator of outcome. As such, a negative sign in Table 5.9 indicates a beneficial service effect.

- In contrast with some of the previous patterns, Figure 5.31 shows increasing returns to factor for the two home care effects in the model. The effects relate to the 47 per cent of service recipients with mild or severe cognitive impairment, and to a complementarity effect with day care inputs. In combination, home care productivities cover approximately two-thirds of the recipients of the service, and about one half of the cases in the sample.
- Figure 5.32 depicts four different day care effects on caregiver stress. The service is found to be most effective where the PIC is in full time employment or where users suffer from cognitive impairment. Figure 5.32 shows how the day care effect for the severely cognitively impaired falls for levels of inputs above £60 per week (approximately two attendances per week). This is likely to be related to unaccounted for need effects of severely confused users who are allocated quasi-full time day care inputs. In addition, day care services exhibit two complementarity effects. Thus, they are found to reduce carer stress when combined with home care inputs or meals on wheels. In contrast to the pattern for home care services, most day care productivity effects show diminishing marginal returns. Overall, they affect 85 per cent of recipients of the service, and less than half of all cases in the sample.
- Perhaps not surprisingly, given its role as one of the main inputs services aimed at relieving pressure on carers, *respite care* also shows substantial marginal productivities for a majority of recipients. Yet again, as for home care and day care, the productivity effect of respite care is particularly high where users suffer from cognitive impairment. In addition, respite care is effective for the 19 per cent of users whom care managers considered to be more reliant on caregivers than others in the same circumstances.
- Finally, *social work* inputs are predicted to have clear and constant marginal productivities for all recipients of the service. This effect, illustrated in Figure 5.34, shows by far the strongest influence on KOSBERG per pound of investment of all the services explored. The same pattern was observed for two of the three indicators of users' psychological well-being.

**Figure 5.31 Productivity curves: home care effect on Kosberg carer burden scale**

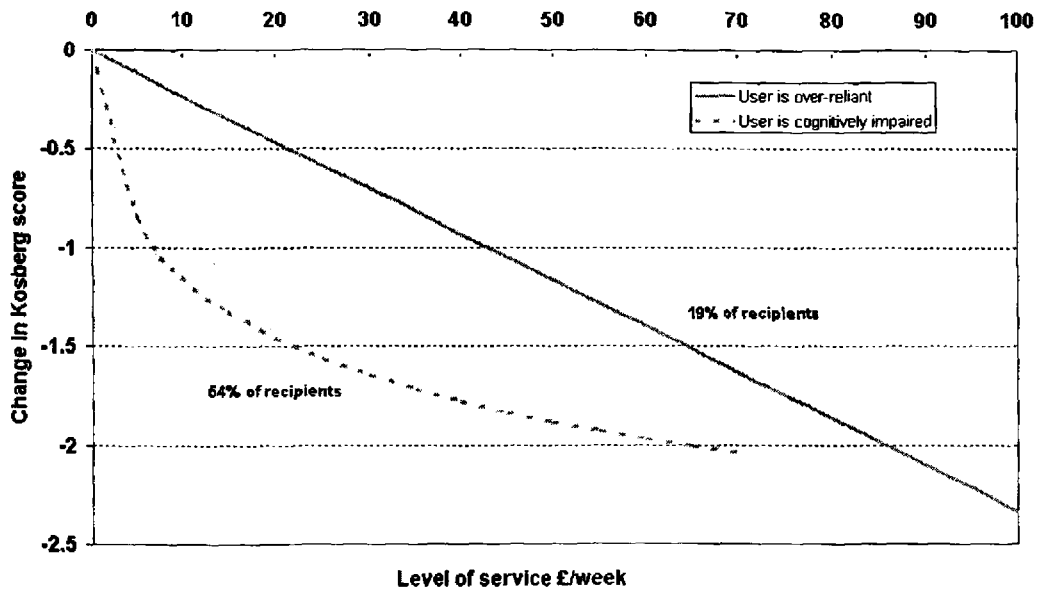


**Figure 5.32 Productivity curves: day care effect on Kosberg carer burden scale**

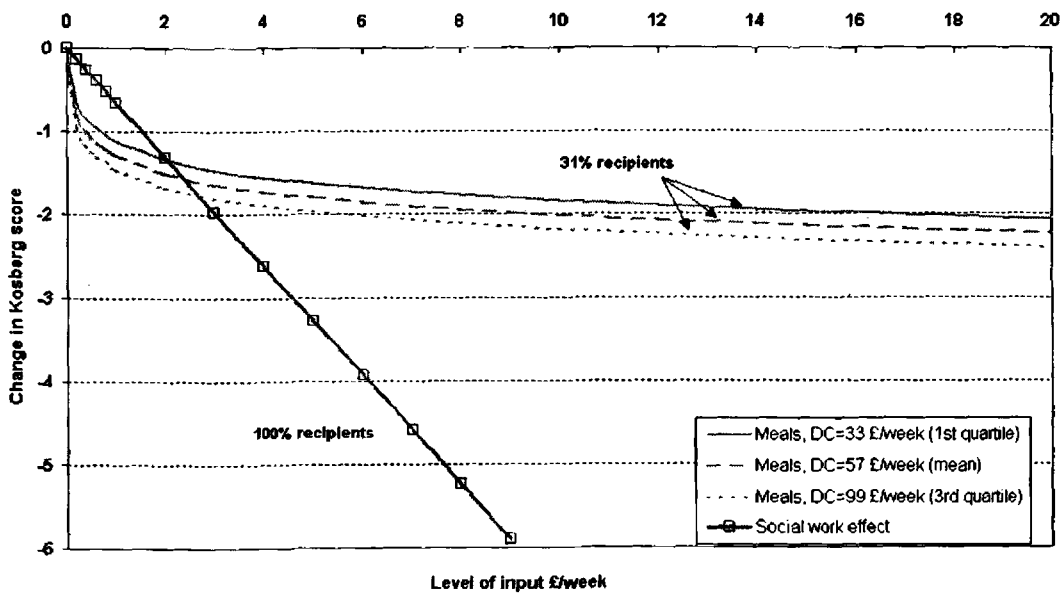




**Figure 5.33 Productivity curves: respite care effect on Kosberg carer burden scale**



**Figure 5.34 Productivity curves: meals and social work effect on Kosberg carer burden scale**



### **5.10.3 Overall service impact, impact for groups, and equity and efficiency**

#### ***NRC and service contributions***

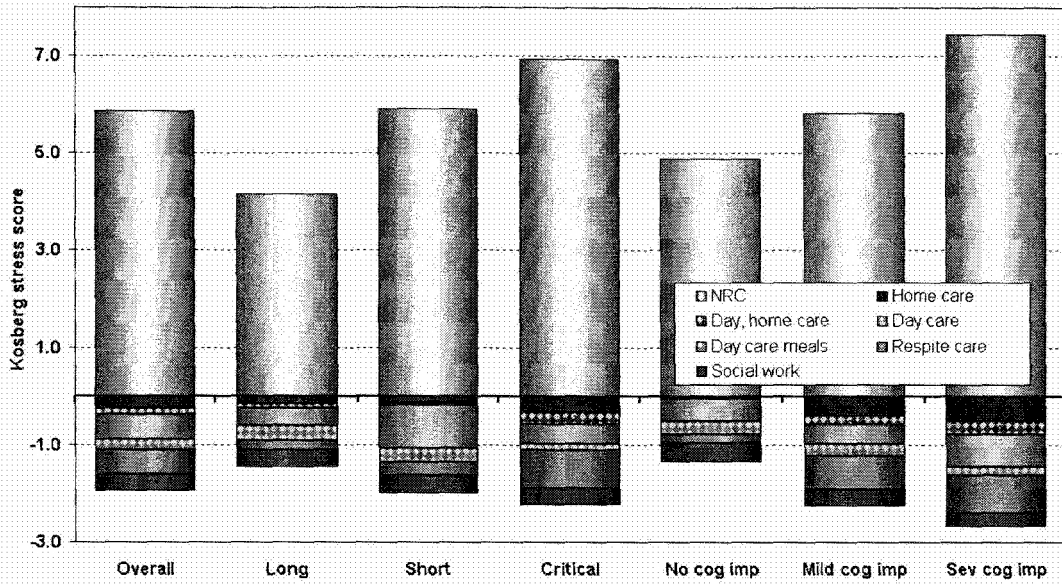
Figure 5.35 shows the effects of risk factors and service contributions on different user groups. Given the nature of the outcome indicator, no patterns are shown for users without informal carers. The figure illustrates that

- although there are substantial service contributions to KOSBERG, these are smaller than the impact of risk factors.
- service contributions increase with users' dependency level and with their level of cognitive impairment.
- as a result, service contributions significantly reduce inequalities in levels of outcomes that would be associated with non-service related factors. In other words, service contributions even out the degree of caregiver burden between groups.
- benefits to the carers of cognitively impaired people were slightly greater than to those who are physically handicapped.

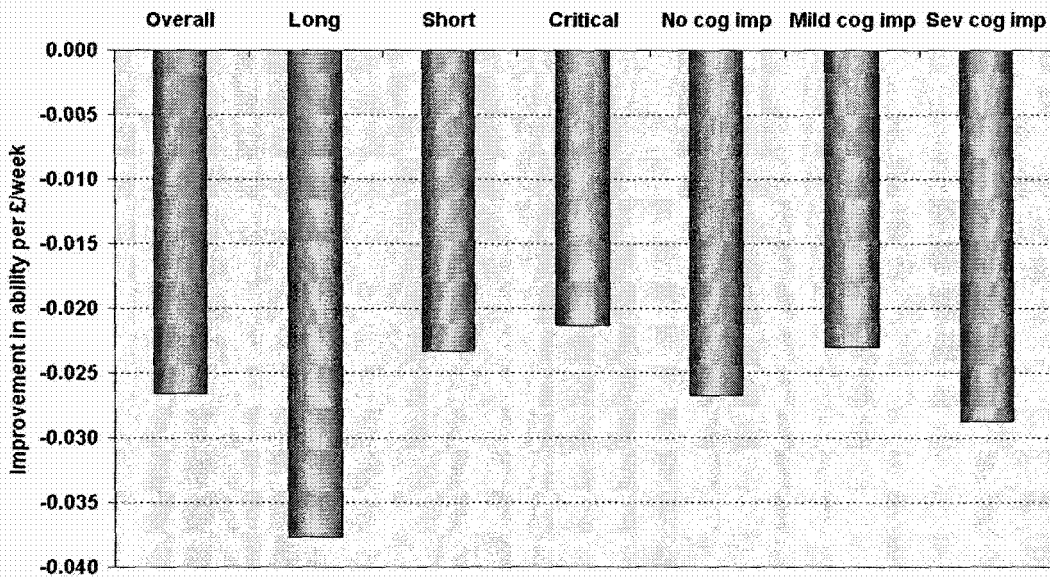
By service type, the main patterns in Figure 5.35 show that

- As would be expected given their nature, respite care and day care services provide the greatest contributions, particularly for the most dependent and for the carers of the severely confused.
- Relative to the levels of the service invested, social work inputs contribute disproportionately to improvements in caregiver stress.

**Figure 5.35 Contributions of services and risk factors to Kosberg carer burden scale**



**Figure 5.36 Average total package productivity for Kosberg carer burden scale**



### ***Care package average productivities***

The average productivities of care packages are depicted in Figure 5.36. They reveal different patterns disaggregated by dependency and by cognitive impairment.

- The average productivities of the overall packages of care are negatively correlated with dependency, and therefore with service contribution. This pattern would be compatible with an attempt to reduce caregiver burden most where the burden is greatest, even though on average such cases enjoy the least benefit per unit of service.
- By level of cognitive impairment, however, the highest average productivity is for users who are severely cognitively impaired. For these users, therefore, services are yielding the highest contribution at least partially because of the higher service productivities.

#### ***5.10.4 Overview***

The results show that

- The model fits well, and yields productivity effects for the five *social* community care services investigated.
- For most services, at least one of the sub-group effects related to cognitively impaired cases.
- Of all services, social work shows the greatest effect per pound of input invested.
- In terms of observed service contributions, however, day care and respite care yield the greatest gains in outcomes.
- Overall service contributions were substantial (although smaller) relative to the effect of NRCs, particularly for caregivers of the most dependent users and of the cognitively impaired.
- As a result, service contributions even out caregiver burden scores between groups.
- The distribution of service contribution between case types is primarily related to differences in the allocation of services to users, rather than to differences in the productivities of inputs.

## **5.11 Degree to which user considered social services to have improved how well user gets on with family and friends (IMPREL)**

IMPREL constitutes the first of two indicators concerned with the extent to which services are able to improve older people's chances to socialise, interact with family and friends and reduce social isolation and social exclusion<sup>28</sup>.

In contrast with SATSOC, the second indicator, IMPREL focuses directly on the perceived contribution of social services, and so should be the more sensitive of the two for capturing productivity effects. As the results for the indicator of user satisfaction showed, it will still be very important to control for the impact of NRCs. Indeed, given that the outcome indicator is expressed in terms of users' perceptions, the circumstances surrounding their case are likely to play an important mediating effect on the answers provided.

### ***5.11.1 The model and the impact of risk factors***

*Goodness of fit.* Table 5.10 reports the results of the modelling. It shows that the model explained a low proportion of the variance of the dependent variable.

#### *Need-related circumstances and other risk factors.*

Three groups of risk factors mediate the perceptions of improvements in relationships:

- Mental health indicators, including both the PGC low morale score at first assessment and care managers' perception of user depression. Not surprisingly, both factors are negatively associated with the output.
- Health indicators, in particular users with cancer reporting less improvement in their relationships with family and friends.
- The presence of informal support. Other things equal, users with informal carers report greater improvements in outcomes, perhaps as a direct reflection of their interaction with the informal caregiver. In addition, the effect associated with the targeting captured effect

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<sup>28</sup> As indicated in Appendix Table 3.2, the precise wording of the question from which IMPREL is derived is: 'Thinking back over the last six months how much the user says the help s/he has received from social services has improved how well s/he gets on with family and friends?'

'user is targeted to receive day care and lives alone' is likely to identify users who are particularly socially isolated and so less likely to develop strong social networks.

**Table 5.10 Production function for improvement in relationships with family/friends due to services (IMPREL)**

PREDICTORS BY DOMAIN	Coef.	Prob. <sup>1</sup>	% Recipients <sup>2</sup>	% Users <sup>3</sup>
<b>NEED-RELATED CIRCUMSTANCES</b>				
<b>General effects</b>				
<i>Mental health</i>				
PGC lack of morale score - PGC	-.100	.056		
User is perceived to be depressed by CM - Wdepr	-1.449	.054		
<i>Other health problems</i>				
User has cancer - Wcancer	-1.951	.028		
<i>Informal care related factors</i>				
User has PIC - Wpic	1.993	.000		
<b>Targeting-captured need effects</b>				
User lives alone, user attends day care - Dc_alon	-1.798	.019		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>				
<b>Individual input effects</b>				
<i>Home care</i>				
User belongs to critical interval need level (squared input) – Hc2_crit	7.2 E-5	.013	23.5	19.8
<i>Delivered meals</i>				
<i>Day care</i>				
<i>Respite care</i>				
User discharged from hospital - Rec_fh	.069	.003	26.3	5.7
<i>Nursing visits</i>				
User belongs to long interval need level - Nvc_long	.026	.000	35.7	12.3
<b>Complementarities</b>				
Day care meals interaction - Dm_wcost	.003	.086	100	13.9
<b>CONSTANT</b>				
Adj R <sup>2</sup>	.24	Prob	.000	Nbr of cases
				183

<sup>1</sup> Results estimated with robust standard errors. <sup>2</sup> Proportion of recipients of the service to whom the effect applies <sup>3</sup> Proportion of the sample to whom the effect applies

### 5.11.2 Service productivities

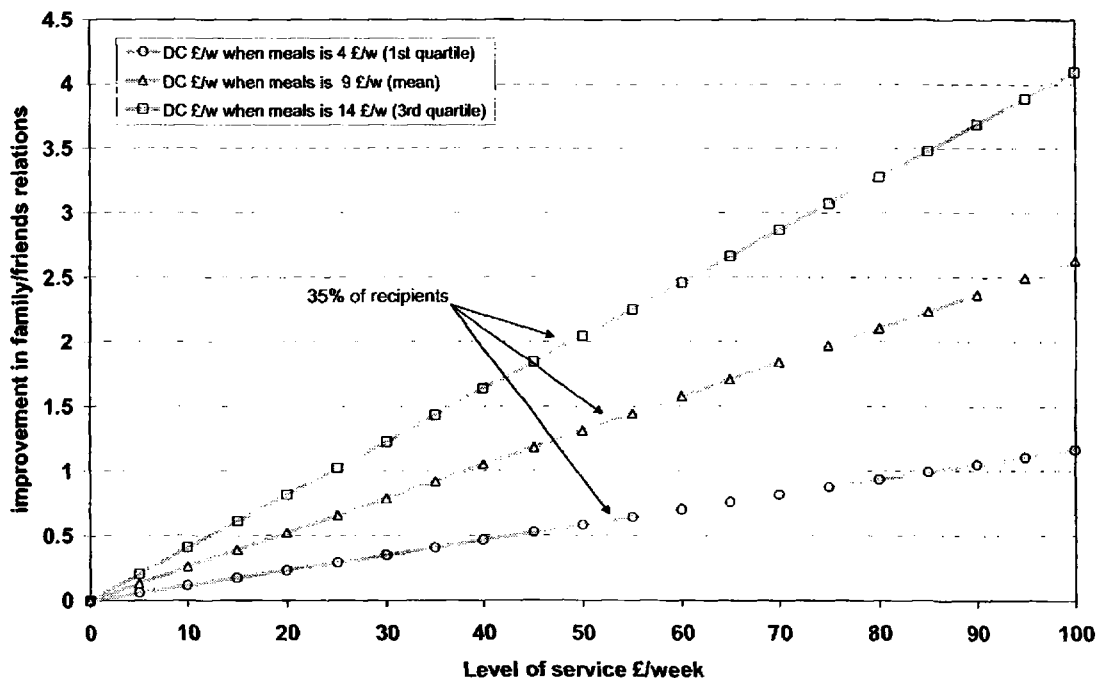
The model in Table 5.10 hints at productivity effects for the principal services. However, the effect concerns a minority of service recipients and are not highly statistically significant.

- Interestingly, as depicted in Figure 5.39, the *home care* effect relates to users with critical interval needs, and exhibits increasing returns to factor. That is, the marginal effect is strongest, the higher the level of provision. Given that home care services do not provide the means for users to socialise outside the home (particularly to critical interval need users), the effect is most likely to convey the existence of a relationship between the home care user and the home helper, made possible only at high levels of service

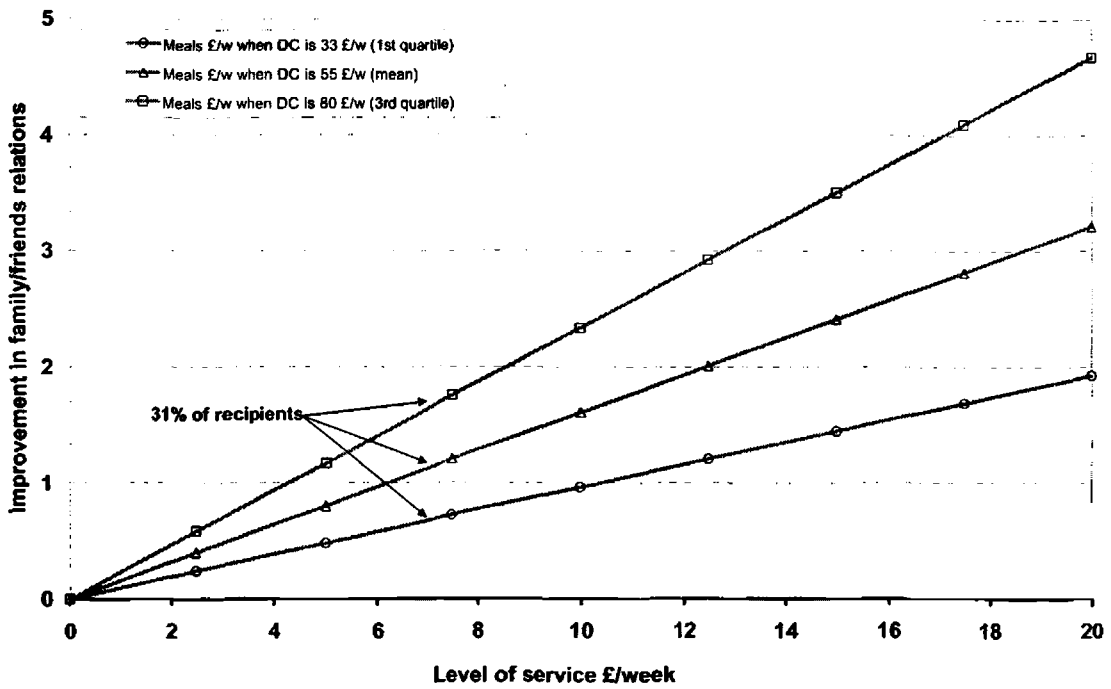
provision. In such cases, formal workers become the very agent of socialisation. Alternatively, the effect may derive from the impact on the user/carer relationship due to the provision of substantial levels of home care support. The effect, although not highly statistically significant, applied to one quarter of users.

- As for DLD, the effect of *respite care* on IMPREL relates to the 26 per cent of respite care users referred to social services following their discharge from hospital (approximately 6 per cent of the sample).
- Although with a relative lower marginal productivity, *nursing* visits show a (surprising) effect on IMPREL for long interval need users. Given the short duration of a typical visit, the effect may arise from improvements in health states derived from the service, providing users with greater chances to relate to family and friends.
- As for Kosberg, the effects of *home-delivered meals* and *day care* are found to be interdependent (see Figure 5.37 and Figure 5.38). The greater the number of meals provided, the larger the effect of increments of day care. Likewise, the larger the level of day care used, the higher the effect of increased meals provision.

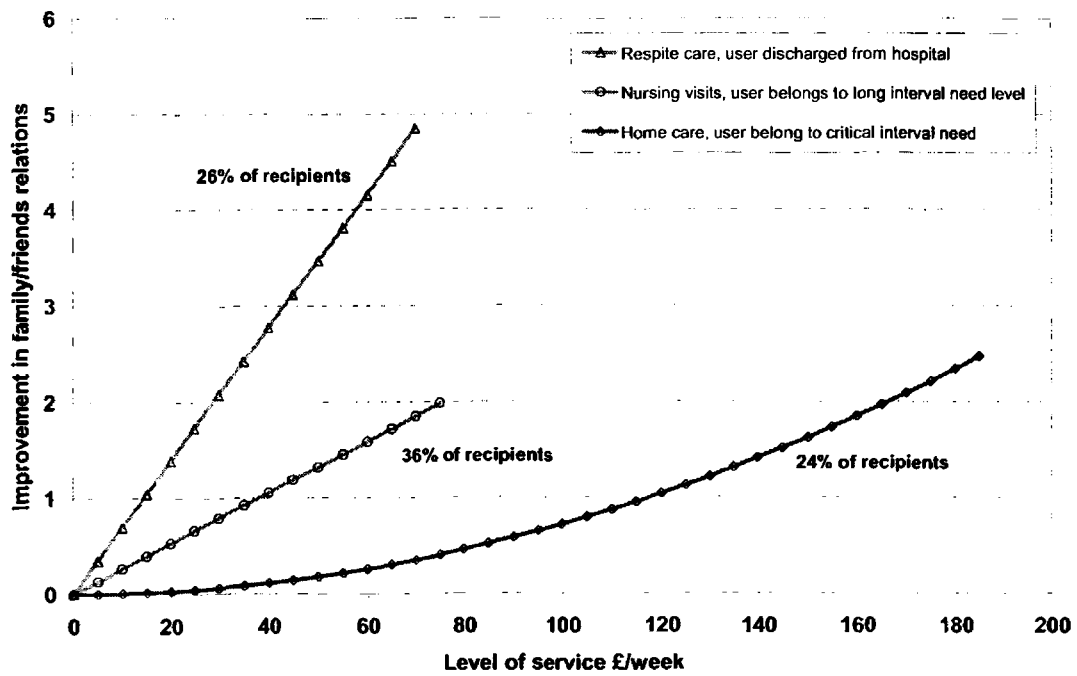
**Figure 5.37 Productivity curves: day care effect on improvement in family/friends relations due to services**



**Figure 5.38 Productivity curves: meals effect on improvement in family/friends relations due to services**



**Figure 5.39 Productivity curves: home care, nursing visits and respite care effect on improvement in family/friends relations due to services**





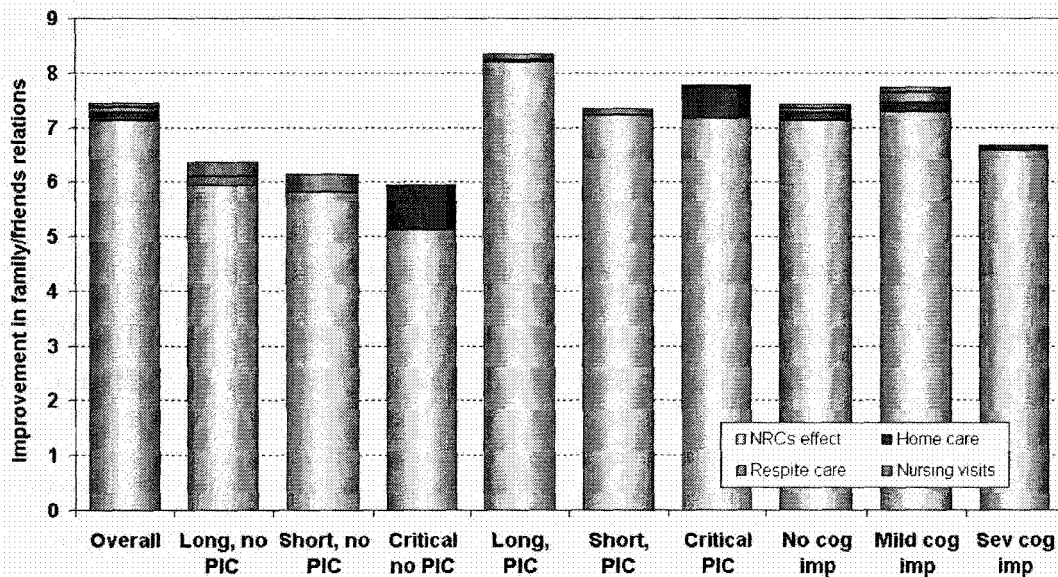
### 5.11.3 Overall service impact, impact for groups, and equity and efficiency

Overall, Figure 5.40 illustrates that service contributions play only a residual role in explaining improvements in relationships with family and friends for most user groups.

- The only case type for which sizeable improvements in outcomes are associated with the impact of services are those with critical interval needs, due to the effect of home care services.
- Overall, levels of IMPREL are higher for users with PICs, and lower for users with high levels of physical dependency.

Given the very small contribution of services, particularly compared with the NRC effects, no attempt was made to explore the pattern of average care package productivities by user groups.

**Figure 5.40 Contributions of services and risk factors to improvement in relationships with family/friends due to services**



#### **5.11.4 Overview**

Results show that:

- The model fits only to a limited extent the variation in the output variable.
- Service productivity effects were small, not highly significant statistically, and pertained to only a small minority of users.
- As a result, except for users with critical interval needs, service contributions are very small compared with the impact of risk factors for all user groups.

### **5.12 Degree of satisfaction of user with chances to meet people and socialise (SATSOC)**

SATSOC constitutes the second indicator concerned with the impact of services on the social networks of users. In contrast with IMPREL, the focus is on users' satisfaction with their opportunities to socialise and meet people in general, rather than those specifically ascribed to the effect of services.

#### **5.12.1 The model and the impact of risk factors**

*Goodness of fit.* As in the IMPREL model, Table 5.11 shows that the model exploring SATSOC predicts a moderate proportion of the variation of the dependent variable, and contains relatively few predictors with a high degree of significance.

*Need-related circumstances and other risk factors.*

- Surprisingly, and in contrast with the patterns for IMPREL, *physical disability* appears not to play a part in determining users' perceptions of their chances to socialise and meet people.
- Mental health factors significantly affect users' chances to socialise. Hence, users suffering from low morale (as indicated by the PGC lack of morale score) or from severe

cognitive impairment (and targeted to receive day care) perceive lower opportunities to meet people.

- As for most outcome indicators, the presence of an informal care support network (indicated here by the intensity of informal care support with housework tasks) improves levels of SATSOC, other things being equal. Amongst users allocated day care, this beneficial effect decreases with the level of difficulty experienced by the PIC in fulfilling the caring role.
- Finally, users suffering from a high degree of anxiety (vexed by charging and highly concerned about the risk of institutionalisation) find it more difficult to obtain or capitalise on opportunities to socialise.

**Table 5.11 Production function for satisfaction with chances to meet people and socialise (SATSOC)**

PREDICTORS BY DOMAIN		Coef.	Prob. <sup>1</sup>	% Recipients <sup>2</sup>	% Users <sup>3</sup>
<b>NEED-RELATED CIRCUMSTANCES</b>					
<b>General effects</b>					
<i>Mental health</i>					
PGC lack of morale score - PGC		-.092	.000		
<i>Informal care related factors</i>					
Informal help with housework hrs/wk - Infhkw		.036	.006		
<i>Other</i>					
User against entry into residential care - Upercent		-.220	.000		
User is vexed by charging - Vexed		-.713	.053		
<b>Targeting-captured need effects</b>					
User is sev cog impaired and targeted for day care - Dc_kats		-.981	.045		
Number of PIC probs with caring, user targeted for day care – Dc_cpnb		-.179	.003		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>					
<b>Individual input effects</b>					
<i>Home care</i>					
User in long interval need level - Hc2_long (squared)		5.7E-5	.000	47.4	39.9
<i>Day care</i>					
Day care - Ldc (log)		.091	.020	100.0	30.6
<i>Nursing visits</i>					
User has mild/sev cog impairment - Nvc_katm		.009	.000	29.4	9.7
<b>CONSTANT</b>					
		5.448	.000		
Adj R <sup>2</sup>	.31	Prob	.000	Nbr of cases 211	

<sup>1</sup> Results estimated with robust standard errors. <sup>2</sup> Proportion of recipients of the service to whom the effect applies. <sup>3</sup> Proportion of the sample to whom the effect applies.

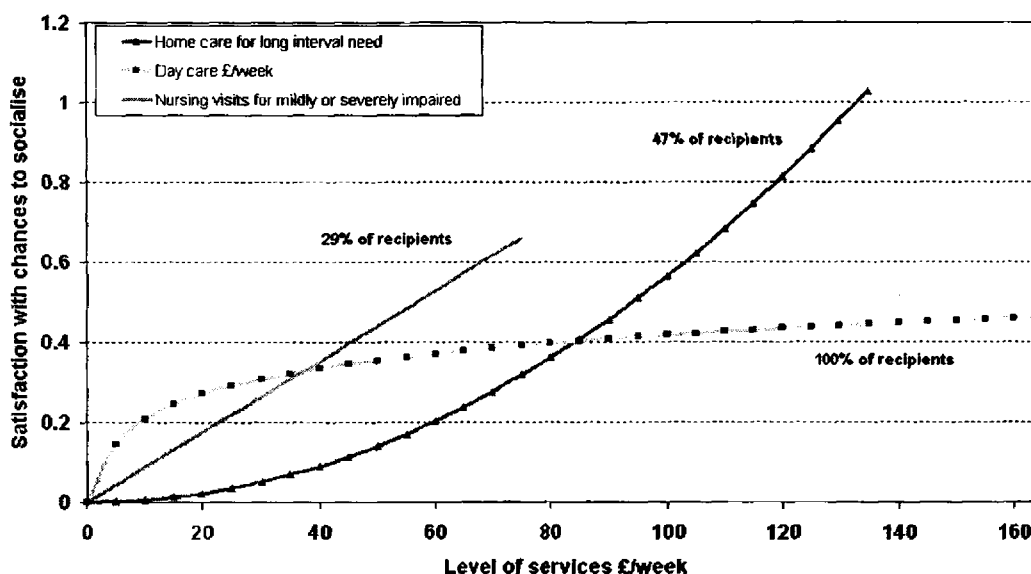
### 5.12.2 Service productivities

Figure 5.41 depicts the service productivity effects identified for home care, day care, and nursing inputs.

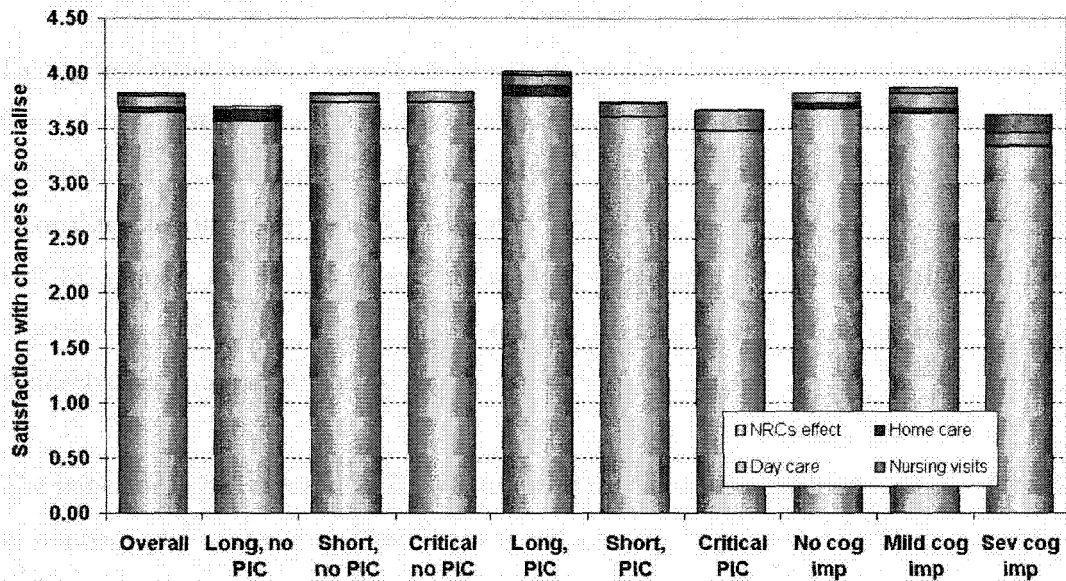
- *Home care* was estimated to have a high productivity for the 47 per cent with a low degree of dependency. As was found for IMPREL, the effect exhibits increasing returns to factor, which suggests that a considerable investment needs to be made in order for a relationship between the user and the home carer to emerge.
- *Day care* exhibits a common productivity effect for all its recipients, although the effect is significant at only the 3 per cent level. In addition, Figure 5.41 shows the decreasing marginal returns of the effect, which fall rapidly after the first weekly session (approximately £30 per week).
- Although the effect is less clearly established, visits of the *district nurse* to the cognitively impaired appears to increase the level of satisfaction with the opportunity to meet people; this may be simply the effect of extending the range of contacts by one.

It is interesting that some of the inputs do not exhibit significant productivities. In particular, it is surprising that the provision of meals appears not to have an effect. Indeed, delivery practice is often for the person to spend a minimal amount of time with the user, so as to provide frequent but short social contact and social support.

**Figure 5.41 Returns to factor: day care, home care and nursing visits effects on satisfaction with chances to meet people and socialise**



**Figure 5.42 Contributions of services and risk factors to improvement in chances to meet people and socialise**



### 5.12.3 Overall service impact, impact for groups, and equity and efficiency

Figure 5.42 shows that users' reported satisfaction with chances to meet people and to socialise to be on average much the same across groups, with trivial contributions from services.

As for IMPREL, the limited size of the service contributions precludes further analysis of the patterns of average care package productivities.

### 5.12.4 Overview

The results show that:

- The productivity effects are not highly significant, and refer to a minority of service users.
- The predicted degree of satisfaction with chances to socialise is not greatly different between groups. Service contributions are minimal.

### **5.13 Worker perception of impact (WKSAT)**

Taking into account the evaluations of care managers regarding outcomes is important for two reasons: first, because their professional view has intrinsic legitimacy as one of the key stakeholders in the production of welfare process; and second, because apparent inconsistencies in perception demonstrates a need for ‘triangulation’ of evidence. In the ECCEP sample, for instance, there are striking differences between what the care manager describes as the main features and problems of a case and what users and caregivers themselves describe (Bauld et al. 2000).

The indicator to be explored, WKSAT, refers to the ‘care manager’s perception of the degree of improvement in user’s welfare due to social services help received’, rated on a one to five scale.

#### ***5.13.1 The model and the impact of risk factors***

*Goodness of fit.* Table 5.12 reports the results of the production function model for WKSAT, and the relatively low proportion of the variance explained.

#### *Need-related circumstances and other risk factors.*

The results indicate that a wide number of need-related circumstances and other risk factors influence a care managers’ perception of the impact of formal resources on users’ welfare.

- Problems with physical functioning, defined in terms of an inability to prepare meals and by the user being bed-bound, are correlated with lower perceptions of improvements in the welfare of users.
- In contrast, users suffering from health problems other than cancer or other terminal illnesses are associated with greater welfare improvements, other things being equal.
- The buffering role of informal care networks is recognised by case managers’ perceptions of improvements in the welfare of users. Hence, cases where the carer expresses a strong affective relationship with the service user are associated with significant improvements in WKSAT. In contrast, as was found in several other outcome indicators, the full time employment of the informal caregiver and high levels of carer stress are factors

associated with lower gains in outcome. Related to this last effect, the over-reliance of users on others (amongst those targeted to receive day care services) and whether users live alone (and are targeted to receive respite care) are also associated with lower gains, *ceteris paribus*.

**Table 5.12 Production function for CM perception of services impact on user welfare (WKSAT)**

PREDICTORS BY DOMAIN	Coef.	Prob.	% Recipients <sup>1</sup>	% Users <sup>2</sup>
<b>NEED-RELATED CIRCUMSTANCES</b>				
<b>General effects</b>				
<i>Physical disability</i>				
User cannot prepare meals - Cantmeal	-.203	.059		
User is bedbound - Cantbed	-.364	.007		
<i>Health problems</i>				
Number of health problems - Whealth	.065	.015		
User suffers from cancer - Wcancer	-.346	.005		
<i>Informal care related factors</i>				
PIC is perceived to be stressed by CM - Wcstress	-.210	.046		
PIC's caring is due to love and affection - Clove	.406	.000		
PIC is employed - Cemploy	-.340	.011		
<i>Other</i>				
User's NRCs require short SSD intervention - Shortint	-.466	.048		
User is vexed by charging - Vexed	-.330	.058		
User receives palliative care - Pallcare	-1.460	.000		
<b>Targeting-captured need effects</b>				
Mild/sev cog impairment, user targeted for day care - Dc_Katm	-.624	.000		
User is over-reliant and targeted for day care - Dc_reli	-.518	.037		
User is perceived as high-risk and targeted for respite care - Re_hrsk	-.336	.005		
User lives alone and targeted for respite care - Re_walo	-.393	.009		
<b>PRODUCTIVITY EFFECTS (£ per week)</b>				
<b>Individual input effects</b>				
<i>Home care</i>				
Home care - Hc_wcost	.003	.000	100.0	85.5
<i>Delivered meals</i>				
<i>Day care</i>				
PIC health probs affect caring - Dcc_chaf	.014	.000	33.4	12.5
User lives alone - Ldc_walo (log)	.090	.004	52.9	19.6
<i>Respite care</i>				
Mild severe cog imp - Rec_katm	.006	.024	54.3	16.0
PIC is employed - Rec_cemp	.005	.067	22.1	7.5
<b>Complementarities</b>				
Day care, respite care interaction, user cannot wash - Drc_wash	1.9 E-4	.000	56.3	11.5
Home care, meals interaction, high relational problems - Hmc_hrel	4.5 E-4	.016	11.9	4.2
<b>CONSTANT</b>				
Adj R <sup>2</sup>	.29	Prob	.000	Nbr of cases
				319

<sup>1</sup> Proportion of recipients of the service to whom the effect applies; <sup>2</sup> Proportion of sample to whom the effect applies

- Interestingly, although not highly statistically significant, difficulties with coping with charges are associated by care managers with lower welfare improvements. This effect

may reflect the traditional dislike expressed by front-line professionals regarding a policy of charging for services.

- Surprisingly, given its prominence for most of the outcome indicators explored, the only cognitive impairment related effect on welfare improvements relates to a negative effect for users targeted to receive day care services.
- Finally, recipients of respite care judged at the time of assessment by the care manager to be at high risk are also associated with lower levels of outcome.

### 5.13.2 *Service productivities*

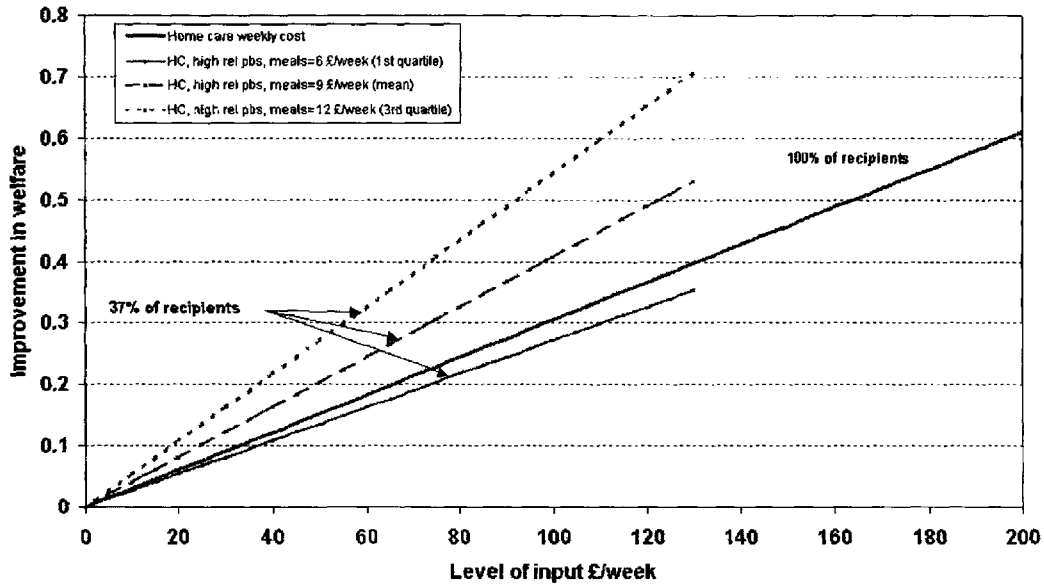
The results show that care managers associate all the main social services with improvements in the welfare of most recipients. The effects are illustrated in Figure 5.43 to Figure 5.46.

- Figure 5.43 shows care managers to consider increments of *home care* to have a small but clear effect on the welfare of all users, with a constant marginal productivity over the entire range observed in the sample. In addition, *home care and meals* complement each other and yield significant improvements in welfare for users with relationship problems.
- *Day care* inputs alone are depicted in Figure 5.45 to have a significant impact on users whose caregivers' health is affected by their caring responsibilities, and for users who live alone. Whereas the former effect exhibits constant returns to scale, the latter is characterised by significant reductions in the marginal effect of additional inputs.
- Given the care manager's perception, *respite care* appears to improve the welfare of cognitively impaired users, and that of users whose principal informal caregiver is in paid employment. For these two groups, the marginal productivities were little different, as is illustrated in Figure 5.46. In addition, the marginal productivity of respite care increases when provided jointly with day care for the 56 per cent of joint users of both services who were unable to wash themselves.
- Two of the services explored do not feature in the results. Firstly social work inputs do not appear to play a significant role in care managers' perception of improvement in the welfare of a case. This is despite the fact that many of the care managers from whom the information was collected were the very social workers who would have provided the inputs. Secondly, no effect is attributed to district nursing inputs. It is likely, however, that care managers did not take into account the effect of community nursing inputs when

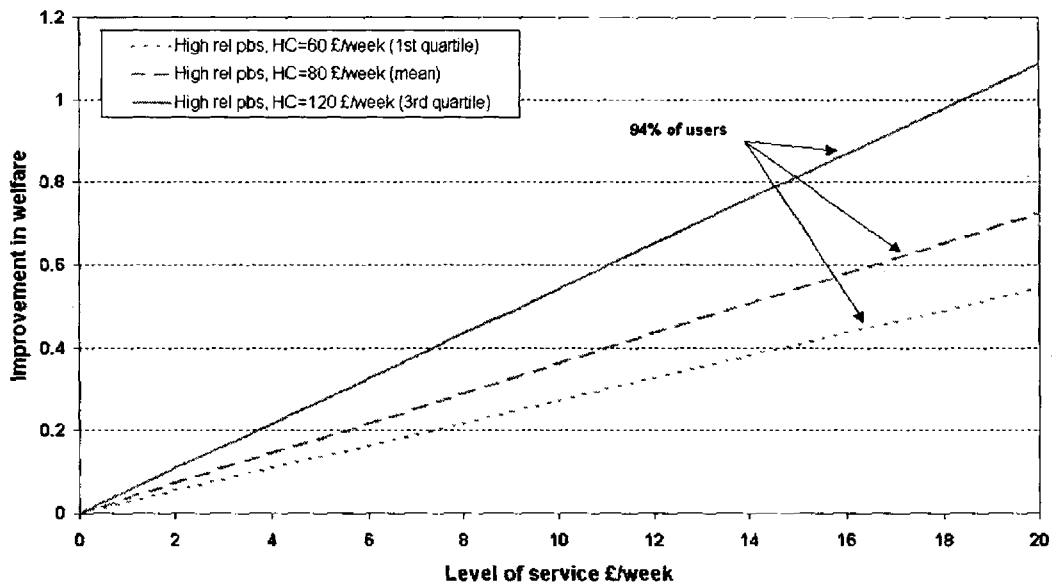


assessing the impact of the care package on users' welfare, given that they constitute health rather than social care inputs.

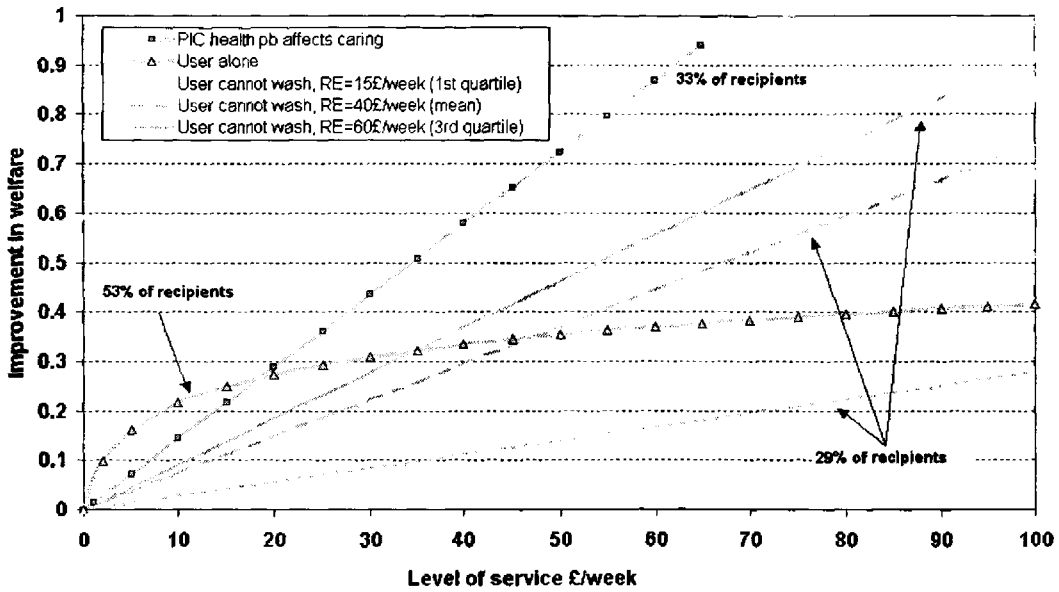
**Figure 5.43 Productivity curves: home care effect on CM perception of services impact on user welfare**



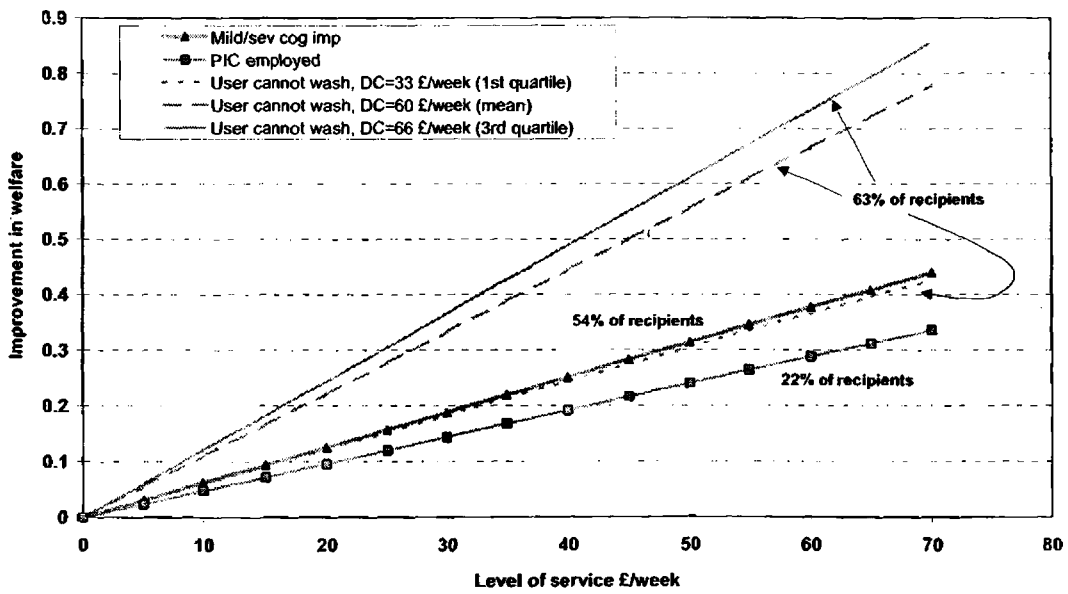
**Figure 5.44 Productivity curves: meals effect on CM perception of services impact on user welfare**



**Figure 5.45 Productivity curves: day care effect on CM perception of services impact on user welfare**



**Figure 5.46 Productivity curves: respite care effect on CM perception of services impact on user welfare**



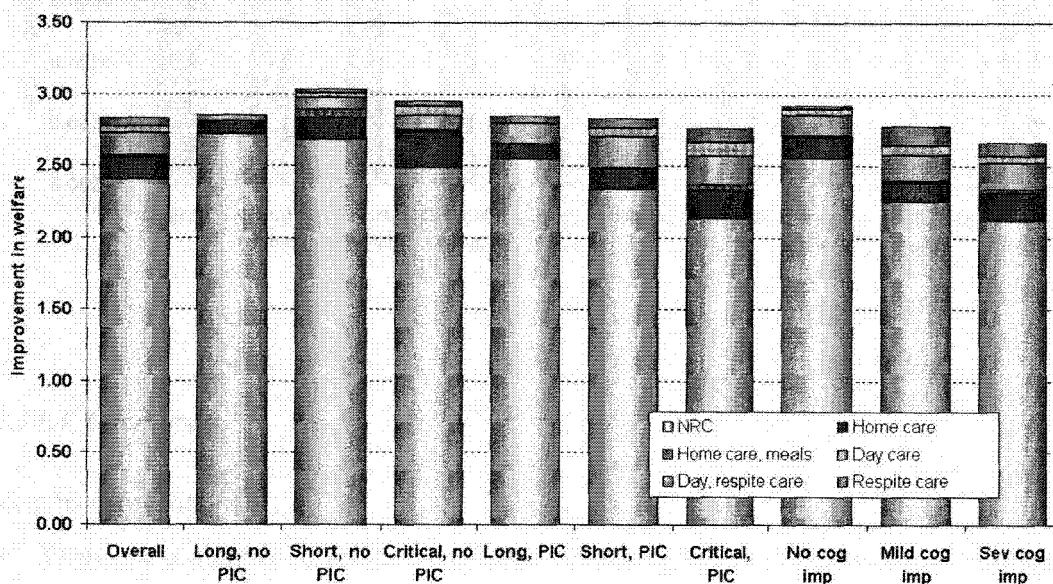
### 5.13.3 Overall service impact, impact for groups, and equity and efficiency

#### NRC and service contributions

Figure 5.47 illustrates that service contributions are substantial in relation to risk factors for some groups.

- Interestingly, perceived service contributions increase with the level of dependency and/or cognitive impairment, and are greater for those with principal informal caregivers.
- Although varying with the characteristics of the cases, the greatest outcome gains are contributed by home care, day care and respite care services, the latter two services contributing most for users with informal caregivers and for cases where the user suffers from cognitive impairment.
- Overall the service contributions compensate (although not fully for users with PICs and by level of cognitive impairment) for the differences in the outcome related to NRC effects.

**Figure 5.47 Contributions of services and risk factors to CM perception of services impact on user welfare**

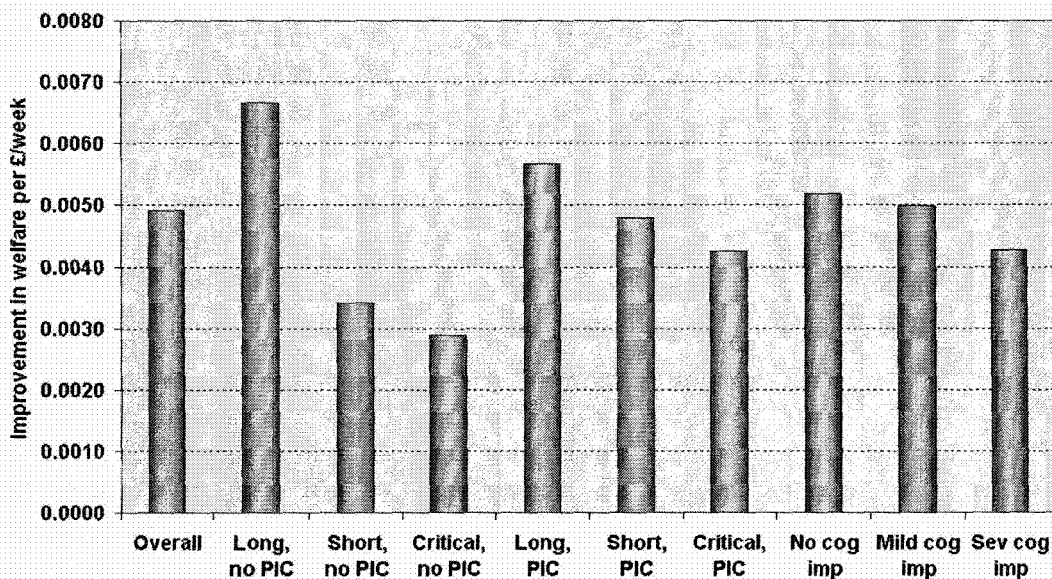


### Care package average productivities

Figure 5.48 shows that for overall packages, average productivities are clearly negatively correlated with users' level of dependency and/or cognitive impairment, and so with the level of service contributions.

Therefore, as has been found for the majority of other outcome indicators, the pattern of service contributions is produced by the greater concentration of services on more dependent users than would be suggested by criteria based exclusively on efficiency grounds. In other words, differences in service contributions can not be explained by relative efficiencies of services between groups, but must be explained in terms of an equity prioritisation.

**Figure 5.48 Average total package productivity for CM perception of services impact on user welfare**



#### 5.13.4 Overview

Results show that

- There are a number of productivity effects of high statistical significance, relating to all services explored except social work and nursing inputs, although the equation does not explain a high proportion of the overall variance.

- Service contributions are substantial (but smaller) compared with outcome levels related to NRCs.
- Service contributions increase with dependency and cognitive impairment. This is due mainly to the provision of progressively more services as dependency increases.

## **6 SERVICE PRODUCTIVITIES: THE MAIN PATTERNS**

Chapter 5 has presented a large body of detailed evidence about the interaction between NRCs, formal inputs and key outcomes associated with important service aims. The aim of the present chapter is to synthesize the central lessons derived from such evidence, focusing on a small number of features of the production of welfare process.

Comparing and synthesising the results from the production functions in Chapter 5 at a higher level of generality should be useful on at least three counts:

- First, it will allow a clearer picture to emerge about the relative performance of the different services with respect to the range of social care outcome goals, and so about the degree of ‘specialisation’ of services in the production of particular outcomes, or of outcomes for particular case types.
- Secondly, it will provide an initial tentative picture of the degree of consistency and, therefore, of the reliability of the findings, by inspecting whether key features are found repeatedly for a number of outcome indicators.
- Thirdly, it will help to construct and refine hypotheses, explored in subsequent chapters, about ways in which the system’s equity and efficiency performance could and should be improved.

Mirroring the treatment of the results of the production function models, the discussion is divided into two main sections. The first outlines the main patterns relating to features of the productivity effects. The second summarises the evidence on service contributions and average care package productivities. As a result, Chapter 6 should provide a broad picture of [a] the overall success of packages in improving outputs, [b] patterns of welfare contributions by service type, and [c] the distribution of service contributions and average productivities by analysis groups.

### **6.1 Productivity patterns**

Equity considerations aside, the process of designing optimum care packages could be viewed as obeying a simple principle: that resources should be invested in the most effective

services, those providing the greatest outcome gains per unit provided. However, as highlighted in Chapter 2, the effectiveness of care packages is likely to be affected by at least three factors:

- The mediating influence of NRCs on the effectiveness of services, so that services which appear highly effective for some cases may not be so for others.
- The degree of substitutability and complementarity between services, key for determining how to mix services in care packages.
- The patterns of returns to scale. That is, the degree to which marginal productivities change with levels of provision, raising questions about the degree to which services ought to be concentrated on some or many services, or on some or many users.

### 6.1.1 Scale effects

Table 6.1 shows the distribution of the productivity effects identified in Chapter 5 for the six services investigated in terms of whether they exhibit increasing, constant, or diminishing returns to factor<sup>29</sup>.

**Table 6.1 Number and nature of service productivity effects**

Service	Increasing Returns		Constant returns		Diminishing Returns	
	Number	Per cent	Number	Per cent	Number	Per cent
Home care	6	35	4	24	7	41
Meals	0	0	6	86	1	14
Day care	1	5	7	35	12	60
Respite care	4	21	9	47	6	32
Social work	0	0	3	100	0	0
Nursing visit	0	0	5	83	1	17
Total	11	15	34	47	27	38

Before discussing the patterns in Table 6.1, it is important to underline that the discussion of the nature of the effects relates to the range of allocations observed. Indeed, as was noted in Chapter 2, diminishing marginal returns to factor would be expected eventually for all services, where levels of provision increased sufficiently.

<sup>29</sup> Joint effects, reflecting the complementarity of services in the production of an outcome, are attributed to (and counted for) both services. The small number of terms implying negative productivities are disregarded.

Overall, by far the most common types of effects in Table 6.1 are those showing either diminishing or constant returns to scale, with only 15 per cent of the effects exhibiting increasing returns to factor.

The fact that almost two-fifths of the productivity effects are best described as involving decreasing marginal effects is important in the context of stringent fiscal environments, and vociferous criticism about the extent to which resources are concentrated on those in greatest need in the post-reform era. Indeed, the trends in Table 6.1 suggest that for a significant number of the productivity effects identified, the provision of high levels of resources would bring about noticeable reductions in their marginal rate of return. It will be important, therefore, for subsequent sections of the thesis to explore the opportunity costs implied by post-reform allocation patterns, and dilemmas involved in redistributing resources to lower dependency cases.

Service by service, the patterns of returns to factor vary.

- To some extent a reflection of their low levels of allocation and thus of the inability of the data to show more intricate patterns, the productivity effects for meals and social work inputs exhibit almost exclusively constant returns to factor effects. In the sample, the maximum number of meals allocated was equivalent to around ten meals per week. Negligible marginal productivities would have been expected beyond levels of 14 meals per week (corresponding to two meals per day for the whole week).
- Approximately 60 per cent of day care effects show diminishing marginal productivities. As hinted at in the user satisfaction (USATIF) model, this finding may relate to the fact that as service use intensifies, recipients of the service feel increasingly 'stuck' in the day care centre. Evidence about older people's ambivalence regarding day care have been discussed for instance in McLaughlin (1994) and Pickard (2004).
- Interestingly, whereas a large proportion of the home care effects exhibit decreasing returns, home care also accounts for the majority of the increasing returns to factor effects. The service has traditionally been allocated as the core input of most care packages, only to be complemented by other services, such as day or respite care. In the current sample, for instance, home care was the sole service for approximately one third of cases, and alone comprised almost half the care package cost of the average case. Home care is therefore the input most likely to have been allocated in sufficient levels to



reach decreasing marginal returns. In contrast, however, home care is the one service allocated in sufficient quantities in a user's home for a personal relationship to develop between the front line practitioner and the service user. The need for a critical mass of the input allowing the development of this user/home helper bond could therefore explain the increasing marginal productivities of home care in the models predicting user satisfaction (USATISF), relational aspects of wellbeing (IMPREL), satisfaction with opportunities to socialise (SATSOC) and even caregiver burden (KOSBERG).

### 6.1.2 Complementarity and substitutability

Not surprisingly given the high proportion of cases in the sample with one-service care packages, the evidence suggests a very high degree of substitutability between services. The analysis identified that for each outcome, on average 3.6 services out of the 6 investigated exhibited independent effects. This refers to effects which do not imply complementarity with any other service, and therefore do not require the presence of other inputs to take effect.

**Table 6.2 Presence of complementarity effects**

	Meals	Day care	Respite care	Social work	Nursing visit	Total	Per cent of all service effects
Home care	1	1				2	12
Meals		2			1	4	57
Day care			2		1	6	30
Respite care						2	11
Social work						0	0
Nursing visit						2	33
Total						8	11

Table 6.2 analyses the pattern of complementarity by combinations of service types. It illustrates that:

- Overall, only about one in ten of the effects identified implies a complementarity effect (half of the twelve equations included no sign of complementarity between services). Broadly speaking, therefore, services appear to operate largely independently of one another.
- Day care and meals on wheels (with six and four effects respectively) are the two inputs most usually showing complementarity with other services (57 per cent of meals effects

involve some joint effect with other services). In fact, all eight complementarity effects involve one of the two services.

- The fact that one third of the district nursing effects involved other services is important from a policy perspective, as it confirms the need for effective coordination between community-based health and social care services.
- Day care inputs show evidence of complementarity with all services excepting social work inputs, and particularly with meals and respite care.
- Meals on wheels inputs show evidence of complementarity predominantly with day care and home care inputs, but also with nursing visits.
- None of the complementarity effects affect social work inputs. However, this may be due to the much smaller range of provision for the service.

In terms of substitutability and complementarity, the evidence therefore suggests that a wide range of alternatives are open to care managers when designing care packages to produce a desired level of outcomes. The question for subsequent optimisation analysis is therefore the extent to which services are combined optimally in order to achieve the greatest gains in outcomes at the lowest cost.

### ***6.1.3 Differences in marginal productivities between user groups***

Table 6.3 reports, for all factors found to have differentiated marginal productivity effects, the count of the times that the factors are found to alter productivities for a given service. The last two columns represent respectively the total number of effects per factor, and the proportion of effects per broad type. With only 11 per cent of the productivity effects exhibiting a common effect for all service recipients, the patterns in Table 6.3 confirm the concerns expressed in Chapter 2 about the need to control for the mediating effect of NRCs on service productivities.

**Table 6.3 Differences in marginal productivities: discriminating factors**

Nature of NRC effect	Home care	Meals	Day care	Respite care	Social work	Nursing inputs	Total	Per cent
<b>Dependency</b>							<b>19</b>	<b>29</b>
High number of problems with ADL tasks			1	1			2	
High number of problems with IADL tasks		1		1		1	3	
Interval need	4	1				1	6	
User cannot buy groceries on her own		1					1	
User cannot do heavy housework tasks	1				1		2	
User cannot go to toilet on her own	1	1					2	
User cannot wash on her own			1	2			3	
<b>Mental health</b>							<b>11</b>	<b>17</b>
Behavioural problems			1	1			2	
Cognitive impairment	1		4	2		2	9	
<b>Health problems</b>							<b>7</b>	<b>11</b>
Skeletal muscular problems	1						1	
User discharged from hospital			2	4			6	
<b>Informal care / informal networks</b>							<b>21</b>	<b>30</b>
Presence of PIC	2					1	3	
PIC is close female relative	2	1	1				4	
PIC is employed			1	1			2	
User is married				3			3	
PIC health affects caring role			1			1	2	
PIC loses sleep due to worry				1			1	
Relational problems	1	1					2	
User lives alone	2		1		1		4	
<b>Mediating</b>							<b>5</b>	<b>8</b>
User is heavily reliant on others				1			1	
<b>Common effect for all recipients</b>	<b>1</b>		<b>3</b>		<b>1</b>	<b>2</b>	<b>7</b>	<b>11</b>

Some of the most salient features of the patterns in Table 6.3 include:

- Compared to the substantial list of potential markers whose effects were explored (reported in Appendix Table 3.1), only a relatively small number of factors appear to discriminate between the effects of services.
- Most of the variables found to differentiate marginal productivities between users are found to do so in several equations or for several services. Overall, only 4 effects are not repeated, the others recurring on average over 3 times. Four out of the 21 factors recur at

least five times, with variables such as 'interval need' or 'cognitive impairment' recurring 6 and 9 times respectively.

- Additionally, most of the factors affect several service inputs. Only four of the 21 factors affect the productivities for only one service. Five factors affect the marginal productivities of at least three out of the six services, despite the few effects found for meals and social work inputs. Again, the individual factor whose effect is most widespread refers to cognitive impairment, affecting the marginal productivities of four of the six services.

In terms of broad categories, the two groups of indicators found to differentiate most often between service productivities refer to dependency and informal care factors, accounting respectively for 29 and 30 per cent of the effects.

- Interestingly, the informal care indicators found to mediate service productivities most significantly are similar to the ones found to affect the allocation of services in Chapter 4. These indicators are not primarily about the intensity of support provided, but describe qualitative features of such support, such as whether it is provided by a close female relative or by a spouse, or whether the PIC is employed.
- It is also worth noting that given the exploratory nature of the modelling, constrained only by broad theoretical or statistical hypotheses, it is likely that an even greater degree of consistency in the definition of effects could have been 'forced' without affecting greatly the broad results. For instance, the differences between many of the dependency-related factors mediating productivities seem to relate to only small distinctions in the threshold of action of the productivity effects. That is, they do not seem to differ greatly in kind, merely in degree.

#### **6.1.4 *Patterns across services.***

Table 6.3 identifies four particularly prevalent interactions between NRC and service productivity effects: interval need shows four effects on home care productivities, cognitive impairment exhibits four effects on the productivities of day care, and 'hospital discharge' and 'user is married' influence four and three times respite care productivities, respectively. However, clearer patterns for the six services emerge when NRC effects are further aggregated, as in Table 6.4.

**Table 6.4 Proportional distribution of service productivities by types of NRC effects (per cent)**

Nature of NRC effect	Home care	Meals	Day care	Respite care	Social work	Nursing inputs
Dependency	38	67	13	24	33	25
Mental health	6		31	18		25
Health problems	6		13	24		
Informal care / informal networks	44	33	25	29	33	25
Mediating				6		
Common effect for all recipients	6		19		33	25

The patterns in Table 6.4 highlight differences in the nature of the interrelationships between NRCs and the productivity effects of the different services. They show that whereas the productivities of the two more 'traditional' types of services (home care and meals on wheels), are mainly affected by dependency and informal care related indicators, the mediating effects on productivities for day care and respite care (the 'newer' services) are of a more diverse nature. In particular, for these services, mental health related factors appear to play a much more prevalent role in determining differences in productivities.

The large impact of dependency factors on the productivity of home care and meals is hardly surprising, and reflects the nature of the support with ADL and IADL functioning provided by the two services. However, *a priori*, given that their aim is often described to be primarily about supporting informal caregivers, it might have been expected that informal care-related factors would influence to a greater extent variations in day care and respite care productivities. Nevertheless, it is likely that the effect of the two services on caregivers is also captured by some of the other indicators, and in particular by those relating to cognitive impairment and physical disability. Indeed, in the sample, users with cognitive impairment or in the critical interval need category were (a) much more likely to benefit from informal support, and (b) if so, much more likely to receive significantly greater levels of informal support. In light of the targeting of day care and respite care on stressed carers and co-resident carers identified in Chapter 4, it is likely that some of the dependency or cognitive impairment related effects for day care and respite care may in fact identify sub-groups of users with informal caregivers<sup>30</sup>.

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<sup>30</sup> Overall, in the sample, users with principal informal caregivers showed significantly higher chances of receiving day care and respite care services (odds-ratios of 2.6 and 3.0, respectively).

Hence, while conforming with general expectations, the patterns in Table 6.3 and Table 6.4 also reflect the importance of interpreting broadly the indicators of NRC mediating effects on productivities. These should be seen not as narrow pointers of underlying causal processes, but rather as the statistically most efficient markers of combinations of effects.

## **6.2 Pattern of contribution given observed allocations**

The discussion in Section 6.1 has focused on three key features of the service productivity patterns described in Chapter 5. The analysis below concentrates on the implications of such productivity effects in terms of improvements in welfare outcomes, given the observed patterns of resource allocation. That is, it describes variations in service welfare contributions and average productivities of care packages for different case types.

### **6.2.1 Package contributions across outputs**

The modelling in Chapter 5 identified productivity effects for all the outcome indicators explored, which arguably span the principal domains of welfare outcomes for which society (including users and carers) values the public subsidy to community care. However, it also identified significant differences in the extent to which services were seen to improve outcome levels for the different indicators. The aim of the analysis below is to provide a comparative overview of the relative success of care packages in securing improvements in the twelve outcomes explored. In light of the lack of policy or practice statements describing desirable levels of service contribution for the different indicators, and as mentioned in Section 3.2.3, the analysis is structured around two performance indicators.

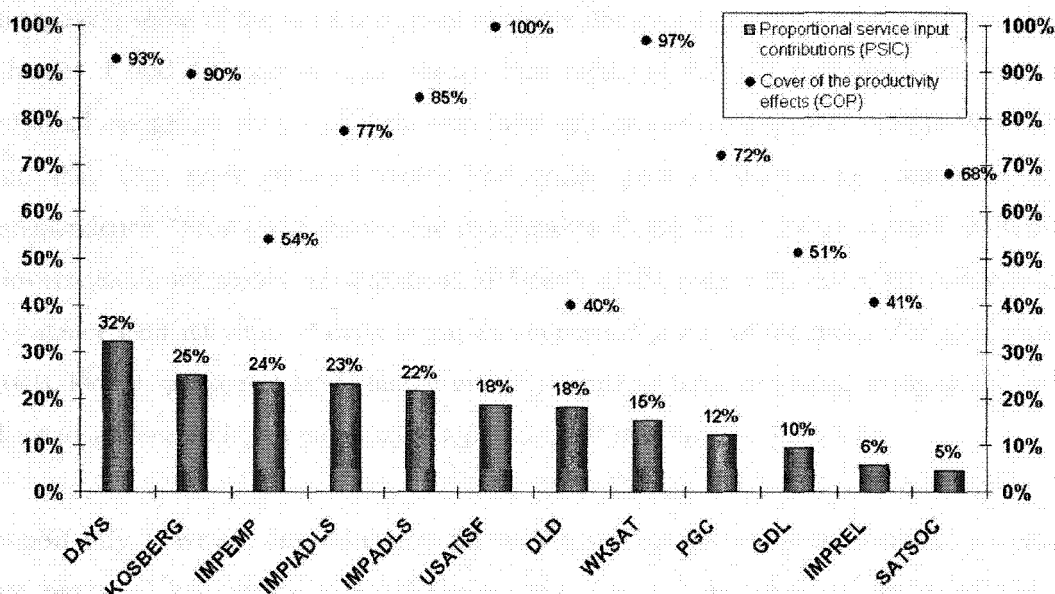
- The level of *cover of the productivity effects [COP]*, that is the proportion of cases in the sample benefiting from improvements in their welfare because of the effect of services. Targeting questions would be begged if service contributions, however large, were limited to small minorities of users and caregivers.
- The *proportional service input contributions [PSIC]*, that is the proportion, on average, of observed outcome levels related to the beneficial effect of services (for example, the number of days spent in the community because of the support of services, relative to the overall length of stay in the community).

Given their definition, PSICs and COPs can take values between 0 and 100, with greater values indicating better performance, and with zero and 100 representing the worst and best possible performance respectively. However, particularly for PSICs, several factors complicate the interpretation of values within the [0-100] range.

- Exactly what order of magnitude of PSIC constitutes good performance is difficult to specify, and is likely to vary between outcomes. Overall, it will depend on the sensitivity of the outcome indicator to the influence of services and NRCs. That is, it will depend on the relative ease with which NRCs and services are likely to bring about changes in outcome. Hence, outcome indicators inquiring directly about the impact of services (such as user satisfaction with services - USATISF - and improvements in relationships ascribed to the effect of services - IMPREL) could be expected, given identical performance from services, to show higher PSICs than outcome indicators relating to general states of welfare, more open to the influence of NRCs (such as length of stay - DAYS - or caregiver burden - KOSBERG). On the other hand, assuming equal levels of performance, outcomes relating to states which are intrinsically less likely to be influenced by factors other than a person's characteristics (such as outcomes relating to general frailty) are more likely to yield lower PSICs.
- The PSIC is an average. The effect of service contributions is often likely to be great for a minority of beneficiaries, but much smaller for the majority. Therefore, levels of PSICs should be interpreted in the context of other indicators, and particularly in conjunction with COPs.

Figure 6.1 summarises PSICs and COPs for the 12 outcome measures in Chapter 5. The indicators are arranged from left to right in descending order of PSIC.

**Figure 6.1 Proportional contributions of services to outcome levels and proportions of users affected**



Overall, Figure 6.1 confirms the hypothesis set out in the weak proposition of the Production of Welfare framework in Chapter 2. That is, it confirms the overwhelming effect of NRC influences on outcomes, which account for at least two thirds of the average levels of outcomes observed. However, it also highlights substantial contributions of services to final levels of outcomes for several of the indicators explored.

At first glance, three clusters of indicators can be distinguished in Figure 6.1, containing respectively

- the first five indicators with the highest levels of PSICs: DAYS, KOSBERG, IMPEMP, IMPIADLS AND IMPADLS, with PSIC values ranging from 32 to 22 per cent
- the following three outcome indicators (USATISF, DLD and WKSAT), with PSICs ranging from 18 to 15 per cent
- and the last four indicators (PGC, GDL, IMPREL and SATSOC) with the worst performance in terms of levels of PSIC, ranging between 12 and 5 per cent.



### *Outcomes with high PSIC levels*

Remarkably, the five best performing indicators in terms of PSIC levels in Figure 6.1 relate to arguably some of the most important outcome dimensions targeted by the reforms. Indeed, Chapter 1 and Chapter 3 have shown that reducing institutionalisation and supporting informal caregivers were by far the two most salient welfare objectives in the White Paper, and that they were phrased within the wider goal of improving empowerment and independence. ‘Promoting choice and independence’, the White Paper argued, ‘underlies all Government’s proposals’ (Department of Health 1989, para 1.8). Also, providing practical assistance with activities of daily living was presented as one of the means for achieving such goals. Hence, services were to help users to ‘acquire or reacquire basic living skills’ to ‘help them to achieve their full potential’ (Department of Health 1989, para 1.8).

Importantly, however, the enthusiasm for such goals was not restricted to central government, but pervaded key actors in local government too. For instance, a survey of 131 local managers about the prioritisation of outcome goals in the 10 local authorities in the ECCEP study showed a striking convergence of perceptions at all levels of the organisations. Indeed, ‘a real chance for more users to stay at home rather than enter a care home’, ‘empowerment, choice and control over their own lives for users’ and ‘support for family carers to enable them to have respite’ were perceived respectively as the first, second and third most important local objectives at the time of the reforms<sup>31</sup>.

At the individual outcome level, the patterns in Figure 6.1 suggest that

- It is for DAYS, *the number of days living at home prior to admission to an institution for long-term care*, that the service contributions show the highest PSIC. Given the power and uncontrollability of many of the medical and social factors causing admission to institutions, such an effect that accounts for 32 per cent of the predicted average length of stay in the community suggests a substantial level of achievement by services. In addition, a COP of 93 per cent indicates that service contributions are widespread amongst service users.

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<sup>31</sup> Appendix Table 6.1 provides further details about the results of the survey.

- The indicator with the second greatest PSIC is KOSBERG, which measures the reduction in the felt burden of caregiving<sup>32</sup>. Again, a PSIC of 25 per cent would seem creditable, given the likely relative strength of the influence of NRCs on variations in the outcome. The COP was also high, with nine out of ten cases with informal caregivers benefiting from reductions in caregiver stress due to the effect of services.
- As for the previous two indicators, Figure 6.1 indicates substantial service contributions to IMPEMP, accounting for about a quarter of the average levels observed. Given that IMPEMP relates to control over the whole of life, not just over areas at which the services are most directly aimed, the results should probably be interpreted as indicative of significant performance. However, just over half of the cases in the sample benefited from improvements in outcome (the COP value is only 54 per cent). Therefore, the patterns suggest significant inequalities (and potentially inequities) in the distribution of gains in the outcome.
- The outcome indicators of improvements in ADL and IADL functioning ascribed by users to the support received from services (IMPADLS and IMPIADLS) show similar PSIC and COP patterns. For both outcomes, service contributions achieve high levels of COPs (particularly with respect to IMPADLS), and their PSIC levels correspond to just under one quarter of the outcome levels observed. Judging the appropriateness of service contributions to the two indicators requires taking into account two of their common features. First, IMPADL and IMPIADL refer to *perceptions* of improvements in I/ADL functioning. As a result, as mentioned in Chapter 5, the two indicators are much more open to the influence of NRC factors (such as users' morale) than would indicators based on objective functioning measurement scales. Secondly, in contrast with DAYS, KOSBERG and IMPEMP, the questions from which the two indicators were derived relate specifically to the *impact of services*. From that perspective, other things being equal, IMPADL and IMPIADL could be expected to be primarily influenced by service related factors. So while the PSIC levels attained may well be judged creditable, they probably indicate significantly worse service performance than for the previous outcomes indicators, DAYS, KOSBERG and IMPEMP.

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<sup>32</sup> For negative indicators of outcome such as KOSBERG, the level of PSIC is calculated as the ratio of service contributions to levels of outcome predicted by NRCs alone. For them, PSICs indicate therefore the proportional reduction in the negative outcome achieved by service contributions. In addition, as KOSBERG only relates to cases with PICs, PSIC and COP were calculated excluding cases without PICs.

### ***Outcomes with medium PSIC levels***

The next set of outcome indicators in Figure 6.1 includes the indicator of user satisfaction with services, USATISF, the indicator of dissatisfaction with life development, DLD, and the indicator of the care manager's perception of the impact of services on the welfare of users, WKSAT.

- Whereas service contributions for user satisfaction with services (USATISF) cover the entire sample, a PSIC level of less than one fifth of the predicted outcome level appears disappointingly low, particularly given the indicator's focus on the effect of services. However, as with other indicators of perceptions such as IMPEMP, IMPADL and IMPIADL, Chapter 5 highlighted the significant mediating effect on outcome levels of NRC effects, and specifically of users' morale.
- *Dissatisfaction with life development*, DLD, shows a COP of 40 per cent, the lowest of all the models estimated. Although it is unlikely that improving morale would constitute one of the main priorities for most people (in the sample, for instance only 13 per cent of users were believed by case managers to suffer from depression) higher levels of coverage would probably be desirable. Combined with an average reduction in the levels of dissatisfaction of almost one fifth, the results suggest substantially large contributions for those who benefited.

As perceived by case managers, formal resources contribute significantly to improving the welfare of practically all users (the COP level for WKSAT is 97 per cent). However, probably reflecting care managers' awareness of the dominance of NRCs on user welfare levels, the SPIC level for WKSAT is low, with services contributing less than one sixth of the outcome levels observed. Assuming that case managers' perceive accurately service contributions, and that SPIC levels are broadly comparable across outcome indicators, the existence of significantly lower SPIC levels for WKSAT than for DAYS could be interpreted to suggest that case managers include other important factors in their view of users' welfare, in addition to the length of time which services are able to support users in the community.

### ***Outcomes with low PSIC levels***

Four outcome indicators in Figure 6.1 exhibit PSIC levels of 12 per cent or below: the two remaining indicators of users' morale, the PGC and GDL scores, and the two indicators of

social functioning, SATSOC (users' satisfaction with chances to socialise and to meet people) and IMPREL (the degree to which users considered social services to have improved how well they get on with family and friends).

The COP and PSIC ratios for the PGC score exhibit the opposite pattern from DLD, discussed above: a high cover of service contribution but a low average intensity of the effects. The low observed PSIC value is probably not surprising, even though general morale has sometimes been shown to respond to services, as was found in the intensive Kent Community Care Project and some of its replications (Davies and Challis 1986). *General dissatisfaction with life*, GDL, had much the same level of PSIC than PGC, but a much lower cover proportion.

Not surprisingly, given their arguably secondary status as community care objectives, the two equations with by far the lowest PSIC ratios refer to the same outcome dimension: the reduction of social exclusion and improvements in socialisation and relationships. Notwithstanding their very low intensity, service effects for SATSOC, the users' degree of satisfaction with chances to socialise and to meet people, appear to be shared amongst a majority of service users.

### *Overview*

The services achieved high offset and cover ratios for some of the outputs whose policy importance is central to the reforms. These include the number of days supported in the community prior to residential admission, the reduction of caregiver stress, the perceived impact of social services on physical functioning, and general satisfaction with services. However, Figure 6.1 shows that there are other outcome goals for which achievements in terms of levels of COP and PSIC appear to be low, particularly for those associated with improvements in morale and social functioning. In contrast with some of the pre-reform evidence (Davies et al. 1990), however, the results reported in this section are generally compatible with a view of community services that are successfully producing benefits of central policy relevance for substantial proportions of users.

### 6.2.2 Individual service contributions

The previous section has illustrated the patterns of care package contributions to the different outcome indicators. The analysis below describes the contributions of individual services.

Table 6.5 depicts the degree of coverage of the productivity effects of the six services in the analysis based on two indicators: the first shows the proportion of outcome indicators affected by the individual services; the second illustrates the average proportion of recipients affected by service contributions<sup>33</sup>.

**Table 6.5 Proportion of outcomes and recipients affected by the productivity effects of individual services**

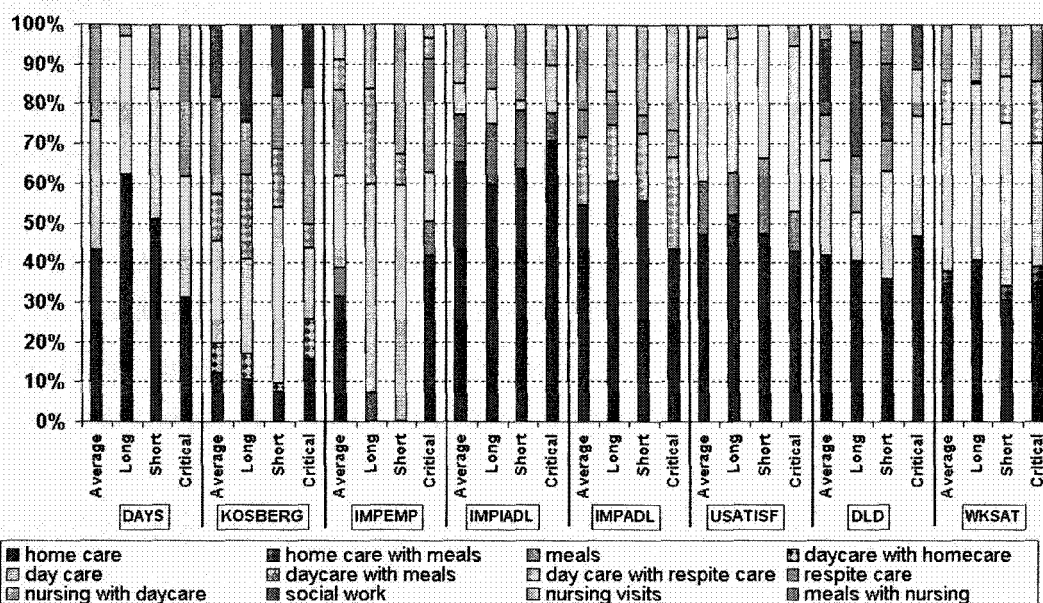
Service	Outcomes affected		Average proportion of recipients covered
	Number	Per cent	Per cent
Home care	12	100	61
Meals	7	58	39
Day care	11	92	68
Respite care	10	83	51
Social work	3	25	86
Nursing visit	6	50	51

Clearly, home care, day care and respite care exhibit the most widespread productivity effects. Such effects cover at least ten of the twelve outcomes investigated, and affect a majority of service recipients. These are followed by meals on wheels, nursing visits and social work inputs, which affect respectively seven, six and three out of the twelve output measures. Interestingly, although social work inputs affect very few outcome indicators (all assessing psychological well-being), their effect involves the vast majority of their recipients.

Given the observed allocation of resources, Figure 6.2 illustrates the shares of the overall care package contributions attributed to the different services. For clarity, the diagram simplifies the exposition in several ways. First, it distinguishes case types only by the interval need of the user. Secondly, the analysis excludes the four poorest performing outcome indicators in Figure 6.1, those with PSIC ratios below 15 per cent.

<sup>33</sup> This proportion is calculated exclusively amongst outcomes affected. Also, the small number of productivity terms implying negative productivities have been disregarded.

Figure 6.2 Individual service share of overall package contributions to outcome measures



The dominance of the red colour in Figure 6.2 illustrates that *home care* remains the foundation of the contributions of care packages to most outcomes, whatever the level of dependency. There are two exceptions, associated with IMPEMP (sense of empowerment among users) for medium and low dependency cases, and with KOSBERG (caregiver stress) for all case types. By case type, the patterns show that the proportional contribution of home care shrink significantly as levels of physical dependency increase for three outcome indicators, and particularly for DAYS.

For most of the outputs, the contribution of *day care* is second only to that of home care. Day care contributes greatly to days before admission to institutions, to user satisfaction, the reduction of caregiver stress, sense of empowerment, reduced sense of dissatisfaction with life development among users with short and critical interval needs; and, with respite care, to users' perceived improvement in personal care functioning. Its substantial proportional contribution for WKSAT (the worker perception of the services impact on the welfare of the user) suggests day care to be widely appreciated by case managers as a particularly effective service. In their pre-reform study, Davies et al. (1990) also showed productivities for day care. However, both the coverage and intensity of such productivity effects were significantly lower than those found in the present study.

Although to a lesser extent than home care and day care, *respite care* impacts substantially on the majority of outcomes in Figure 6.2. Its relative contribution is particularly great where it would be most expected, for reducing caregiver stress and among cases where the user is very dependent.

The large and low-cost contributions of '*social work*' to the relief of caregiver stress and a reduced dissatisfaction with life development is one of the most interesting results. Indeed, it suggests that, although for a limited number of outputs, a small investment in qualified social work inputs may potentially yield very substantial returns.

*Community nursing* makes a contribution primarily to three outputs: i) users' perception of control over their lives, where there is an effect when consumed with day care as well as a direct effect, ii) users' perceptions of improved capacity to perform personal care and iii) instrumental activities (for both ADLs and IADLs). The last may in part reflect the allocation of nurses to those recovering from an illness or accident. In combination with meals, there is also estimated to be a small contribution to the reduction of dissatisfaction with life development.

Not surprisingly, the contribution of *home-delivered meals* is smaller than for other services, and concentrated on user satisfaction (USATISF) and on the user's perception that social services improved their IADL functioning (IMPIADL).

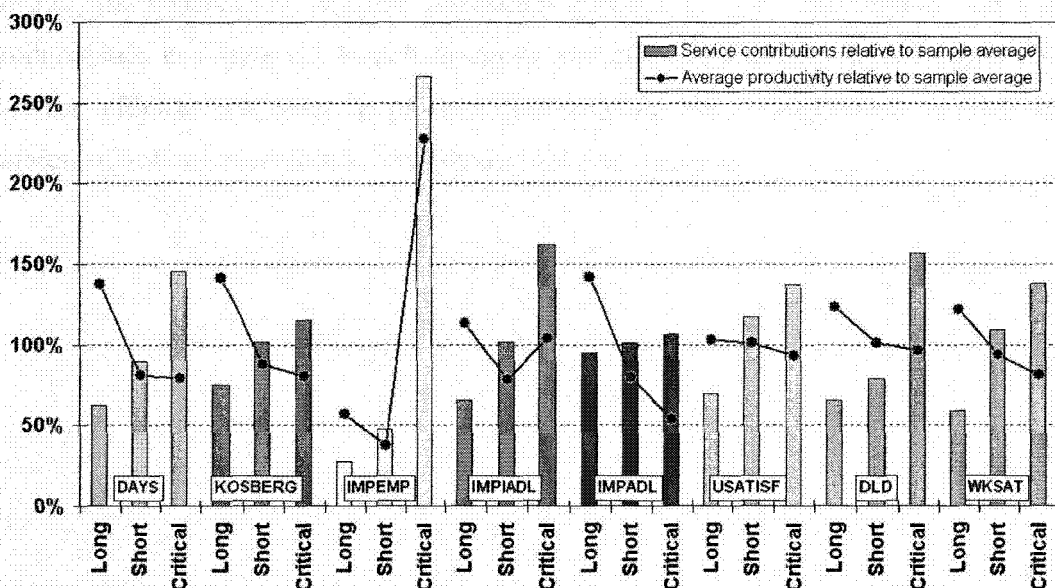
Overall, the patterns in Figure 6.2 also confirm the limited contribution derived from complementarity effects (indicated by bicoloured diamond-shaped areas), the largest of which involve day care inputs.

### **6.2.3 Service contributions and average productivities across outputs**

So far, the evidence has shown significant overall gains from social service inputs for a wide range of outcomes. The present section investigates patterns of efficiency in the production of service contributions for different case types, by exploring whether they respond mainly to differences in service productivities or to differences in the levels of resources allocated.

Figure 6.3 summarises levels of service contributions and average productivities of care packages by case type. Again, for the sake of simplicity, the results are presented for only the eight outputs with PSIC levels above 15 per cent, and users are grouped exclusively by interval need category. In addition, service contributions and average productivities are standardised by expressing them relative to the observed average level in the sample, so as to simplify the comparison of patterns across outcome indicators. Hence, for instance, a hypothetical service contribution of 150 per cent in Figure 6.3 represents a 50 per cent higher service contribution than the average contribution for all cases.

**Figure 6.3 Service contributions and care package average productivities by interval need category**



The homogeneity of the patterns depicted in Figure 6.3 is striking. For all outcome indicators, service contributions increase significantly with the level of dependency of the user. In contrast, increases in dependency are associated with less productive care packages for all outcomes but IMPEMP, the indicator of control over own life. In other words, given their contribution to outcomes, the level of services allocated to cases of high dependency by far exceed those that would be implied by allocation policies aimed at maximising aggregated outcome levels.



The observed negative gradient between average productivities and levels of disability is the product of a combination of factors:

- The presence of decreasing marginal returns to factors and the allocation of greater resources on those in greatest need. Table 6.1 showed that approximately two-fifths of service effects exhibited decreasing returns to factor. These most affect the more intensive care packages, such as those provided to more dependent users.
- The observed service input mixes. Average productivities represent the weighted sum of the individual productivities of services, and so depend on the particular combinations of services allocated to different case types.

Overall, the consistently negative correlation between service contributions and average productivities in Figure 6.3 begs both equity and efficiency questions. The subtle balance between efficient responses to productivities and the equity judgements implicit in the patterns of utilisation constitute a key theme of the next chapter.

## **PART THREE**

### **IMPROVING EQUITY AND EFFICIENCY**

## **7 IMPROVING EQUITY AND EFFICIENCY IN THE PRODUCTION OF WELFARE: OPTIMISATION ANALYSIS**

How could service allocation patterns be improved so as to insure better outcomes in the light of the relationships between services and outcomes observed in Chapter 5 and Chapter 6? How far are observed service contributions from their maximum attainable levels, given current resources? What would be the opportunity costs of improving performance with respect to the different outcome goals explored?

Focusing on efficiency in the allocation of community care resources, Chapter 7 attempts to illuminate the questions listed above. Thus, Section 7.1 introduces the methodological background of the analysis and the set of assumptions underlying the optimisation scenarios postulated in the analysis. Subsequently, Sections 7.2 to 7.9 introduce sequentially the results of the optimisation analysis for eight key outcome indicators. Finally, Section 7.10 provides a short overview of the connection between Chapter 7 and the final chapter in the thesis.

### **7.1 Assumptions and methods**

The analysis in Chapter 7 is based on optimisation methods, the last of the production of welfare tools introduced in Chapter 2. Following a short overview of the technique in Section 7.1.1, Sections 7.1.2 to 7.1.4 explore the justification behind the assumptions embodied in the analysis. Finally, Section 7.1.5 explains the structure of the result sections.

#### ***7.1.1 Optimisation analysis***

Section 2.2.4 has provided a detailed account of the aims and methods of optimisation analysis. In the present context, its role is to identify differences between:

- Current and optimum service allocation patterns, those yielding the maximum aggregate outcome levels given available resources and service prices.
- Current and optimum levels of outcomes, those produced by optimum care packages.

### *Identifying optimum care packages*

The first objective of the optimisation analysis will be to gauge the degree of *input mix efficiency* in the allocation of community care services. That is, the effectiveness with which care packages reflect the relative productivities and prices of inputs in order to achieve the maximum aggregate levels of outcomes at least cost. Optimum care packages will be determined by comparing service marginal productivities across case types, so as to concentrate resources on those services (and for those users) yielding the greatest gain in aggregate levels of outcomes. As mentioned in Section 2.2.4, in cases where the production function is concave, the optimum solutions will be derived using Lagrangian multiplier methods (Lambert 1988, p.105)<sup>34</sup>. In other cases, the solution will be derived by manual iterative exploration, exploring in particular the existence of corner solutions, whereby resources are concentrated on specific services or case types.

The analysis will consider the six service types studied in previous chapters, including district nursing inputs, in order to explore the interdependence between health and social care services in the community. In order to maximise the reliability of the analysis, the maximum service levels provided to individual case types following optimisation will not be allowed to exceed the ranges of provision observed in the sample.

### *The context of the optimisation*

Working out the optimisation allocation of resources requires the specification of a set of key elements:

- the output maximand, that is the quantity to be maximised
- the nature of the relationship linking the output maximand to the inputs available for investment (in the present case, the production functions estimated in Chapter 5)
- the nature of constraints imposed on the use of resources.

In the thesis, the optimisation analysis will be carried out individually for each of the eight outcome indicators with PSIC values above 15 per cent in Chapter 6. It will distinguish six

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<sup>34</sup> The analysis has been carried out using the software Mathematica and Excel.

case types, combining interval need category and presence of informal support. Informal support and physical dependency were the two factors identified in Chapter 6 as most often mediating service productivity effects<sup>35</sup>. It is important to note that, in contrast with Chapters 5 and 6, the results will not present average patterns for case 'groups', but rather patterns for six case 'types'. In other words, the results will not summarise patterns for the whole sample, averaged at the case group level. Instead, the analysis will be performed on six case types, whose characteristics (NRCs and levels of resources) will be equivalent to the average values for the case group they represent. The rationale for doing so is two-fold. First, it limits the number of optimisations to a manageable level<sup>36</sup>. More importantly, however, using case types reduces the influence of outliers on the pattern of results, as it 'forces' the analysis to operate nearer the sample average, where results are more robust.

Therefore, the optimisation results should not be interpreted as representative of the distribution for the whole of the sample. In particular, given the prevalence of non-linearities in the production function models, patterns for each case type should not be expected to depict the average patterns of results for groups of cases with the same characteristics<sup>37</sup>.

In order to explore the sensitivity of the results to alternative constraints on the use of resources, the optimisation analysis will be repeated for the following three scenarios:

- ***Overall-budget-constrained optimisation***, in which only aggregate resources for all cases are constrained to their observed levels, so that expenditure can be moved freely across user groups and service types.

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<sup>35</sup> The typologies of cases did not differentiate users by their level of cognitive impairment, the third most prevalent effect on service productivities, in order to limit the number of optimisations to be carried out. However, overall, the patterns by interval need would be expected to also capture variations in cognitive impairment levels.

<sup>36</sup> The analysis below, for eight outcomes, six case types and three optimisation scenarios implies 135 separate optimisations, most of which require manual imputation due to the non concavity of the production functions. The equivalent task at the individual level would have implied many thousands of optimisations.

<sup>37</sup> This is because, in the presence of a non-linear function  $f$ , we find that  $\sum_{i=1}^n f(x_i) / n \neq f\left(\sum_{i=1}^n x_i / n\right)$ . See

for instance Duan, N. 1983. "Smearing estimate: a nonparametric retransformation method." *Journal of the American Statistical Association* 78:605-610. for a discussion of this problem in the context of the transformation problem.

- ***Group-budget-constrained optimisation***, corresponding to a situation where budgets for individual user groups are fixed to their observed levels but expenditure in the different services remains unconstrained.
- ***Service-budget-constrained optimisation***, whereby aggregate resources allocated to the different service types are fixed to their observed levels but levels of services can be moved freely across user groups<sup>38</sup>.

The following subsections explore the rationale behind the varying assumptions defining such scenarios.

### ***7.1.2 The single output maximand assumption***

Contrary to standard practice in economics and operational research, the analysis will not attempt to construct an aggregate objective function. That is, it will not aggregate outcome indicators by postulating different weights for them, so as to reflect the preferences that would underlie some implicit social welfare function (Barr 1993). Instead, the analysis will explore successively, for a set of key outcomes, the implications of maximizing one individual goal at a time. There are several reasons for doing this.

- *The indicators available are not easily amenable to aggregation.* Chapter 3 has argued that the outcomes in the analysis comprise most aspects of the welfare goals ascribed to social care services. However, differences in the level of generality to which alternative outcome indicators relate complicate the conceptualisation and derivation of tradeoffs between them. For instance, the fact that improvements in ‘empowerment’ and ‘length of stay in the community’ are likely to follow from improvements in ‘functioning’ or user’s ‘morale’ complicate the hypothetical specification of trade-offs between them.
- More importantly, however, the single output maximand strategy responds to the ***lack of sources of evidence*** from which to draw weights for the specification of a welfare function. In particular, it would be very difficult to derive with sufficient precision from either policy or academic literature sets of weights which took into account the implications of the highly heterogeneous characteristics of cases (for instance, in order to

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<sup>38</sup> By definition, in the service-budget-constrained scenario, the observed allocation of services which are not found to have an effect on the outcome being maximised remains unchanged following optimisation.

reflect the presence of informal caregivers, or users' dependency levels, cognitive impairment, material and social deprivation). The estimation of such weights would have therefore required the collection of fresh evidence about the prioritisation of outcomes beyond the scope of the thesis.

- Also, it is not clear *whose preferences* should be incorporated into the welfare function (Boyd et al. 1990; Dolan 1999; Kind 1995). In addition to the general population, at least three key stakeholders could claim an interest in the derivation of weights: the users of the services, their caregivers and the care managers in charge of the cases.

In addition to sidestepping many of these complications, the single output maximand assumption offers important benefits. By not imposing (potentially arbitrary) weights on the outcomes prior to the maximisation process, it allows the sets of results produced to be interpreted, *ex post*, from a number of perspectives. In particular, it empowers the analysis to illuminate much more explicitly the implications of concentrating efforts on given outcomes, by clarifying the nature of the opportunity costs involved (the gains foregone in other outcomes), and the changes in the patterns of allocation of resources required. In other words, it allows the analysis to provide clarity about means and ends, an important recurring theme of the pre-reform community care critique (Audit Commission 1985; Goldberg and Connelly 1982).

However, the use of a single output maximand increases the ambiguity in the interpretation of the results. Indeed, by not imposing equity weights to reflect the desired prioritisation of outcomes and user types, differences between the optimum and observed patterns can be interpreted as either evidence of inefficiencies in the production of welfare system, or as the result of unaccounted for prioritisation of cases and/or outcomes (or of a combination of the two). In practice, the analysis will interpret differences between observed and optimum resource allocations and outcome levels through two opposing prisms: first, as the product of inefficiencies in the allocation of resources; and secondly, as evidence of the nature of the system's implicit prioritisation of outcomes and users.

Overall, the decision not to derive a composite outcome index is therefore based on the belief that the conditions are not present in the data used in the thesis for the derivation of a reliable overall outcome indicator, and that greater clarity and reliability can be achieved by comparing of the results of individual indicators.

### ***7.1.3 Assumptions about flexibility of service supply***

By setting different assumptions about the availability of services, the analysis aims to investigate the impact of constraints in the supply of community care services on performance. At the policy level, this relates to the ‘market enabling’ role ascribed to local authorities in the White Paper, whereby they were to be agents overseeing the mixed economy of care, so as to insure that ‘the range and diversity of domiciliary care services can be greatly increased’ (Department of Health 1989, para. 3.6.3).

In practice, the optimisation scenarios will contrast two opposing assumptions with respect to services.

- Unlimited availability of services supplied at current prices/costs. That is, the assumption of perfectly elastic supply curves.
- *Unadjustability of the total expenditure on each service.* That is, the assumption that aggregate service supply is constrained to its observed level in the sample. When such assumption applies, gains in efficiency can still be achieved by changing service input mixes and overall budget levels for individual case types, but holding aggregate budget and input service mix levels constant.

### ***7.1.4 Assumptions about changes in case budget levels***

The single objective driving the optimisation process is to maximise the aggregate sum of outcomes across individuals (within the resource constraints specified). In practice, the optimisation does so irrespective of the nature of the distribution of gains obtained, and particularly irrespective of whether all resources end up being concentrated on a few case types. In that sense, the optimisation procedure can be loosely associated with utilitarian distributional principles, as it is ‘supremely concerned with the interpersonal distribution of the sum’ (Sen 1973, p.16).

By fixing budget levels for case types to their observed levels in one of the optimisation scenarios, the analysis aims to:

- Postulate a scenario where broad prioritisation patterns between cases are preserved (to the extent that group budgets implicitly embody equity judgements), as a means of



constraining potential inequities in the distribution of outcomes following optimisation<sup>39</sup>. As a result of fixing user group budgets to observed levels, the group-budget-constrained scenario prevents deterioration in the outcome being maximised for all individual users, and therefore forces the hypothetical solutions to be Pareto superior.

- Understand the opportunity costs implied by the observed patterns of distributions of resources. By comparing the aggregate levels of outcomes achieved by the optimisation scenarios which do and do not allow changes in case budgets, the analysis should be able to illuminate the dilemmas implied by the concentration of resources on those in greatest need.

In the context of the development of community care services, the specification of limits in the average expenditure per case were an important element of the incentive structure of the early British experiments in budget-devolved care management (Davies and Challis 1986), as well as in some of the contemporaneous American experiments, notably ACCESS (Eggert 1990).

### **7.1.5 Common structure of efficiency sections**

As in Chapter 5, the reporting and discussion of the analysis will be structured around two standard diagrams, repeated for each optimisation scenario and for each outcome indicator:

- the first diagram will show improvements in service contributions to outcomes following optimisation and changes in care packages associated with them (see for instance Figure 7.1);
- the second will explore the impact of optimum service allocations on *collateral* outcomes, that is on the remaining outcomes not being maximised by the analysis (see for instance Figure 7.2).

For each optimisation scenario, and for each of the six case types specified, the figures depicting collateral outcomes will focus on two key features of the patterns explored:

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<sup>39</sup> This assumption is for want of a better alternative. Indeed, there are no good reasons to expect observed budgets to be perfectly equitable. And even if they were, the outcome of the optimisation process would imply changes in optimum budgets, following changes in the rate of returns of the resources invested. Nevertheless, given the lack of alternative sources of evidence, the assumption represents the best available mechanism for constraining optimal solutions to current broad prioritisation patterns.

- The *relative improvement or deterioration* of collateral outcomes following optimisation. That is, the extent to which following optimisation on a given outcome, other collateral outcome levels improve or deteriorate. Diagrammatically, this will be indicated by the relative length of the white and blue rows (which refer to the observed and collateral outcome levels, respectively). Also, the diagrams will identify outcomes which experience falls in service contributions following optimisation by encircling them in red.
- The *difference between collateral and optimum levels of* outcomes: that is, the extent to which collateral outcome levels associated with the optimisation of a given indicator are close to the levels that would be implied by the optimisation of the collateral indicator itself. In the figures, observed and collateral outcomes levels will be expressed as a proportion of the levels that would be achieved following optimisation of the individual outcome indicators. Therefore, the shortfall (or excess) in outcome levels relative to optimum outcome levels will be inferred from the distance between the top of the blue column and the 100 per cent line.

By expressing observed and optimum collateral outcomes as a proportion of optimum levels, the analysis therefore:

- Standardises the unit of measurement of collateral outcomes, which facilitates the comparison of patterns across indicators.
- Allows a more complete interpretation of the relative performance of services, by judging changes in collateral outcome levels relative to both observed and optimum levels.

Overall, collateral levels will depend on (1) the extent to which the optimum input mixes for the output maximand in question ‘suits’ the production of other outcomes and (2) the degree to which optimum budgets are higher or lower for some case types than those implied by the optimisation of other collateral outcomes. Hence, given their different assumptions about the optimisation process, the interpretation of the values of collateral outcomes will differ slightly between optimisation scenarios. In particular, in the group-budget-constrained optimisation scenario, collateral levels will be constrained to values below or equal to 100 per cent, and will reflect exclusively the degree of input mix efficiency of the optimum care packages with respect to the achievement of collateral outcomes. In the other two scenarios, where user-group-budgets are endogenous to the optimisation process, collateral outcomes

could be found to exceed the 100 per cent value due to significant changes in the distribution of budgets following optimisation.

*Limits in the interpretation of the optimisation results*

It is important to discuss the limitations associated with the interpretation of the results. Given the emphasis in early chapters on the inherent complexity of the community care system, it would be inappropriate to characterise the optimisation results either as precise estimates of likely changes in welfare following changes in allocation patterns, or conversely, as precise descriptions of levels and mixes of care packages required for maximising different dimensions of welfare. Instead, the optimisation results provide a broad brush picture of the likely *direction of change* in welfare and service provision associated with alternative policy foci, and of the opportunity costs involved in prioritising different user case types.

In some respects, the optimisation results are likely to present a ‘caricaturised’ picture of the means for improving efficiency in community care. Within the constraints set by the different scenarios, the optimisation process will concentrate resources blindly on those users and services for whom resources are found to be most productive. Importantly, it will do so regardless of

- how small the differences in the cost-effectiveness of services are
- the degree to which the resulting distribution of resources is concentrated on particular services, or on given case types.

It is therefore likely that several of the solutions of the optimisation process will represent ‘corner solutions’, whereby large quantities of particular services are concentrated on a few case types, or on a few services<sup>40</sup>. Clearly, from a policy perspective, such extreme solutions would not represent realistic alternatives. They should be therefore be interpreted as markers of:

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<sup>40</sup> In the context of traditional microeconomic theory, a corner solution indicates a choice made by an agent that is at a constraint, typically a budget constraint. In the current example, in addition to the constraints implied by the definition of the optimisation scenario, all service allocations to case types will be constrained to values within the levels of provision observed in the sample.

- the direction of efficiency-improving changes in the allocation of resources, by indicating which services (and for which users) would be likely to yield the greatest improvements in aggregate outcomes
- the current implicit prioritisation of services and users, by pointing out which case types are observed to receive more than their ‘efficient’ share of resources for the production of a given outcome.

## 7.2 Maximizing length of stay in the community (DAYS)

### 7.2.1 *Changes in input mix and levels of outcomes following optimisation*

Figure 7.1 illuminates differences between observed and optimum care package contributions and observed and optimum allocations of services. The patterns are shown for the three optimisation scenarios and the six case types in the analysis. The units for service levels are labelled in the left-hand margin of the figure. The units for the outcome (number of days) are labelled in the right-hand margin.

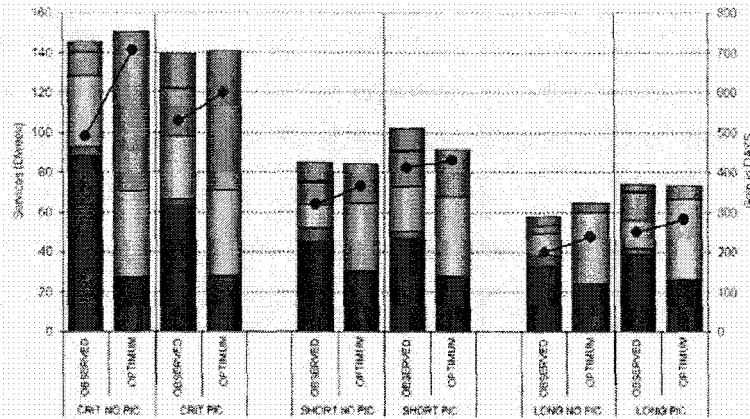
*Striking parallels between the overall-budget-constrained and the group-budget-constrained scenarios.*

- *Concentrating resources on the neediest:* Figure 7.1 reveals striking similarities in the patterns of outcomes, budget levels and service input mix between the overall-budget-constrained and the user-budget-constrained optimisation scenarios. From a policy perspective, such a finding is remarkable. Indeed, it suggests that maximising the aggregate level of DAYS, arguably the most important outcome indicator in the analysis, does not necessarily imply altering substantially the relative distribution of resources between users in low and high need. The finding thus contradicts some of the efficiency-related concerns that have been expressed about the opportunity costs of concentrating resources on those in greatest need<sup>41</sup>.

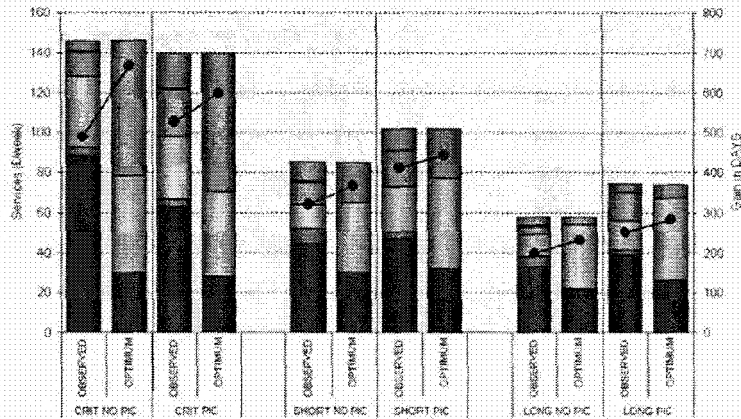
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<sup>41</sup> It is important to note, however, that the analysis cannot shed light on outcomes for users not in receipt of community care services. This is important because in addition to reductions in average resources allocated to low dependency cases, changes in targeting since the reforms have implied reductions in the numbers receiving social care services.

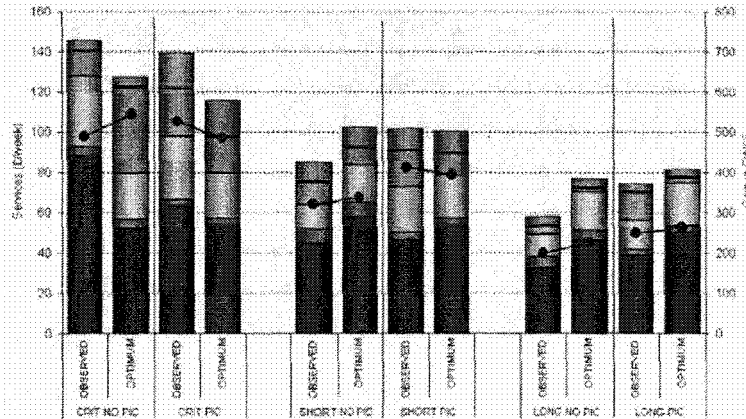
Figure 7.1 Input mix efficiency for length of stay in the community (DAYS)



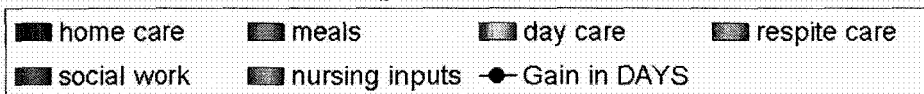
Overall-budget-constrained optimisation scenario



Group-budget-constrained optimisation



Service-budget-constrained optimisation



- *More day care and respite care, less of other services:* In terms of input mix efficiency, the ‘overall-budget-constrained optimisation scenario’ and the ‘group-budget-constrained optimisation’ both imply, for all case types, heavy reductions in the utilisation of all services except day care and respite care, which following optimisation constitute by far the main pillars of the care packages. Overall, while day care levels increase considerably for all cases (with a small gradient by level of disability) the expansion in the use of respite care is particularly noticeable for the most dependent users, those with critical interval needs. Appendix Figure 7.1 shows greater variations in the level of day care provided when the optimisations focus on cases with and without cognitive impairment and behavioural problems.
- *Higher outcomes for all, particularly for the most dependent.* It has been noted above that by definition, fixing user group budgets precludes losses in outcome levels for any case following optimisation. But even in the overall-budget-constrained scenario, all case types are shown to gain significantly higher levels of outcomes, particularly high dependency users. In other words, the distribution of resources implied by the overall-budget-constrained assumption is Pareto superior to the observed allocation.

These results are compatible with arguably the only other comparable optimisation analysis of social care services, applied to the US long-term channelling project. By analysing the levels of community based services which would minimise total long term care costs (through their effect on of the probability of transition to nursing homes), the authors found that the optimum use of services would concentrate resources heavily on the most dependent users (Greene et al. 1995).

*The importance of flexibility in the supply of services.*

The pattern of results for the service-budget-constrained optimisation are in stark contrast with those implied by the other two scenarios. In particular, when aggregate levels of individual services are constrained, the optimum allocation implies

- a transfer of resources away from the most dependent cases
- (moderate) outcome gains exclusively for the low dependency cases and users with PICs, and outcome losses for the other case types.

Thus, the significantly worse outcomes associated with the service-budget-constrained scenario suggest that for DAYS at least, insuring flexibility in the supply of services (while avoiding significant increases in prices) – and particularly in the supply of day care and respite care – is crucial for improving equity and efficiency in community care.

*Optimum solutions in the context of previous average productivity patterns.*

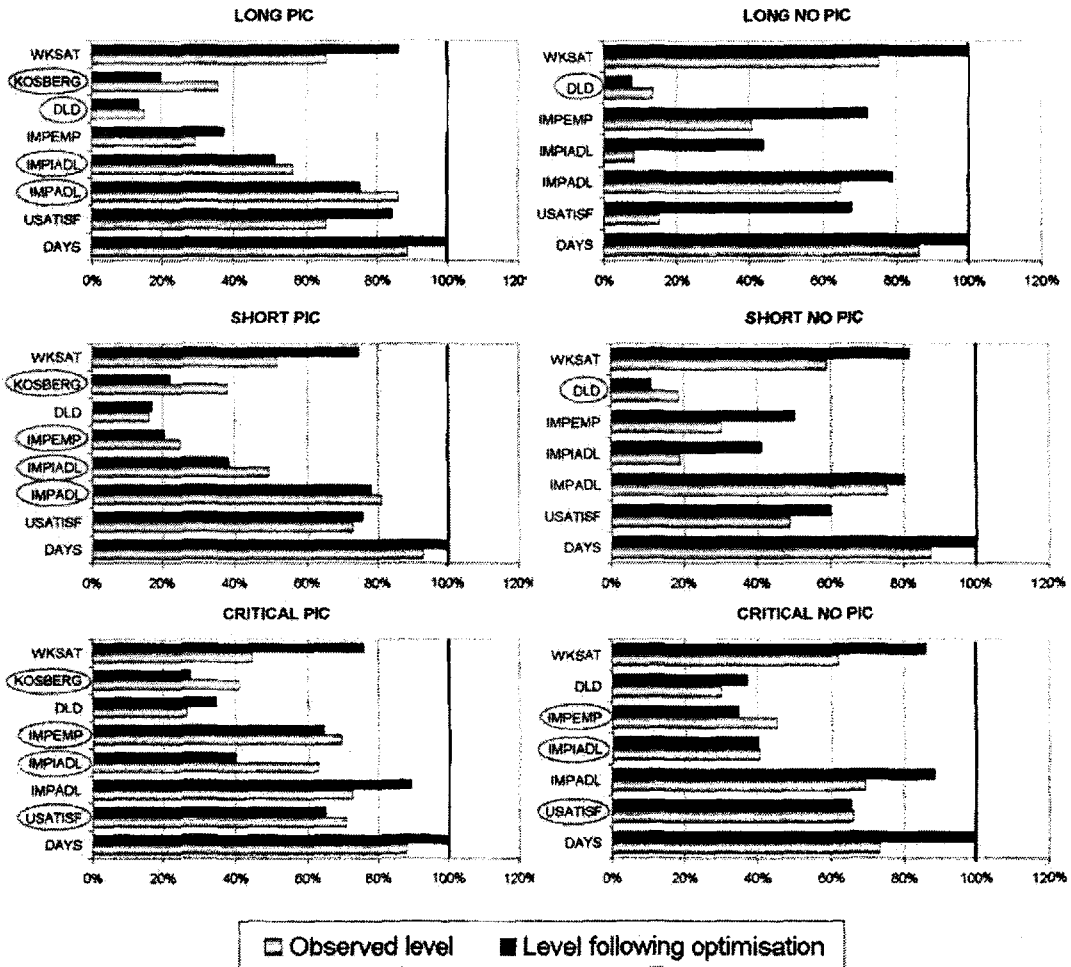
Surprisingly, given the negative correlation between service contributions and average productivities by level of dependency identified in earlier chapters, maximising aggregate length of stay does not imply redistributing resources away from those in greatest need, except on one condition: that levels of provision of day care and respite care (the newer types of services) at current prices cannot be increased. Where restrictions in the availability of the two services apply, maximising aggregate length of stay is associated with reductions in levels of services for the neediest and lower outcome gains for all users. Interestingly, greater private and voluntary provision of day and respite care was explicitly quoted in the 1989 White Paper as one of the aims associated with the new enabling role for local authorities.

### *7.2.2 Collateral outcome levels*

Figure 7.2 to Figure 7.4 summarise the observed and collateral outcome levels (in white and blue, respectively) associated with the optimisation of DAYS, for the six case types and three scenarios explored. That is, they depict the implications for all outcomes in the optimisation analysis of the resource allocations found to maximise DAYS. As mentioned above, outcome levels are expressed relative to the optimum levels achievable for each individual outcome, which are thus represented by the 100 per cent line.

It is perhaps most useful to begin the discussion of the patterns of collateral outcomes with the results from the group-budget-constrained scenario, shown in Figure 7.2, for which by construction changes between observed and collateral outcome levels are due exclusively to changes in service mix.

**Figure 7.2 Collateral outcome levels for optimisation on DAYS with group-budget-constrained optimisation**





### *User-budget-constrained optimisation*

#### *Worse collateral outcomes for cases with PICs.*

Figure 7.2 highlights significantly worse collateral outcomes for cases with PICs.

- For cases with informal caregivers, an average of almost four of the seven collateral outcomes explored fall following optimisation. Collateral levels of KOSBERG and IMPIADL, the indicators of caregiver burden and improvement with IADL functioning respectively, deteriorate for all case types with PICs.
- In contrast, amongst users without PICs, maximising DAYS brings about reductions in collateral outcome levels only for dissatisfaction with life development (DLD) for medium and low dependency cases, and for IMPEMP (sense of empowerment) for users with critical interval needs<sup>42</sup>.

#### *Collateral improvements in worker satisfaction and user satisfaction.*

Figure 7.2 shows particular improvements in collateral outcome levels for two indicators.

- The indicator of workers' perceptions of the impact of services on a users' welfare (WKSAT) increases significantly for all case types following optimisation. In fact, for several case types, collateral WKSAT levels are close to the 100 per cent mark (that is, the maximum levels of the outcome attainable, given the observed case budgets).
- Collateral levels for USATISF (user satisfaction with services) are higher than observed levels for users with long and short interval needs. Arguably, it is for such case types that USATISF's prominence is likely to be greatest, given their relatively lower risk of institutionalisation.

#### *Significant tradeoffs between the optimisation of outcomes*

As can be observed by the relative distance between the collateral outcome levels and the 100 per cent line, optimising DAYS yields collateral levels significantly below the optimum values achievable for several outcome indicators. In other words, setting DAYS as the only system goal appears to imply significant trade-offs in the achievement of several outcomes.

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<sup>42</sup> The decreases in IMPIADL and USATISF are not mentioned because of the very small nature of the changes they imply.

This finding is not altogether surprising. Indeed, optimum care packages for DAYS are made up exclusively of home care, day care and respite care, the three services found to significantly extend the length of stay in the community. Hence, the collateral levels for outcomes most strongly affected by other services would be likely to be low.

The collateral levels of DLD and KOSBERG (respectively, the indicators of dissatisfaction with life development and of caregiver burden) remain well below 40 per cent of their optimum levels for all case types examined. This finding is to a large extent related to the lack of social work inputs in the optimum care packages for DAYS. In light of the large effect of small levels of social work inputs on DLD and KOSBERG identified in Chapter 5, it is therefore likely that a more balanced set of collateral outcomes could be achieved by including small levels of social work inputs in the care packages.

As for DLD and KOSBERG, optimising DAYS appears to produce collateral levels of IMPIADL significantly below their potentially achievable levels. As will be shown below, this shortfall in performance is mainly related to the lack of nursing inputs in the optimum care packages for DAYS.

### ***Overall-budget-constrained optimisation***

#### *Similar gains in collateral outcomes to those in the group-budget-constrained scenario*

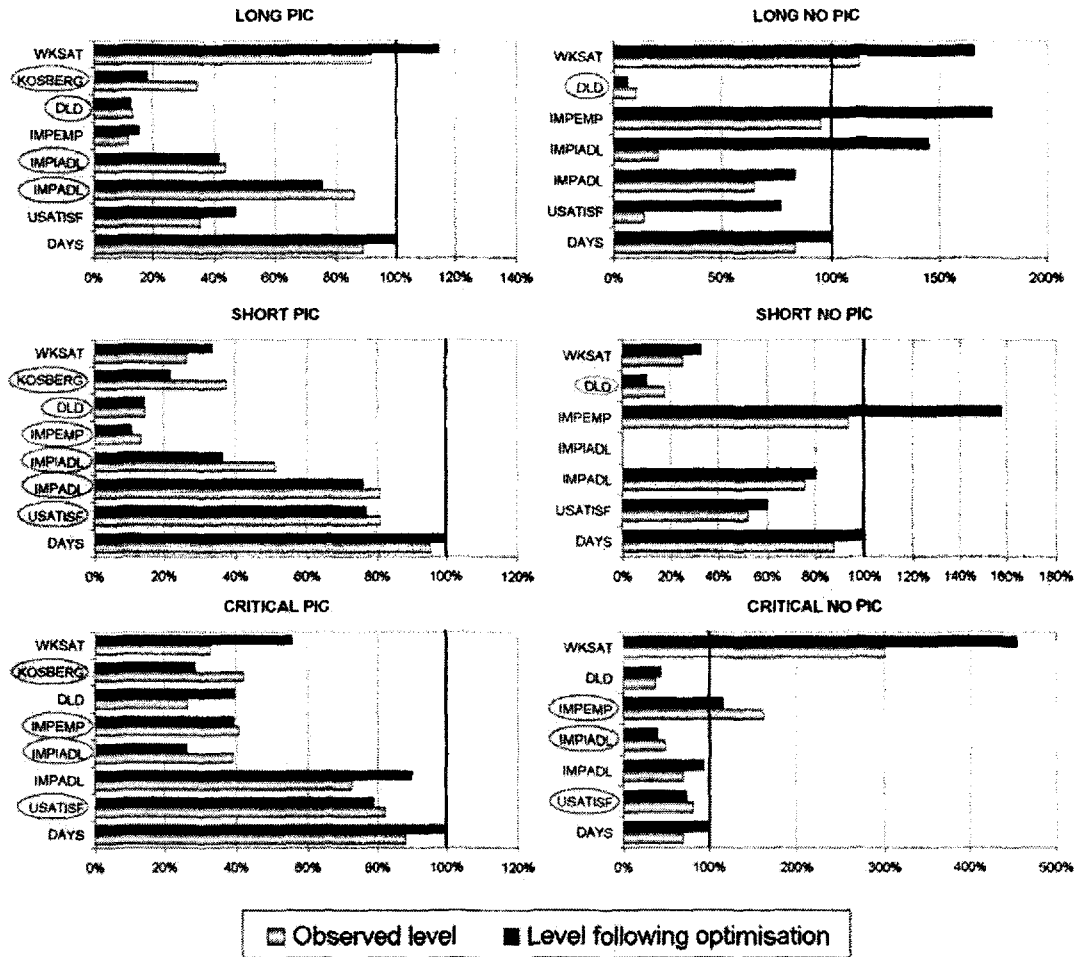
Since, as shown in Figure 7.1, the resource allocations implied by the overall-budget-constrained and the group-budget-constrained optimisations are almost identical, it is not surprising that the patterns of *relative gains* in collateral outcomes depicted in Figure 7.3 follow very closely those in Figure 7.2. In particular, the proportional change in outcome levels following optimisation, indicated by the relative height of the white and blue columns, remains broadly unchanged.

#### *Differences between collateral and optimum outcome levels*

As mentioned previously, the outcome indicators in the figures exploring collateral patterns represent the ratio of

- outcome levels achieved by either the observed care packages or the care packages implied by the optimisation of the output maximand (in this case DAYS) to the level of outcomes implied by the optimisation of the outcome indicator itself.

**Figure 7.3 Collateral output levels for optimisation on DAYS with overall-budget-constrained optimisation**



Given that, for DAYS, the group-budget-constrained and the overall-budget-constrained scenarios imply quasi-identical optimum care packages, differences between the patterns in Figure 7.2 and Figure 7.3 therefore reflect mostly differences between optimisation scenarios in the optimum outcome levels associated with the different indicators. In other words, they reflect differences between the scenarios in the outcome levels associated with the 100 per cent line. Hence, the fact that collateral levels of IMPEMP for cases without PICs in Figure 7.3 are much higher than those in Figure 7.2 reflects that that maximising aggregate levels of control over own life (IMPEMP) produces much lower levels of the outcome for cases without PICs when budgets are allowed to be transferred between cases during the maximisation process. Furthermore, the values of IMPEMP for cases without PICs above 100 per cent in Figure 7.3 suggests that, within the overall-budget-constrained scenario, maximising aggregate DAYS produces significantly higher levels of IMPEMP for cases with PICs than the optimisation of IMPEMP itself.

Importantly, this finding should not be interpreted as suggesting that the *aggregate levels* of IMPEMP would be higher following the optimisation of DAYS than that of IMPEMP. In fact, by definition, the optimisation of IMPEMP ought to yield at least equal but probably significantly higher *aggregate* levels of the outcome. What the results suggest is that the distribution of service contributions to IMPEMP would be different, with users without PICs being prioritised much more following the optimisation of DAYS.

In addition to IMPEMP, the main differences between the patterns in Figure 7.2 and Figure 7.3 relate to WKSAT, the indicator of worker perception of the impact of the care package on the welfare of the user. With respect to that indicator, the optimisation of DAYS in the overall-budget-constrained scenario brings about higher than optimum collateral outcome levels for users with long interval need levels and for users with critical interval needs without informal support, and much lower than optimum levels of the WKSAT for the other three case types.

The absence in Figure 7.3 of readings for IMPIADL for the short interval need without PIC case is due to the fact that in the overall-budget constrained scenario, the optimisation of IMPIADL does not allocate any resources to that case type, and therefore yields zero service

contributions for them. For the case type, the collateral outcomes of IMPIADL represented a 93 per cent improvement over the observed levels.

### ***Service-budget-constrained optimisation***

#### ***Improvements in collateral outcomes***

Again, most gains in collateral outcomes in the service-budget-constrained optimisation scenario relate to users without PICs (see Figure 7.4). In particular, for users without PICs and with long and short interval needs, all collateral outcomes increase following optimisation. Also, IMPADL levels improve for all cases except users with long interval needs and PICs.

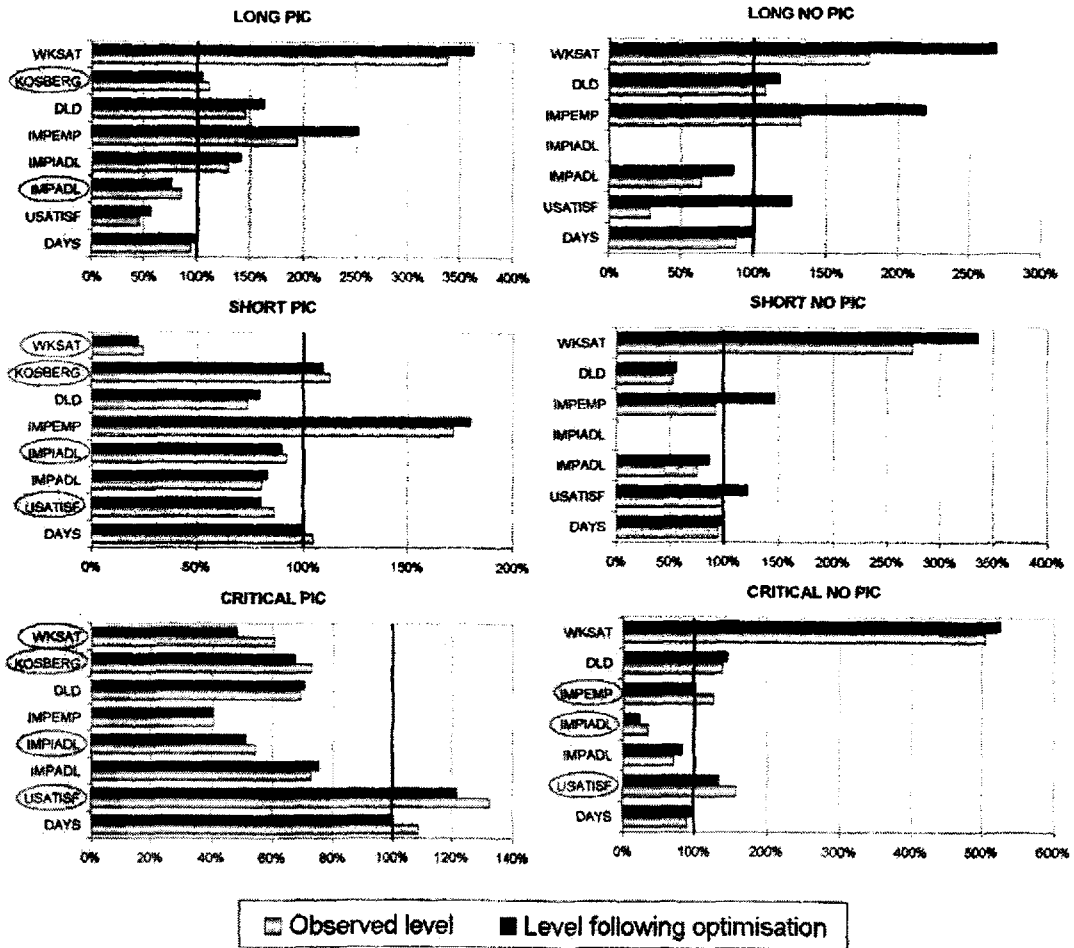
Reflecting the transfer of budget levels from high to low dependency cases following the optimisation of aggregate levels of DAYS in the service-budget-constrained optimisation scenario, the number of improvements in collateral outcomes decrease with dependency levels. Hence, seven, four and two collateral outcomes fall following the optimisation of DAYS for cases with critical, short and long interval needs, respectively.

#### ***Differences between collateral and optimum outcome levels***

For many case types and outcome indicators, optimising DAYS in the context of limitations in the aggregate levels of supply of services yields collateral levels which are close to or exceed the optimum levels implied by the optimisation of the individual indicators. As found in previous scenarios, the greatest shortfalls between collateral and optimum outcome levels appear to be for the most dependent users and those with informal care support.

As in the previous scenario, the lack of IMPIADL collateral values for the long and short interval need without PIC cases is due to the fact that the optimisation of IMPIADL implies zero service contributions for them.

**Figure 7.4 Collateral output levels for optimisation on DAYS with service-budget-constrained optimisation**



### **7.2.3 Overview**

#### *Gains in outcomes*

- Who benefits and by how much depends on the assumptions made about the free availability of services.
- If no constraints on aggregate service supply levels are imposed, the optimisation brings about sizeable improvements for all clients, but much greater for the most dependent cases.
- If service supply levels are constrained, aggregate gains are significantly reduced and bring about losses in DAYS for some cases.

#### *Optimum budget levels and input mixes*

- The pattern of service distributions and outcome gains associated with the user-group-budget constrained and the overall-budget-constrained scenarios are almost identical. This implies that (1) constraining budgets to their observed levels does not bind significantly the aggregate level of DAYS that can be produced and (2) that maximizing aggregate DAYS does not necessarily imply redistributing resources away from those in greatest need.
- When the supply of services is not constrained, the share of home care in the optimum care packages is significantly reduced for most case types. In contrast, the share of day care and respite care services increases considerably, particularly for the most dependent users.
- When aggregate service supply levels are held to their observed levels, optimising DAYS implies redistributing resources from the most dependent cases to the least dependent ones, while concentrating the available level of respite care and day care on the most dependent cases.

#### *Collateral output levels*

- Broadly speaking, maximising DAYS implies reductions in the levels of other important outcomes for users with PICs, but comprehensive gains in many collateral outcomes for users without PICs.
- To a lesser extent, collateral patterns also deteriorate with the level of dependency.

- Given its large influence on other important outcome indicators, a more balanced performance in terms of collateral outcomes could perhaps be achieved by mixing social work inputs in the optimum care packages.

### **7.3 Maximizing user satisfaction with services (USATISF)**

#### ***7.3.1 Changes in input mix and levels of outcomes following optimisation***

Figure 7.5 depicts the gains in levels of USATISF following optimisation, given the three scenarios postulated in the analysis, as well as the changes in the composition of care packages required to achieved them.

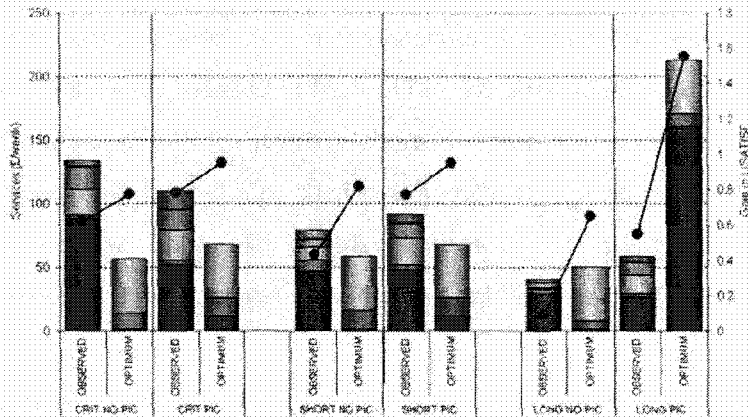
##### ***Strong impact of service supply levels on outcome gains***

Two sets of hypotheses about the conditions for optimisation – the overall-budget-constrained and the user-budget-constrained scenarios – imply improvements in the indicator for all cases observed. In the case of the overall-budget-constrained optimisation, these generalised improvements in USATISF levels are in spite of considerable reductions in the budgets for the critical and short interval need cases. In contrast, maximising aggregate levels of user satisfaction when the supply of services is constrained to observed levels implies trading losses in USATISF for some cases (those with the highest levels of need) in exchange for greater gains in satisfaction for the low dependency cases. In addition to implying a non-Pareto superior solution, the solution in the service-supply-constrained optimisation also appears to yield levels of USATISF which in aggregate are far below those produced in the two other scenarios.

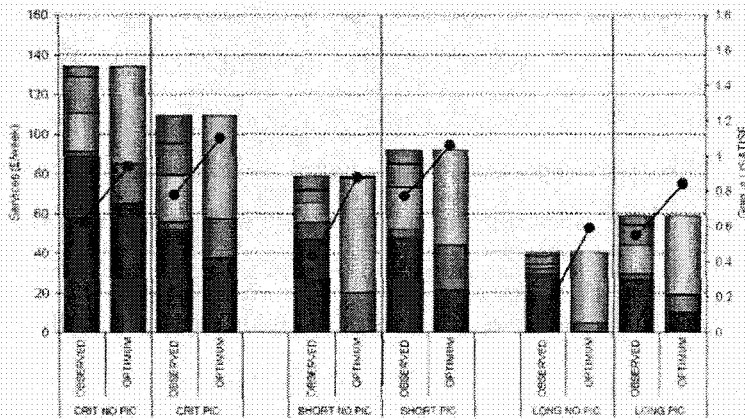
Interestingly, the same pattern of trade-offs between gains and losses in the outcome and of lower overall aggregate outcome levels for the service-supply-constrained scenario was described in the context of the optimisation of DAYS.



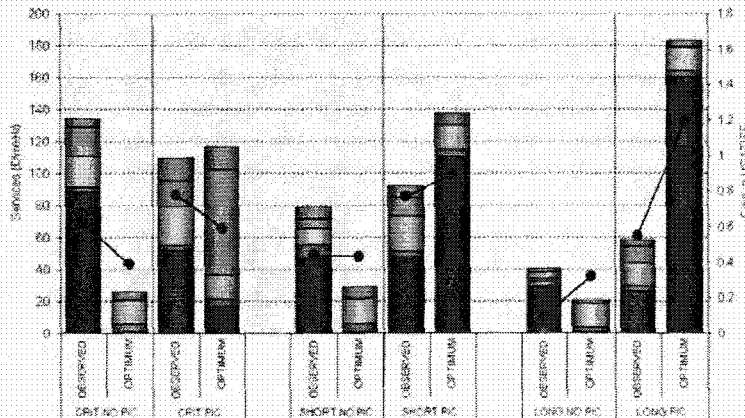
**Figure 7.5 Input mix efficiency for user satisfaction with services (USATISF)**



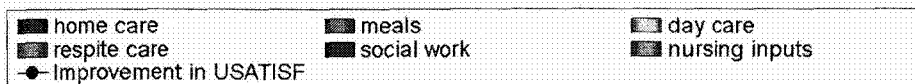
**Overall-budget-constrained optimisation scenario**



**Group-budget-constrained optimisation**



**Service-budget-constrained optimisation**



### *Concentrating home care inputs*

Figure 7.5 exposes dramatic differences in the patterns of service provision between the three scenarios explored for the optimisation of USATISF. Broadly, these contrasts appear to relate to the concentration of significant levels of home care on particular case types. It will be remembered that Section 5.3 had identified two home care effects on user satisfaction. The first, relating to users with informal caregivers, showed decreasing marginal returns. The second effect, associated with users who lived alone, exhibited increasing returns to factor.

- Overall, the maximisation of USATISF in the overall-budget-constrained optimisation implies the concentration of large levels of resources (mostly home care) on one case type, and the significant reduction of care packages for practically all other cases, who receive mostly day care and meals on wheels services. Such a distribution of resources appears therefore to exploit the increasing marginal effects of home care by concentrating very high levels of the input on the long interval need with informal care case type<sup>43</sup>, who benefits most strongly from the input, as shown in Appendix Figure 7.2. Not being able to exploit the increasing marginal effects of home care for other case types within the observed overall budget constraint, the optimum allocation of the remaining resources appear to be distributed fairly equally amongst other cases, mostly on higher levels of day care and meals on wheels. Both services had shown, in Section 5.3, large but quickly decreasing marginal effects on USATISF. Figure 7.5 shows how the level of day care inputs in the optimum care packages never exceeds £60 per week. This level, which corresponds approximately to two weekly attendances, was found in Section 5.3 to represent the threshold at which day care marginal productivities on USATISF turned negative.
- Forcing case budgets to their observed levels generates altogether different optimum case budgets than the overall-budget-constrained scenario, but similar service mixes for a majority of cases. Unable to exploit the increasing marginal effects of home care for users living alone due to the immobility of case budgets, the solution to the optimisation brings about significant reductions for all case types in home care levels, and increases in the levels of day care and meals on wheels.

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<sup>43</sup> In fact, the provision of home care for the case type is capped at a maximum of £160 per week, the maximum observed level of provision of the service in the sample.

- Finally, when aggregate service supply levels are restricted to their observed levels, the optimum allocations imply large transfers of resources from the more dependent to the less dependent cases, and from cases without PICs to cases with PICs. Like in the overall-budget-constrained scenario, the optimisation when service supply levels are constrained concentrates the highest amounts possible of home care inputs on users with long interval needs and with PICs<sup>44</sup>.

As was discussed in Section 5.3, the high returns on USATISF associated with concentrating resources on intensive home care packages for some cases could be understood in terms of:

- changes in the content of the service provided as the intensity of provision increases and provides a greater opportunity for assistance with housework tasks (a service which is highly valued by service users)
- the impact of more intensive home care packages on the relationship between the home carer and the service user, and the cementing of a personal bond between them.

In this context, it is important to understand the potential changes in resource allocation which might be implied by a system focused mostly on maximising user satisfaction, as this would help to gauge the likely impact of changes in the balance of control over care planning, for instance, through the development of direct payment schemes. This will be discussed in greater detail in the final chapter of the thesis.

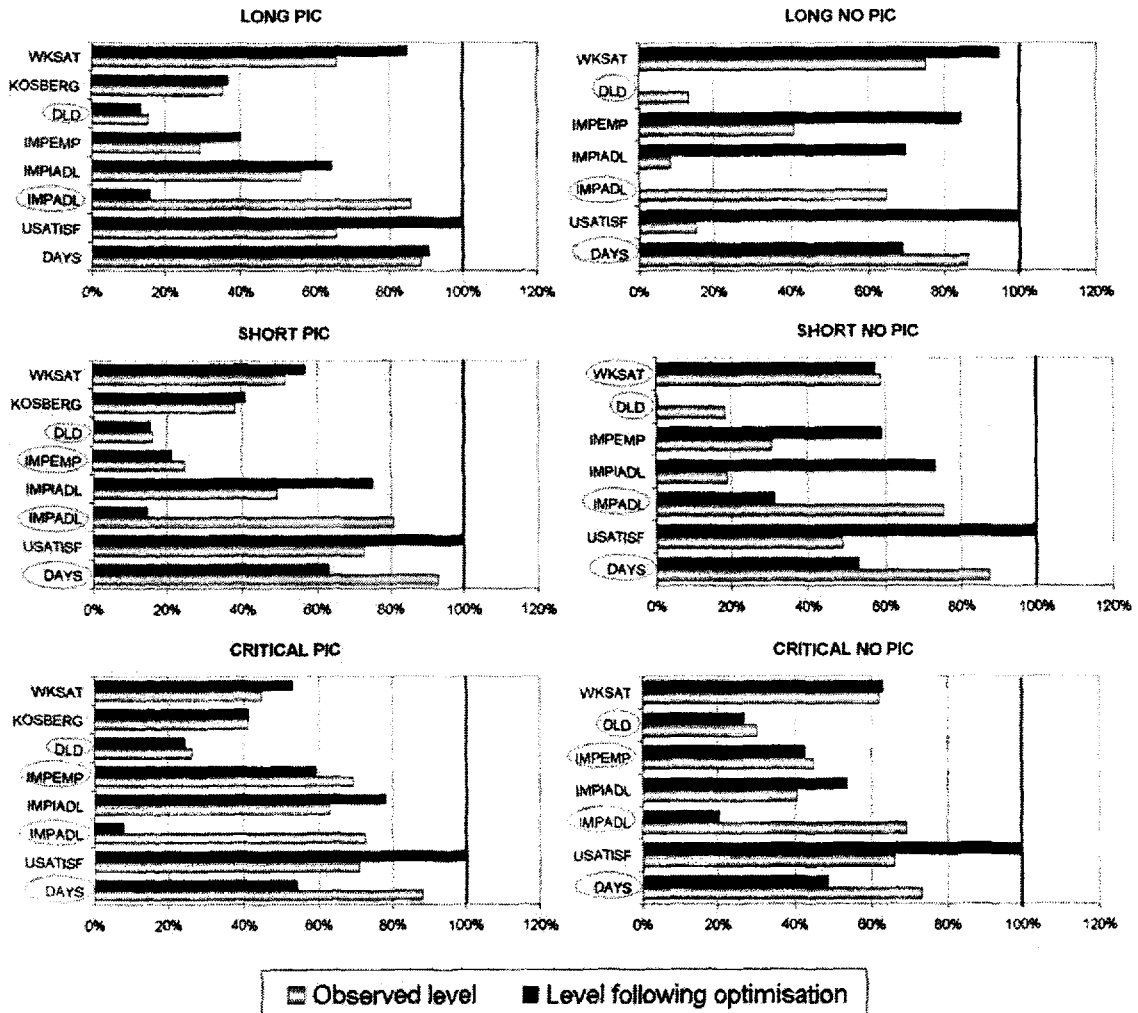
### **7.3.2 Collateral outcome levels**

Figure 7.6, Figure 7.7 and Figure 7.8 summarise the patterns of changes in collateral outcome levels following the optimisation of USATISF in the group-budget, overall-budget and service-budget-constrained scenarios, respectively.

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<sup>44</sup> Again, the levels of the service are capped to £160 per week, the maximum observed level for a significant number of cases in the sample.

**Figure 7.6 Collateral output levels for optimisation on USATISF with group-budget-constrained optimisation**



### *Significant losses in key collateral outcomes*

Even when restrictions on case budgets prevent the concentration of resources on a few cases, the optimization of USATISF appears to bring about reductions in important collateral outcomes for a majority of users. Hence, Figure 7.6 shows that in the case-budget-constrained scenario, maximizing user satisfaction diminishes care packages' contributions to ADL functioning and to the indicator of dissatisfaction with life development for all cases in the analysis. Significantly, achieving the greatest gains possible in USATISF also appears to be at the expense of shorter lengths of stay in the community, particularly for users with the greatest dependency. Section 7.2 had showed that maximizing DAYS in the identical scenario improved user satisfaction for cases with long and short interval needs, but reduced to a small degree user satisfaction for the most dependent cases.

### *Some improvements in collateral outcomes, particularly for low dependency cases*

In spite of the deteriorations noted above, Figure 7.6 also shows some improvements in collateral outcome indicators following the optimization of USATISF, particularly for the two cases with long interval needs.

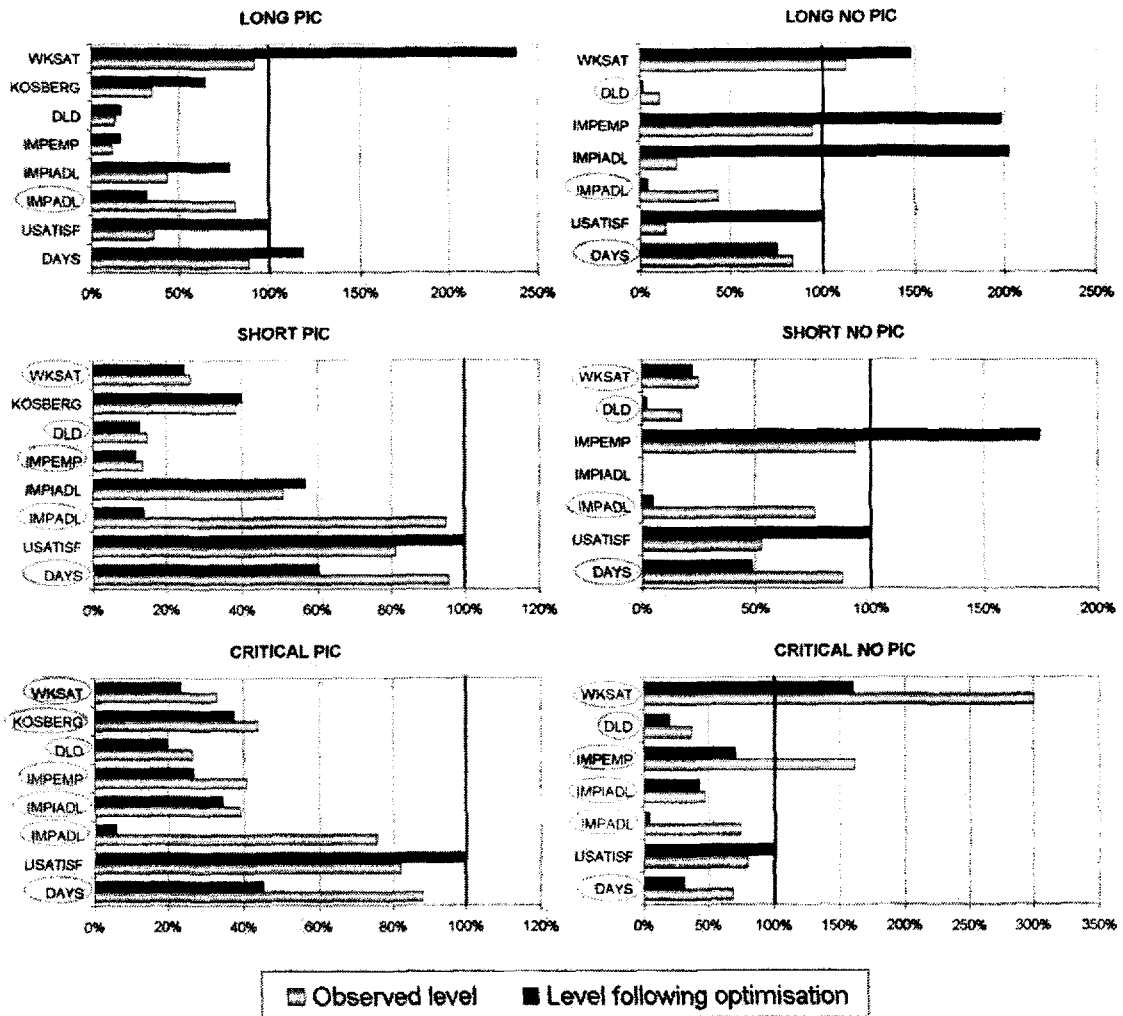
Although to a lesser degree than following the optimization of DAYS, maximizing user satisfaction raises levels of WKSAT (the care manager's perception of the impact of care packages on users' welfare) for five of the six cases explored. Also, for all case types, the levels of service contributions to instrumental functioning (IMPIADL) show large improvements. Although to a much more limited degree, the same is true of KOSBERG, the indicator of caregiver burden.

### *The impact of concentrating resources in a few cases*

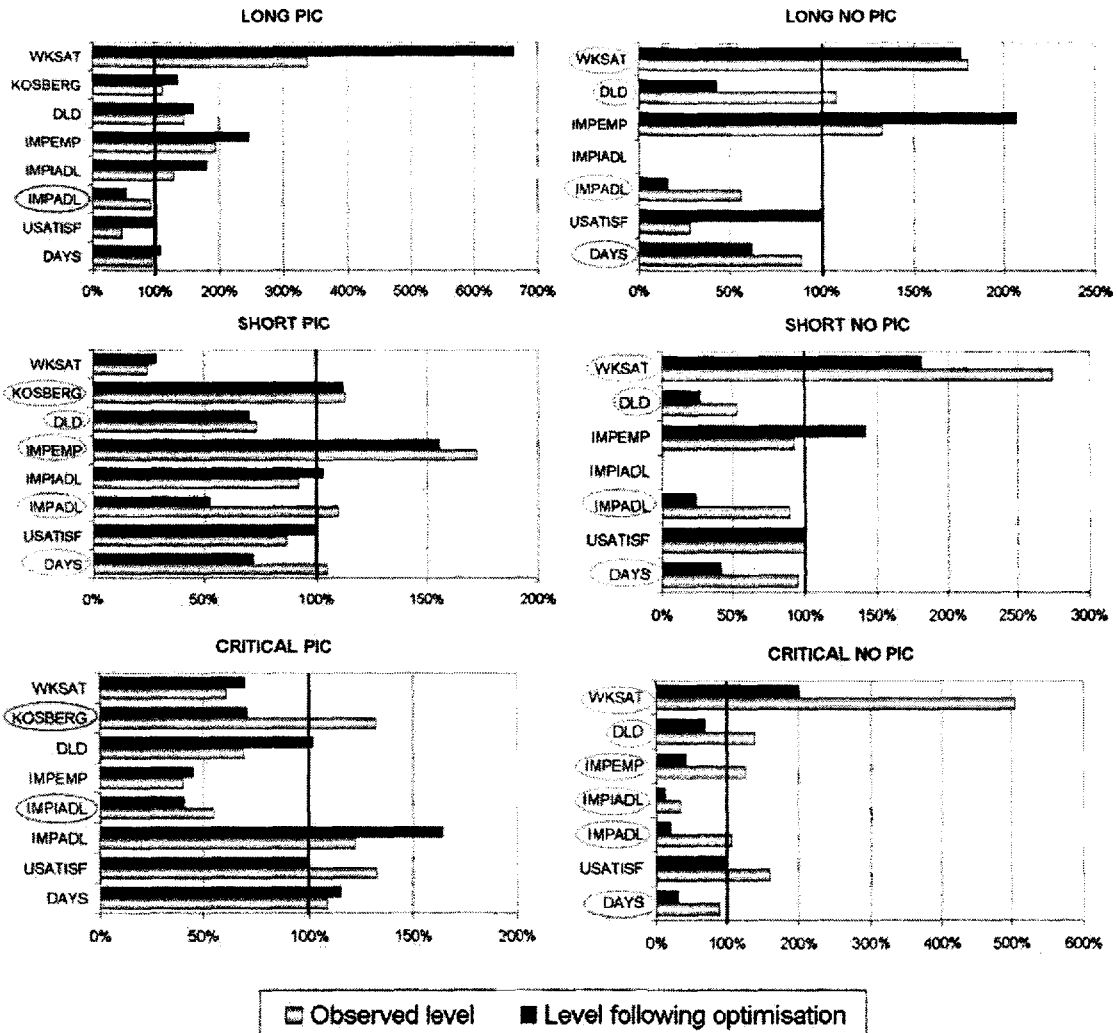
Not surprisingly in light of the skewed nature of the distribution of resources implied, the patterns of collateral outcomes in the overall-budget and service-budget-constrained scenarios reflect mostly the pattern of changes in case budgets. Hence, Figure 7.7 shows that in the least constrained scenario, optimising USATISF brings about deteriorations in practically all collateral outcome indicators for cases with short and critical interval needs.

In both Figure 7.7 and Figure 7.8, the only case type to experience widespread gains in collateral outcomes is that with long interval needs and a PIC. In fact, in such cases, all collateral levels improve except personal functioning, IMPADL.

**Figure 7.7 Collateral output levels for optimisation on USATISF with overall-budget-constrained optimisation**



**Figure 7.8 Collateral output levels for optimisation on USATISF with service-budget-constrained optimisation**



### **7.3.3 Overview**

#### ***Gains in outcomes***

- There are significant potential gains in USATISF to be made for all case types. However, the extent to which they can be attained - and which case types are most likely to benefit - depend on the conditions for optimisation, and particularly on the degree to which service supply levels are constrained. In such a case, maximising aggregate levels of USATISF yields significantly lower aggregate improvements, and implies trading-off losses in service contributions for the most dependent cases for gains for the least dependent, particularly those with informal support.

#### ***Optimum budget levels and input mixes***

- Optimum care packages appear either to concentrate very high levels of resources on home care inputs, or to imply significant reductions in the levels of the service consumed. This effect, related to the presence of increasing marginal productivities for users living alone (those users most likely to be socially excluded), is interpreted as relating to the concerns expressed by users for the need to develop a personal relationship with formal carers, and to the provision of support with non-personal care related tasks.
- After home care, the most prevalent services in optimum care packages are day care (never beyond two attendances per week) and meals on wheels.
- When case budgets are endogenous to the optimisation process, maximising aggregate levels of USATISF implies reductions in the resources allocated to the most dependent cases.

#### ***Collateral outcome levels***

- Even when case budgets are fixed to their observed levels, maximising USATISF brings about significant deterioration on important collateral outcome indicators such as DAYS, DLD or IMPADL for the majority of case types contemplated.
- In the two optimisation scenarios where case budgets are not fixed, the pattern of collateral outcomes mostly reflects the large concentration of resources on users of low dependency.



## **7.4 Maximising personal care functioning (IMPADL)**

### ***7.4.1 Changes in input mix and levels of outcomes following optimisation***

Figure 7.9 depicts observed and optimum care packages, and their contributions to the indicator of user perceived improvement in personal care functioning (IMPADL), for the six case types and three optimisation scenarios postulated.

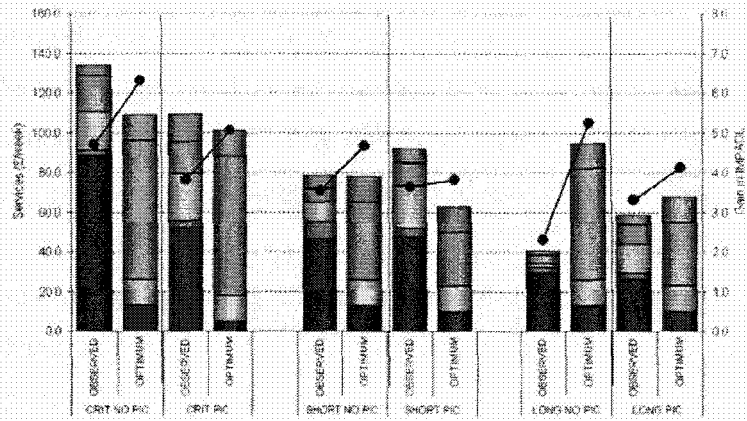
#### ***Impact of constraints on service supply levels***

As in the previous two optimisation examples, Figure 7.9 indicates dramatic differences in the patterns of optimum input mixes and outcome levels between the optimisation scenarios which do and do not impose limits on the availability of aggregate levels of services. Hence, in the overall-budget and group-budget-constrained scenarios, optimum care packages are largely composed of respite care inputs, complemented with some levels of day care, nursing and home care inputs (the other three services identified in Section 5.4 as significantly improving IMPADL).

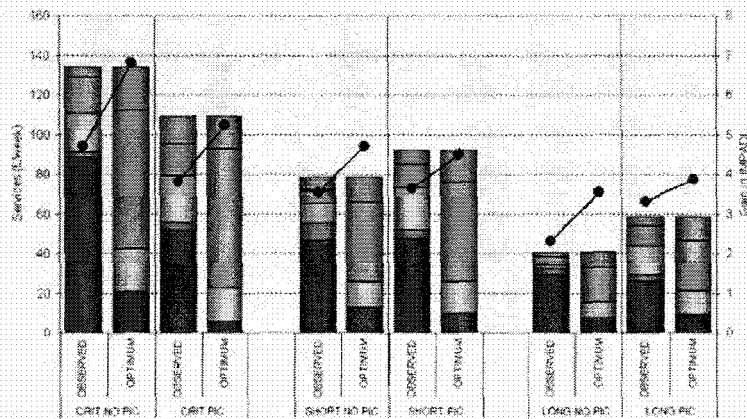
Section 5.3 showed that the effectiveness of respite care on IMPADL was particularly substantial for users referred to social services following their admission into hospital. Consequently, the highest levels of the service appear to be allocated, following optimisation, to users with critical interval needs (50 per cent of whom were referred following an inpatient hospital stay). In fact, for them, the optimum levels of respite care are capped at £ 70 per week, the maximum level observed in the sample.

Following this radical change in the composition of care packages, and despite the redistribution of budgets away from the most dependent cases in the overall-budget-constrained, the maximisation of IMPADL when no restrictions are placed on service levels brings about large improvements in the outcome for all the case types considered. In sharp contrast, maximising aggregate levels of IMPADL in the service-budget-constrained scenario implies concentrating the gains on only three of the six case types (the two long interval need cases and the short interval need without PIC case). Furthermore, in aggregate, the gains so achieved are insignificant (IMPADL levels improve on aggregate by less than six per cent following optimisation).

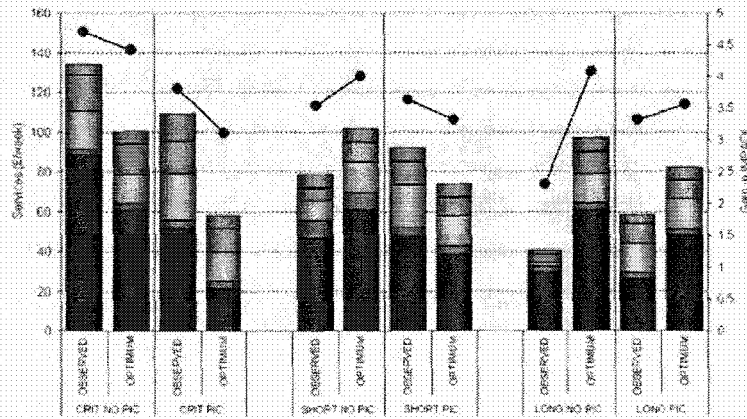
**Figure 7.9 Input mix efficiency for personal care functioning (IMPADL)**



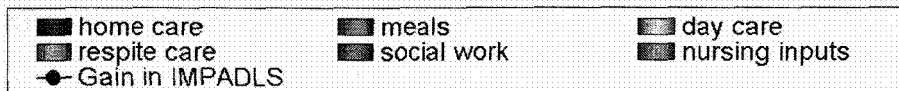
**Overall-budget-constrained optimisation scenario**



**Group-budget-constrained optimisation**



**Service-budget-constrained optimisation**



### *Redistribution of services away from the most dependent*

When case-budgets are not fixed in the optimisation, maximising IMPADL results in a significant reduction in the levels of resources allocated to the most dependent users, regardless of the conditions placed on the utilisation of individual services.

In the service-budget-constrained optimisation, maximising aggregated levels of IMPADL entails mostly changes in the level of home care services allocated to the different cases. Due to the decreasing marginal returns of home care inputs, Figure 7.9 indicates a reduction in the optimum care packages in the concentration in the levels of home care services for critical interval need cases. Given that they are more likely to be living alone, and so to benefit more significantly in terms of improvements in IMPADL, the greatest share of home care inputs is thus reallocated to users without PICs.

### **7.4.2 Collateral outcome levels**

The impact on collateral outcomes of the maximisation of IMPADL in the group-budget-constrained, overall-budget-constrained, and service-budget-constrained scenarios is illustrated in Figure 7.10, Figure 7.11 and Figure 7.12, respectively.

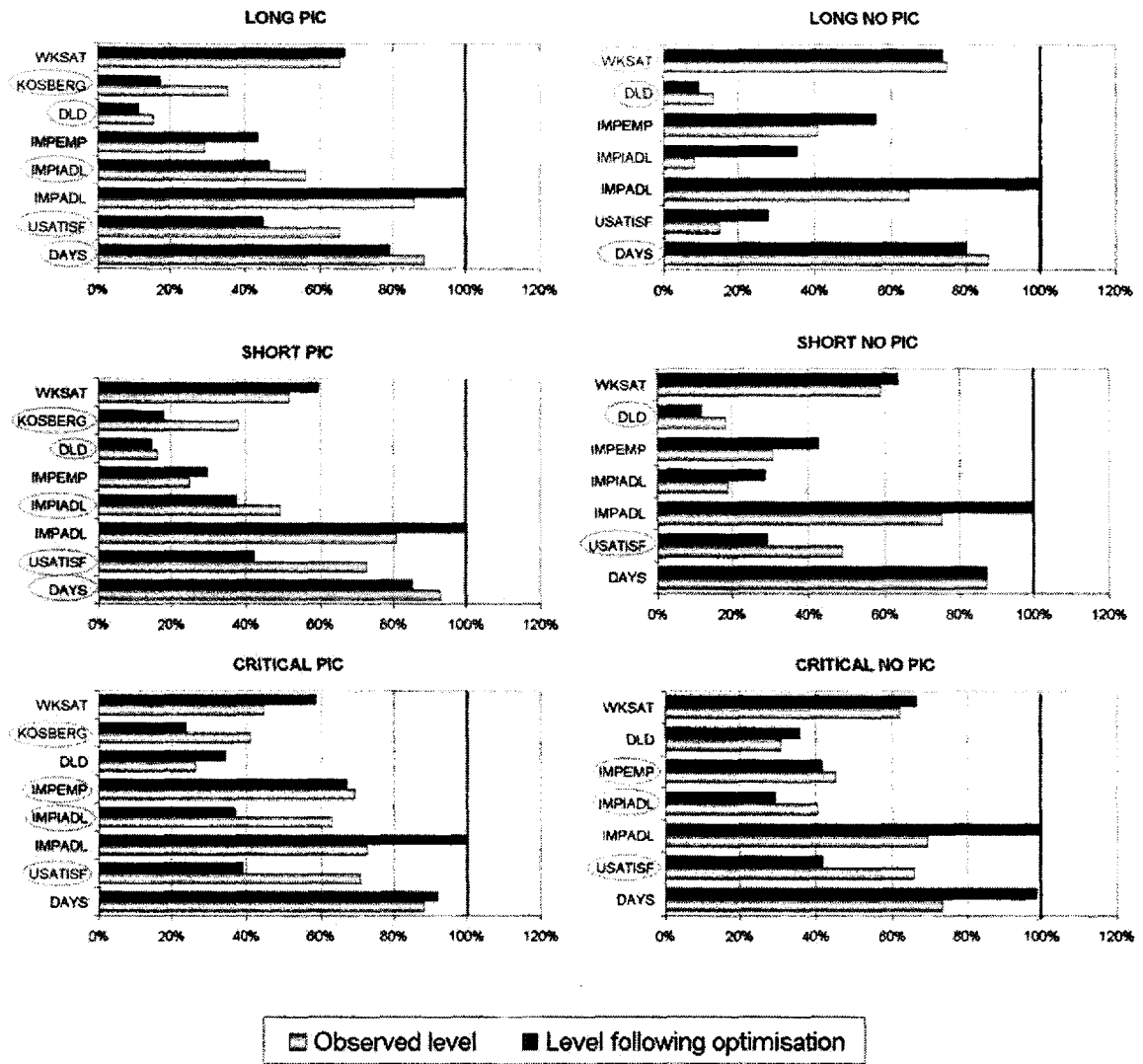
#### ***Group-budget-constrained optimisation***

##### *Deteriorations in large numbers of collateral outcomes*

Overall, the patterns described in Figure 7.10 indicate that maximising IMPADL in the group-budget-constrained scenario brings about reductions in a significant proportion of collateral outcomes, particularly for users with PICs. Hence, overall, approximately 66 and 44 per cent of the collateral values for case types with and without PICs decreased, respectively, following optimisation.

In terms of patterns by individual outcome indicator, Figure 7.10 illustrates that despite the prevalence of respite care inputs in the optimum care packages, (which are perceived as an important tool for supporting informal caregivers), KOSBERG levels worsen following the optimisation of IMPADL for the three case types with PICs. User satisfaction (USATISF), is

**Figure 7.10 Collateral outcome levels for optimisation on IMPADL with group-budget-constrained optimisation**



also shown to deteriorate for five of the six cases considered. In spite of their common focus on functioning, maximising aggregate levels of IMPADL brings about deteriorations in levels of IADL functioning (IMPIADL) for all cases with PICs, and for cases with critical interval needs.

The impact of the optimum care packages on the risk of institutionalisation (DAYS) appears to vary with the level of disability of the cases. Thus, whereas for critical interval need cases (the most dependent) the maximisation of IMPADL leads to improvements in DAYS, the opposite applies for cases in the middle and low dependency categories. In fact, the two critical interval need cases experience improvements in WKSAT, dissatisfaction with life development (DLD) and DAYS, but reductions in user satisfaction (USATISF), sense of control over own life (IMPEMP) and IADL functioning (IMPIADL).

#### *Trade-offs between IMPADL and other outcome goals*

As in previous results, the optimisation of IMPADL produces levels of several outcomes substantially below their optimum levels. Again, this is particularly true for caregiver burden (KOSBERG), dissatisfaction with life development (DLD), and sense of control over own life (IMPEMP).

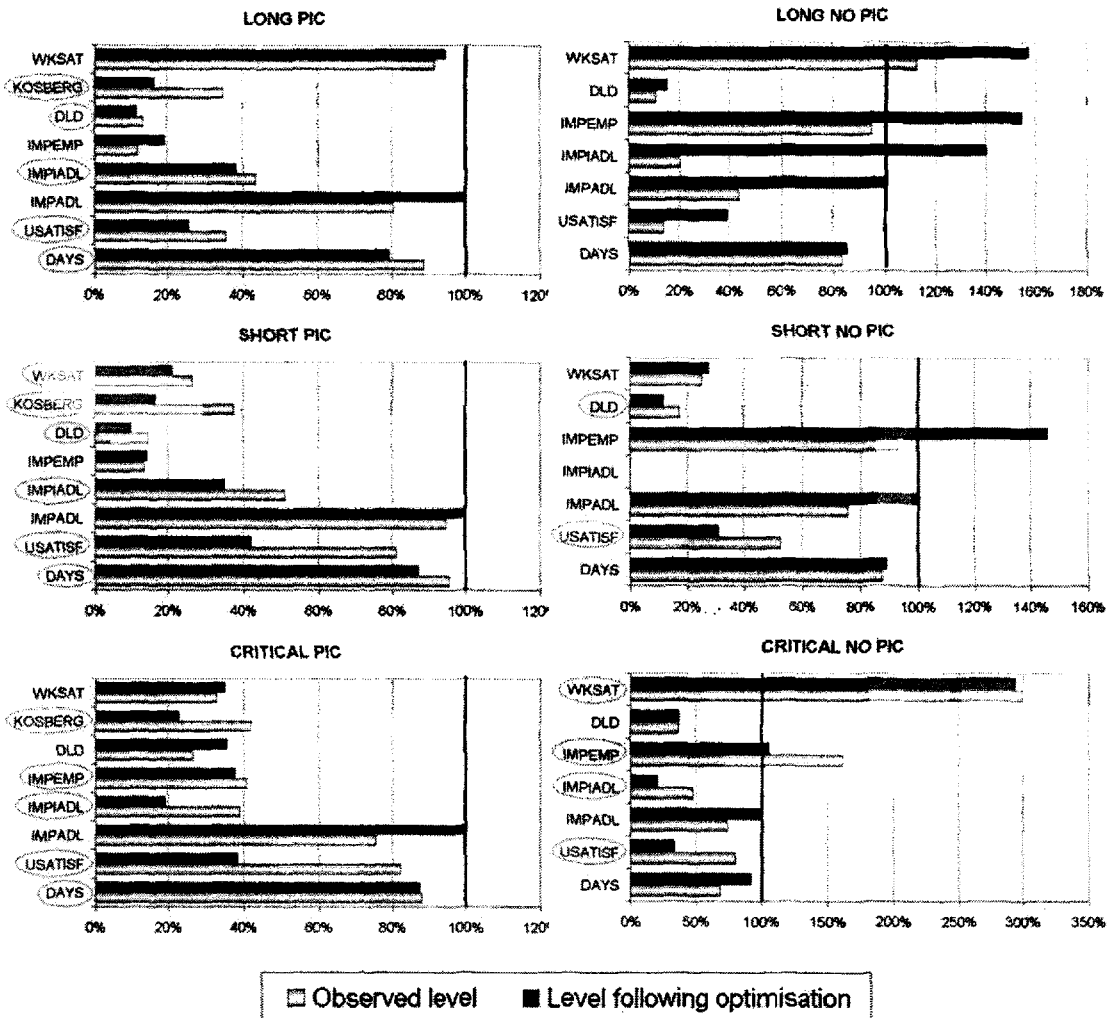
#### *Overall-budget-constrained optimisation*

##### *Gains focused on the low disability, no PIC cases*

Clearly, the patterns of collateral outcomes in Figure 7.11 reflect the concentration of resources on low dependency users and on cases without PICs, following the optimisation of IMPADL in the overall-budget-constrained scenario. As a result, in particular, all collateral outcome levels for the long without PIC case increase following optimisation. Also, the concentration of resources on cases without PICs produces for them levels of collateral outcomes for several of the indicators which exceed their optimum levels (those that would be implied by their individual optimisation) in the scenario considered.

Respectively, approximately 76 and 33 per cent of the collateral outcome levels for cases with and without PICs fall following optimisation. A similar gradient can be shown by dependency levels, with 38, 62 and 69 per cent of the collateral outcomes falling for cases in the long, short and critical interval categories, respectively.

**Figure 7.11 Collateral output levels for optimisation on IMPADL with overall-budget-constrained optimisation**



### *Common patterns with the group-budget-constrained optimisation*

The patterns of collateral outcomes in the overall-budget-constrained scenario share many of the features identified in the group-budget-constrained scenario. For instance, the service contributions to reducing caregiver stress (KOSBERG) fall for the three case types with PICs, user satisfaction (USATISF) worsens for all but one of the cases considered, and satisfaction with IADL functioning (IMPIADL) falls for all cases with PICs and for cases with critical interval needs.

### *Service-budget-constrained optimisation*

The picture of collateral outcomes in the service-budget-constrained optimisation, shown in Figure 7.12, portrays an even greater polarisation of gains and losses by informal support and levels of disability. Thus, following the optimisation, whereas only one of the collateral outcome indicators falls for users with long interval need cases or with short interval needs without informal support, every single one of them deteriorates for the remaining three case types (those with critical interval needs or with short interval needs with PICs).

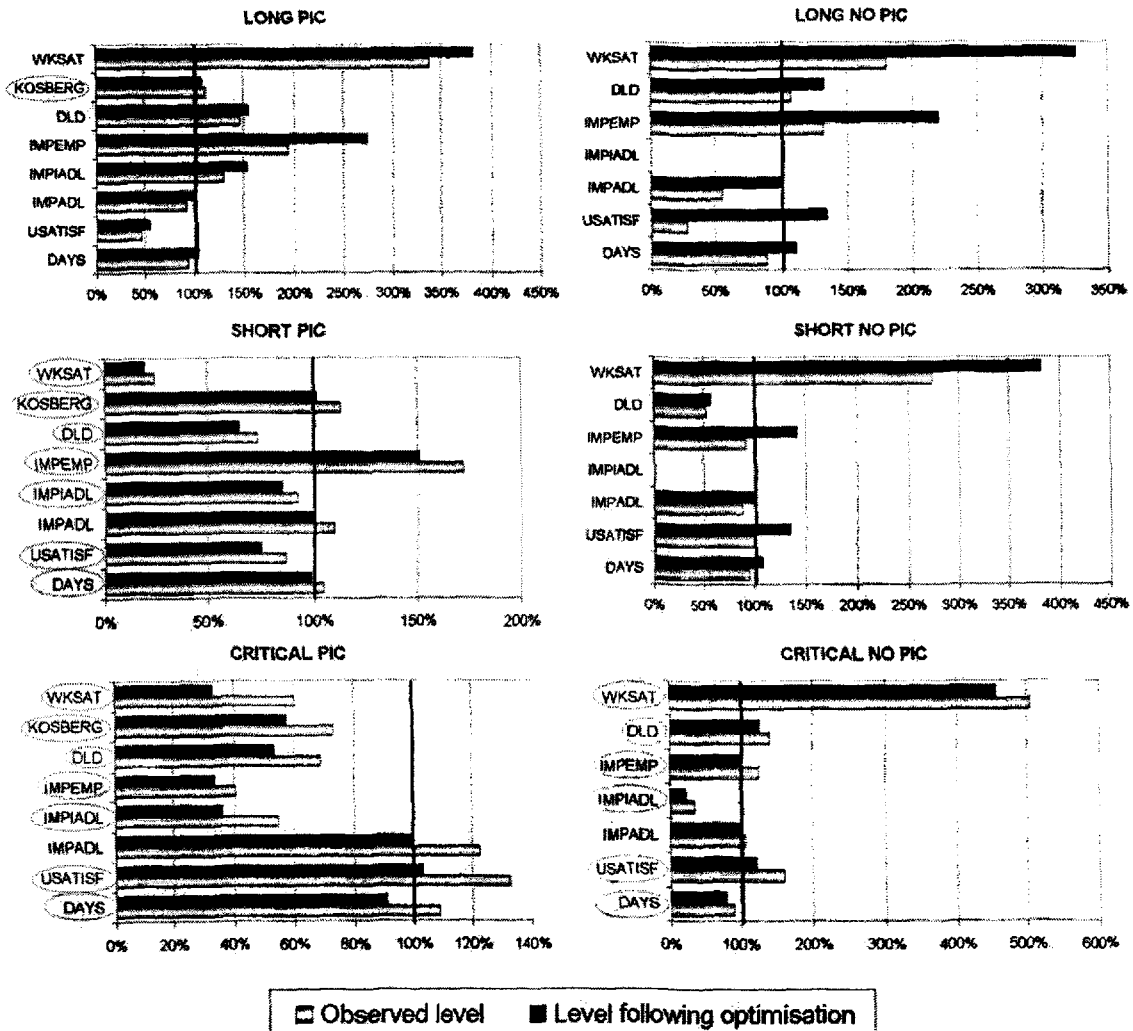
The frequency with which values of collateral outcomes exceed the 100 per cent line reflects the variegated nature of the pattern of allocation of budgets across cases following the optimisation of the different outcome indicators in the service-supply-constrained scenario.

### **7.4.3 Overview**

#### *Gains in outcomes*

- The levels and distribution of improvements in IMPADL vary to a very considerable degree with whether restrictions are placed on the availability of the supply of services. The two optimisation scenarios which do not constrain service supply achieve substantial improvements in IMPADL levels for all the cases postulated in the analysis. In contrast, maximising aggregate levels of IMPADL in the service-budget-constrained scenario implies the concentration of gains on the long interval need without PIC case, and significant losses in the levels of the output for three of the case types. In aggregate, the levels of gains in IMPADL following the optimisation when service supply levels are constrained are very limited (below 6 per cent).

**Figure 7.12 Collateral output levels for optimisation on IMPADL with service-budget-constrained optimisation**





### *Optimum budget levels and input mixes*

- When case-budgets are allowed to vary from observed levels, optimising IMPADL implies a reduction in the levels of resources invested in the very dependent cases and in cases with PICs.
- Overall, except in the service-budget-constrained case, maximising IMPADL reduces very considerably the levels of home care provided. The main component of the care package becomes respite care, followed by much lower levels of home care, day care and nursing inputs.
- If service supply levels are constrained, the optimum allocation provides higher and almost identical care packages for cases without informal caregivers. Amongst users with PICs, optimum budgets decrease with dependency levels.

### *Collateral outcome levels*

- Maximising aggregate levels of IMPADL implies deteriorating, for many cases and types of indicator, collateral outcomes levels. In particular, collateral outcomes are poor for caregiver burden (KOSBERG), user satisfaction (USATISF ) and IADL functioning IMPIADL. In contrast, in some of the optimisation scenarios, levels of worker satisfaction with the impact of the care package on the welfare of the user (WKSAT) appear to improve for a majority of case types.
- Reflecting increases in budgets following the optimisation, the patterns of collateral outcomes improve for cases of low dependency or without PICs.

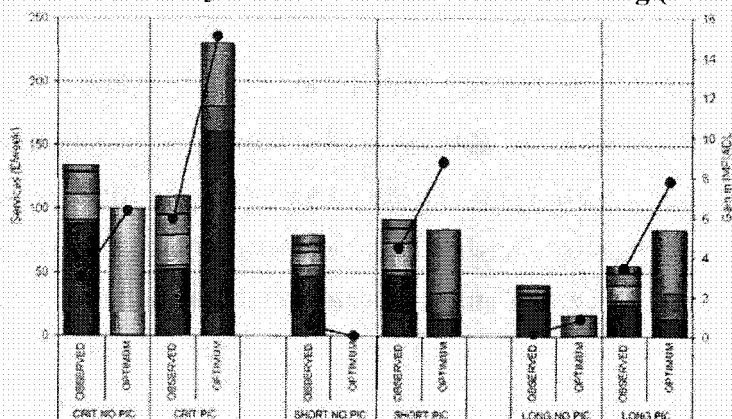
## **7.5 Maximising instrumental care functioning (IMPIADL)**

### ***7.5.1 Changes in input mix and levels of outcomes following optimisation***

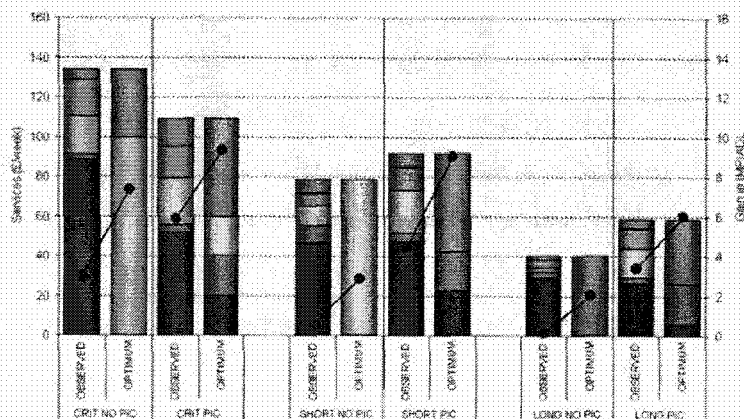
Figure 7.13 depicts changes in resource allocation and service contributions following the optimisation of the indicator of instrumental functioning (IMPIADL) in overall-budget-constrained, group-budget-constrained and service-budget-constrained scenarios.

To a greater degree than previous optimisations, the three optimisation scenarios in Figure 7.13 imply different patterns of results. In addition, in two of the scenarios, the optimum

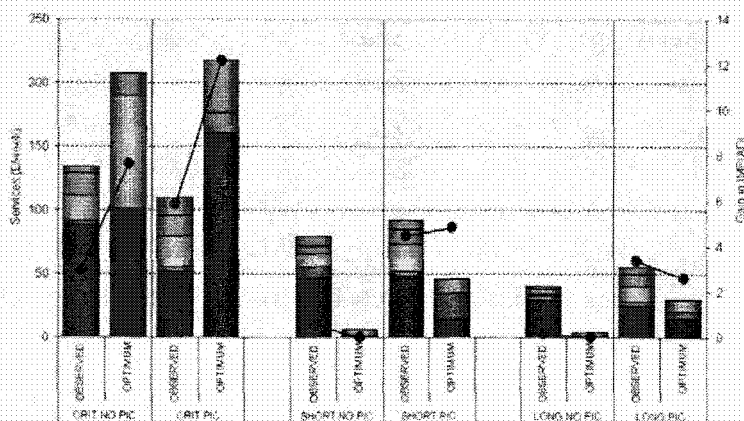
Figure 7.13 Input mix efficiency for instrumental care functioning (IMPIADL)



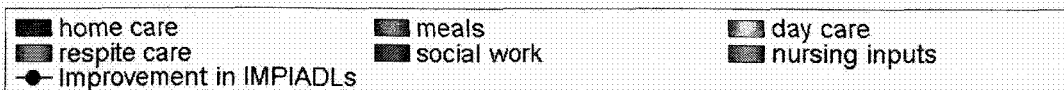
Overall-budget-constrained optimisation scenario



Group-budget-constrained optimisation



Service-budget-constrained optimisation



solution implies for the first time zero gains in IMPIADL for at least one of the case types explored.

#### *Concentrating home care*

Section 5.5 identified two home care effects on IADL functioning. The first, exhibiting increasing returns to factor, applied to users with critical interval needs. The second, showing sharp decreasing marginal returns, related to users with informal care support. As in the user satisfaction optimisation, the degree to which restrictions in the optimisation process allow the concentration of intensive home care levels on some case types (so as to take advantage of its increasing marginal returns) are at the heart of some of the differences between the patterns of the three optimisations.

Hence, the overall-budget-constrained optimisation (which is subject to the fewest restrictions in the allocation of resources) concentrates large levels of home care (£160 per week, the maximum level observed in the sample) on the critical interval need with PIC case. In contrast, the group-budget-constrained optimisation results in significantly different optimum service mixes for that case type: the greatest share of the care package is allocated to nursing inputs (which, given their linear marginal productivity effect, are capped at £50 per week), followed by equal levels of meals on wheels, day care and home care inputs.

When the aggregate levels of individual services are constrained to observed levels, the allocation process focuses the majority of home care and day care inputs on the two critical interval cases.

#### *More resources for the most dependent*

As a result, the optimum allocations of resources in the two scenarios which allow variations in group-budgets concentrate resources on the most dependent cases.

#### *Higher levels of meals on wheels and nursing inputs*

The intensity in the utilisation of home care services in the optimum care packages is partly the product of restrictions in the maximum allocation of other services, which are limited by definition to fall within the ranges observed in the sample. In particular, for all cases with a PIC in the overall and group-budget-constrained optimisations, the levels of meals on wheels and nursing inputs allocated had to be restricted to £20 and £50 per week, respectively. In

other words, the optimum levels allocated to the two services would have been much greater (and those to home care much smaller) had the aforementioned restriction not applied.

For users with short and critical interval need without a PIC, it is also worth noting a significant increase in the levels of day care provision following the optimisation<sup>45</sup>.

#### *Uneven distribution of service contributions*

The extent to which service contributions to IMPIADL improve following the optimisation differ significantly across case types and optimisation scenarios.

By fixing case budgets to their observed levels, the group-budget-constrained optimisation achieves a much more even distribution of the gains in IMPIADL than the other two optimisation scenarios. Indeed, in the group-budget-constrained case, all case types enjoy significant improvements in the output maximand. In contrast, the service-constrained optimisation focuses most service contributions on the critical interval need cases and on cases with informal caregivers, and the service-constrained optimisation improves significantly levels of IMPIADL exclusively for critical interval need cases.

Overall, the aggregate, group and service-budget constrained optimisations yielded aggregate levels of IMPIADL equivalent to 222, 211 and 157 per cent of the levels associated with observed care packages.

#### **7.5.2 Collateral outcome levels**

In light of the patterns exhibited in Figure 7.14, Figure 7.15 and Figure 7.16, the evidence suggests that choosing IMPIADL as the primary goal for the community care system would

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<sup>45</sup> Section 5.5 indicated that the nursing care effect applies specifically to cases where the *user* acknowledges the receipt of help from an informal caregiver. The allocation in some optimum care packages of nursing inputs to users without informal caregivers responds to the fact that (i) the indicator of presence of informal care used for defining the analysis groups was based on the care manager's perception and (ii) that in approximately 13% of the cases in which the user identified a PIC, the care manager did not do so. As a result, the characteristics associated with non PIC cases in the optimisation analysis include a small probability of receipt of informal care as perceived by the user.

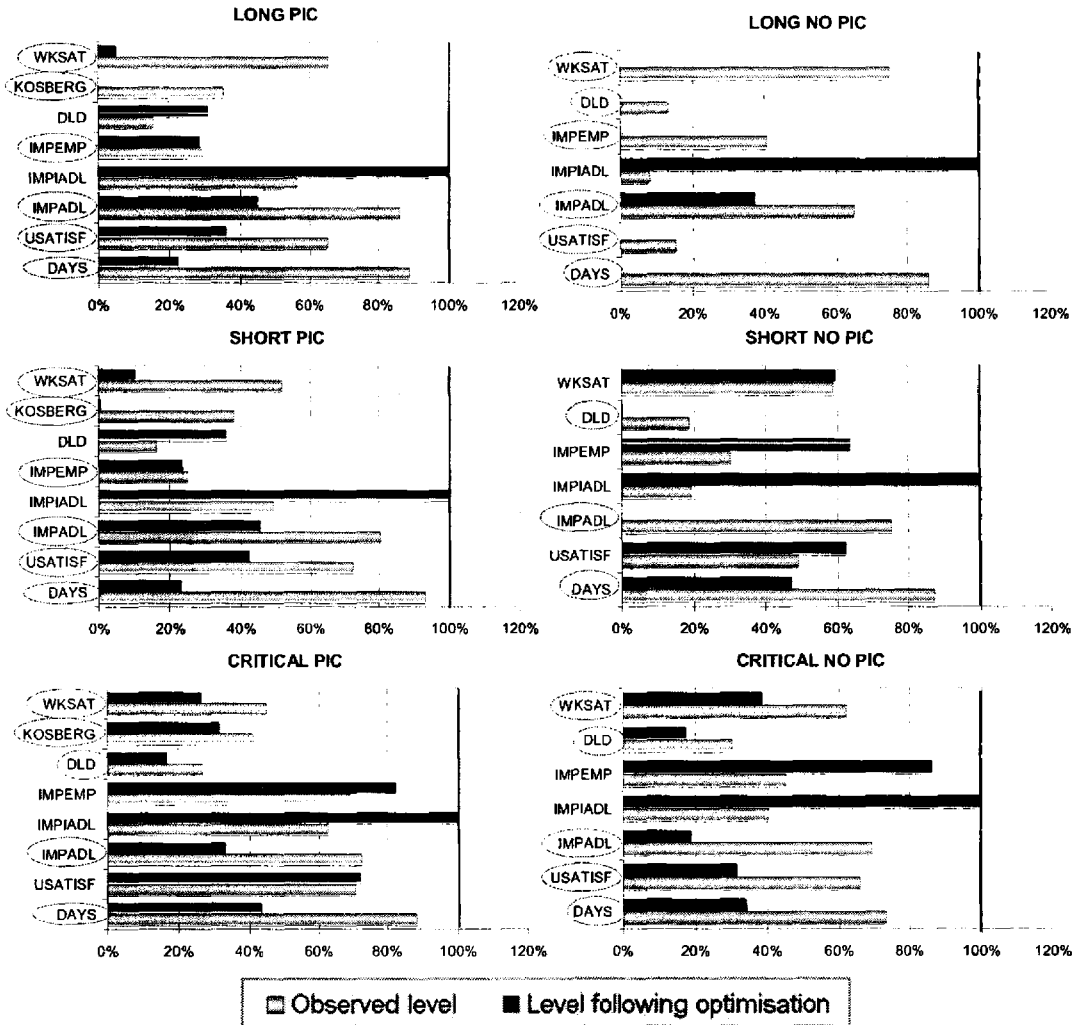
bring about a significant deterioration in the levels achieved of other important welfare goals, for all case types, and regardless of the nature of the optimisation scenario.

In the group-budget-constrained scenario, for instance, more than 82 per cent of the collateral outcome values decreased relative to their observed values, following the optimisation of IMPIADL (see Figure 7.14). Hence, amongst other effects, the optimisation brings about the deterioration for all cases in the length of stay in the community (DAYS), the level of caregiver burden (KOSBERG), and ADL functioning (IMPADL); and a deterioration for five of the six cases considered in the degree of worker satisfaction with the impact of the care package on the welfare of the user (WKSAT). For only one outcome indicator (IMPEMP), maximising IMPIADL implies improvements in collateral levels for at least three of the six case types in the study.

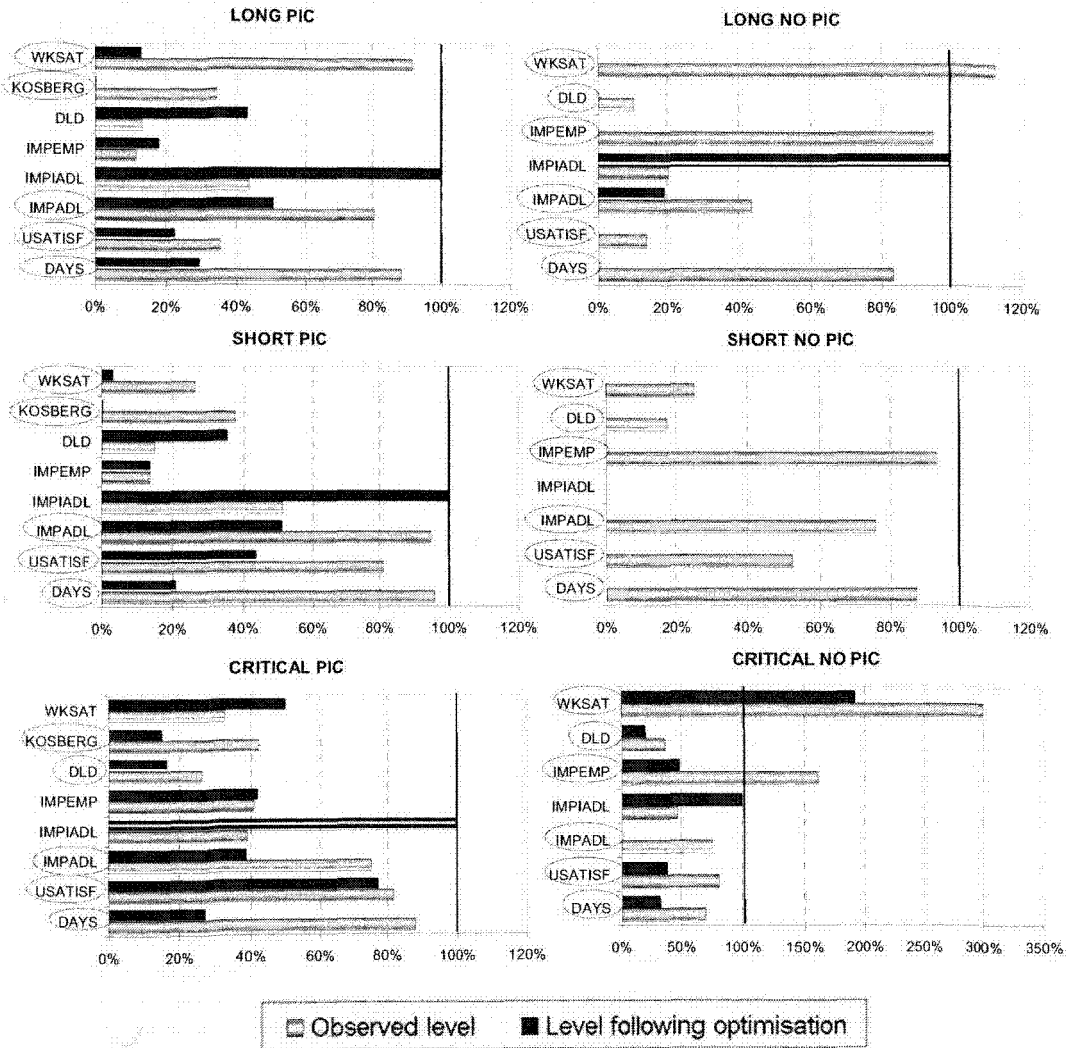
Yet, the picture described in the other two optimisation scenarios is still more negative. As shown in Figure 7.15, the overall-budget-constrained optimisation brings about a significant deterioration in all collateral outcome indicators for cases without PICs, and in the vast majority of collateral indicators for cases with PICs (overall, more than 85 per cent of the collateral outcome values decreased relative to their observed values, following the optimisation of IMPIADL).

Strikingly, Figure 7.16 shows that following the service-budget-constrained optimisation, every one of the collateral outcome indicators improves for the critical interval need without PIC case, while every one deteriorates for the remaining case types in the analysis.

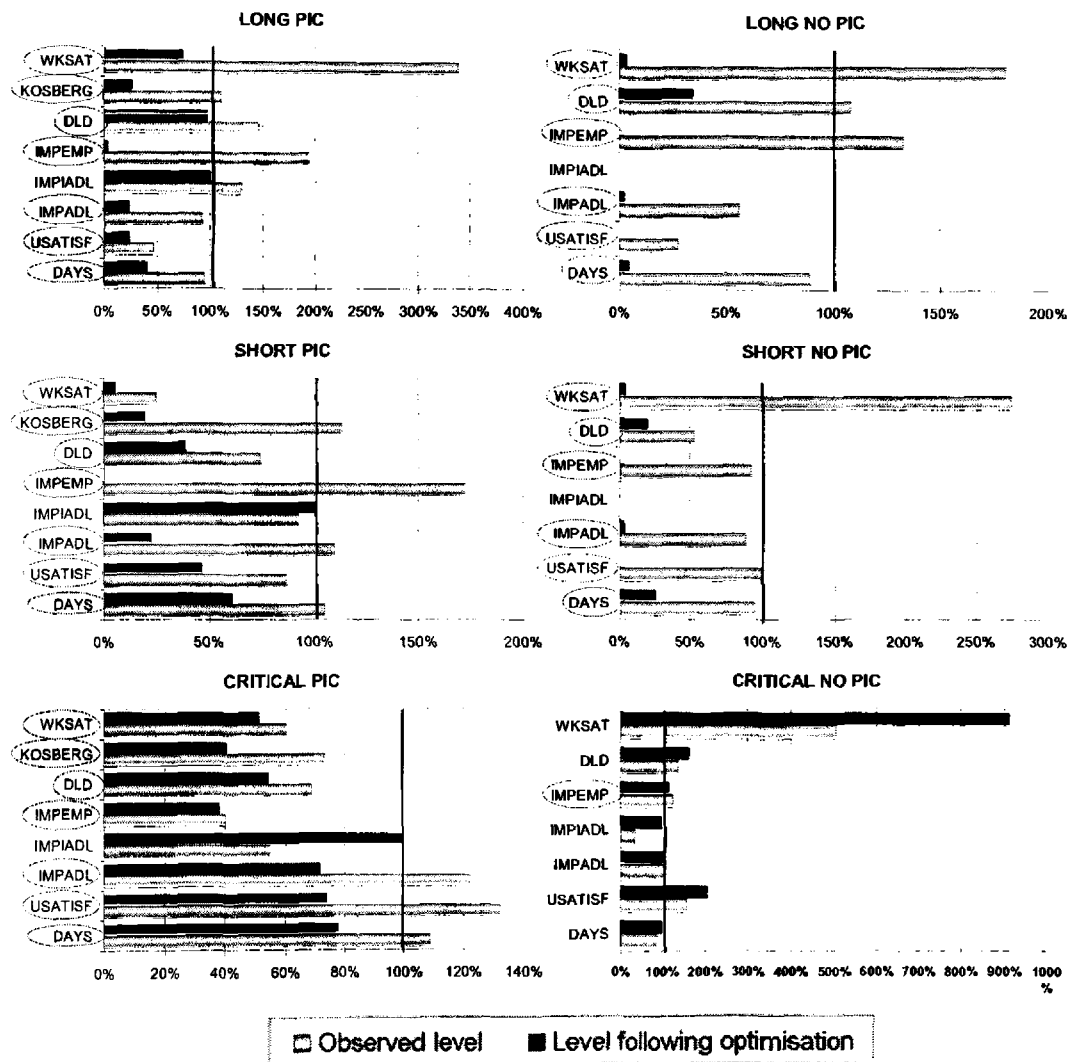
**Figure 7.14 Collateral outcome levels for optimisation on IMPIADL with group-budget-constrained optimisation**



**Figure 7.15 Collateral output levels for optimisation on IMPIADL with overall-budget-constrained optimisation**



**Figure 7.16 Collateral output levels for optimisation on IMPIADL with service-budget-constrained optimisation**





### 7.5.3 Overview

#### *Gains in outcomes*

- The distributions of the gains in IMPIADL derived from its optimisation vary significantly with the maximisation scenario considered. When the budgets allocated to case types are fixed to their observed levels, maximising aggregate levels of IMPIADL achieves fairly even gains for all case types in the analysis. In contrast, when user budgets are endogenous to the optimisation process, and particularly when aggregate service-budgets are limited to their observed levels, the gains from the optimisation are restricted to a few, and particularly to cases in the critical interval need category.

#### *Optimum budget levels and input mixes*

- When changes in the case budgets are not restricted, and particularly when service supply levels are limited, one of the implications of the optimisation is to increase the level of resources provided to the most dependent users.
- For users with informal support, the optimum care packages increase very significantly the level of nursing inputs and meals on wheels provided. For the critical interval need without PIC case type, the optimisation concentrates high levels of day care inputs.

#### *Collateral outcome levels*

- Maximising aggregate levels of IMPIADL does not represent, given the patterns identified, an attractive sole criterion for guiding the performance of community care services. Indeed, its optimisation brings about widespread and significant deteriorations in most other outcome indicators explored.

## **7.6 Maximising user felt control over own life (IMPEMP)**

### ***7.6.1 Changes in input mix and levels of outcomes following optimisation***

Figure 7.17 depicts the observed and optimum care packages, and their contribution to levels of user felt control over own life (IMPEMP), for the six case types and three optimisation scenarios postulated.

#### *Significant variations by optimisation scenario*

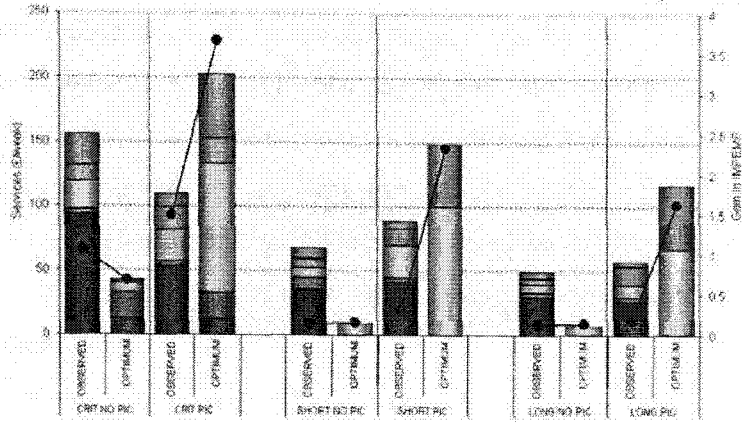
Just as in the results of the optimisation of IADL functioning (IMPIADL), the patterns of optimum budgets and service contributions vary markedly with the restrictions imposed on the optimisation. Hence, the overall-budget-constrained optimisation focuses the vast majority of the resources available on cases with PICs, particularly on those with the highest dependency levels. In contrast, the service-budget-constrained scenario prioritises almost exclusively the two cases with critical interval needs, and in particular the one with PIC, which following the optimisation sees its budget increased more than three-fold.

#### *More day care and nursing inputs*

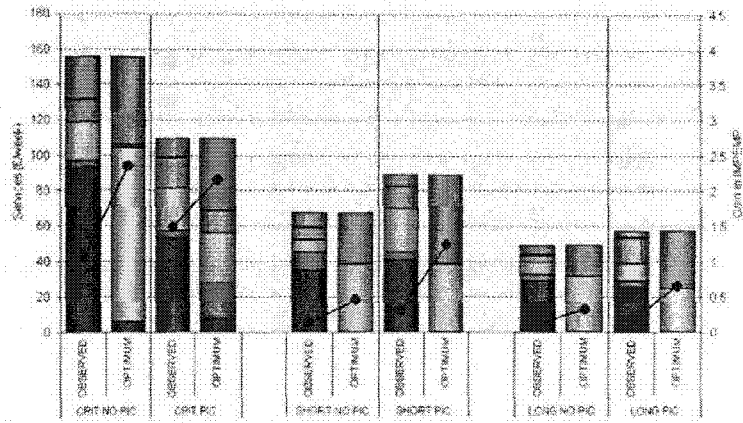
Figure 7.17 indicates a common configuration in the composition of optimum care packages in the overall and group-budget constrained optimisations. Indeed, for most case types, in both scenarios the optimum care packages are composed almost exclusively of large levels of day care and nursing inputs. These patterns of utilisation stem from the fact that the optimisation process maximises gains in aggregate levels of IMPEMP by exploiting the complementarity effect between day care and nursing inputs identified in Section 5.6.

When, in the service-constrained-optimisation scenario, the aggregate service supply levels are constrained to their observed levels, the maximisation process shares all available levels of home care inputs between the two critical interval need cases (the only case groups to whom related the home care effect on IMPEMP identified in Section 5.6). In addition, the large majority of available inputs from other services are assigned to the critical interval need with PIC case, resulting in the tripling of its budget mentioned above.

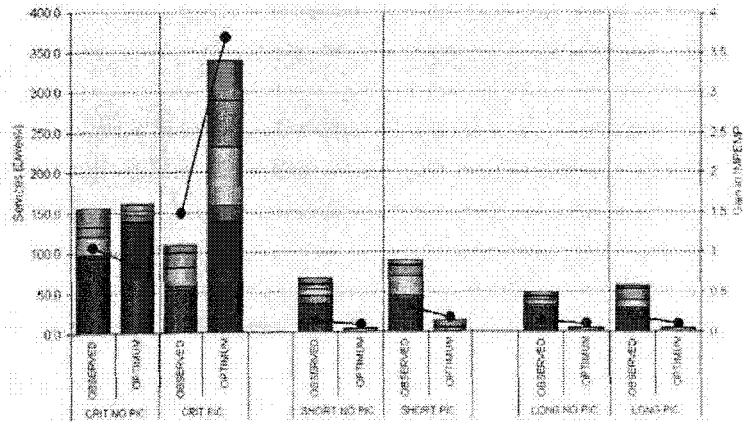
**Figure 7.17 Input mix efficiency for user felt control over own life (IMPEMP)**



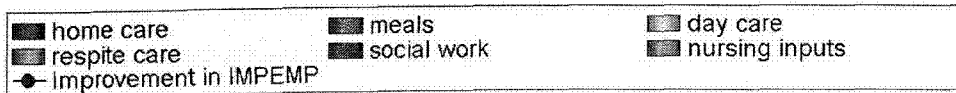
**Overall-budget-constrained optimisation scenario**



**Group-budget-constrained optimisation**



**Service-budget-constrained optimisation**



### *Significant tradeoffs in service contributions between case types*

Given the uneven distribution of resources implied by the overall and service-budget-constrained optimisations, it is not surprising that Figure 7.17 displays significant tradeoffs in the service contributions to IMPEMP between the different case types in the analysis. For instance, the maximisation of aggregate levels of IMPEMP in the overall-budget-constrained scenario implies significant gains in IMPEMP relative to observed levels only for cases with PICs, and losses or no gains for the remaining case types. More noticeably still, the service-budget-constrained optimisation directs all improvements in IMPEMP to one single case type, that with critical interval needs with PIC.

In contrast with the arguably inequitable distribution of service contributions to IMPEMP in the two scenarios just discussed, the group-budget-constrained optimisation achieves significant gains in IMPEMP levels for all the case types in the analysis. Again, however, these are somewhat higher for cases with PICs or with critical interval needs.

Overall, it thus appears that it is for very dependent users and those with informal support that the greatest potential for improvements in IMPEMP might be achieved.

### **7.6.2 Collateral outcome levels**

The implications for other important outcome indicators of the patterns of service utilisation implied by the optimisation of IMPEMP in the group, aggregate and service-budget-constrained optimisations are depicted in Figure 7.18, Figure 7.19 and Figure 7.20, respectively.

Perhaps not surprisingly given the concentration of large levels of resources on a few service and/or case types, the results in each of the three maximisation scenarios indicate a widespread deterioration in collateral outcome levels following optimisation.

#### ***Group-budget-constrained optimisation***

Interestingly, in the group-budget-constrained scenario, the higher relative improvements in IMPEMP levels for cases with PICs are not accompanied by better patterns of collateral

outcomes, particularly for the long and short critical need cases. Consequently, Figure 7.18 shows that approximately 76 per cent of the collateral outcome levels for cases with PICs fall following optimisation, versus 66 per cent for cases with no PICs.

Overall, the results indicate a significant trade-off between increases in the sense of control over life and improvements in other important welfare objectives. For instance, the patterns in Figure 7.18 imply a deterioration in collateral outcome levels for all case types for the indicators of length of stay in the community (DAYS), of worker satisfaction with the impact of the care package on the welfare of the user (WKSAT), and of dissatisfaction with life development (DLD), and a deterioration in ADL functioning (IMPADL) for five of the six case types explored.

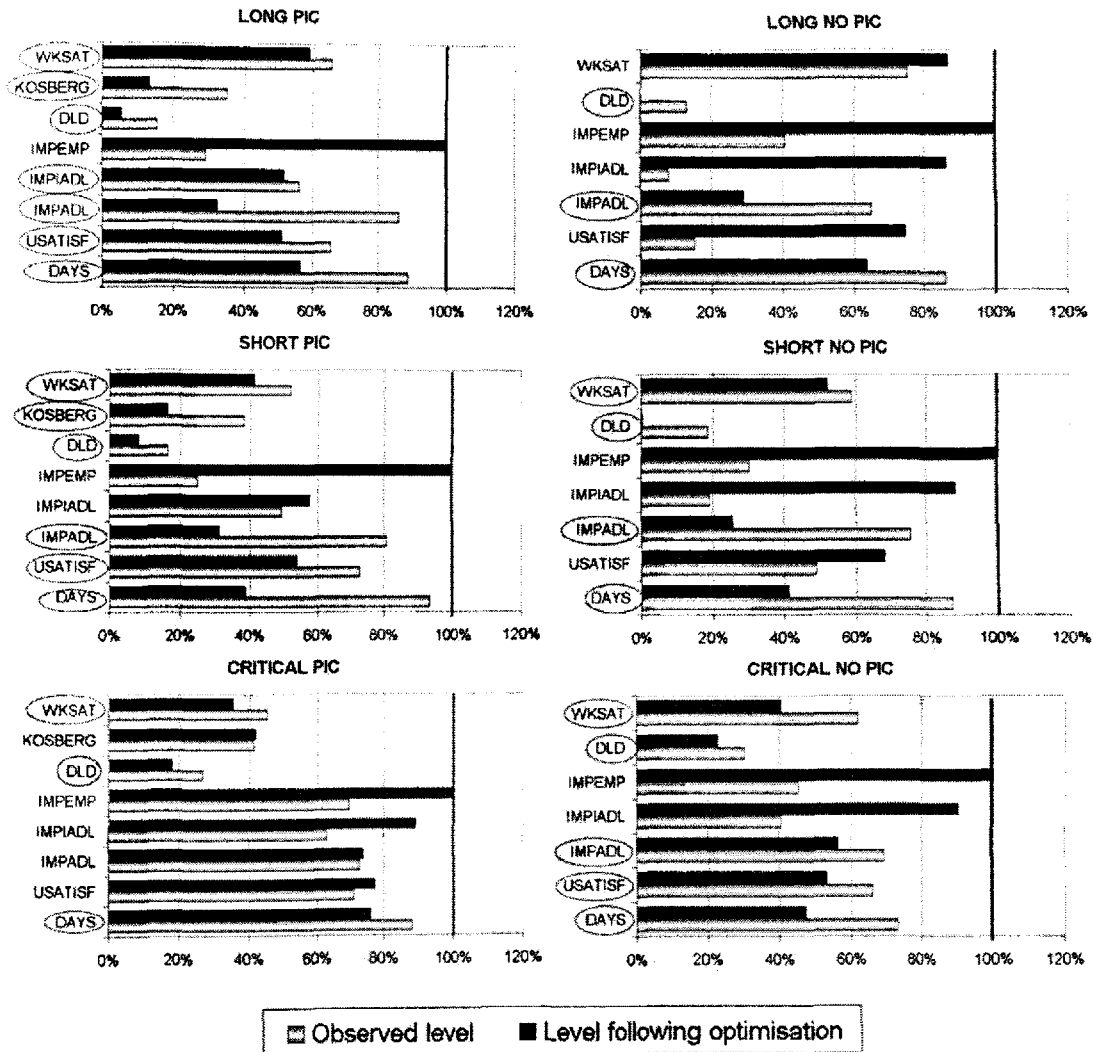
The only collateral outcome for which the maximisation of IMPEMP appears to yield widespread improvements is IMPIADL, the indicator of IADL functioning. This result is compatible with the results from the optimisation of IMPIADL, which singled out IMPEMP as the only collateral outcome indicator for which gains could be observed for at least three of the six case types in the analysis.

### ***Overall-budget-constrained optimisations***

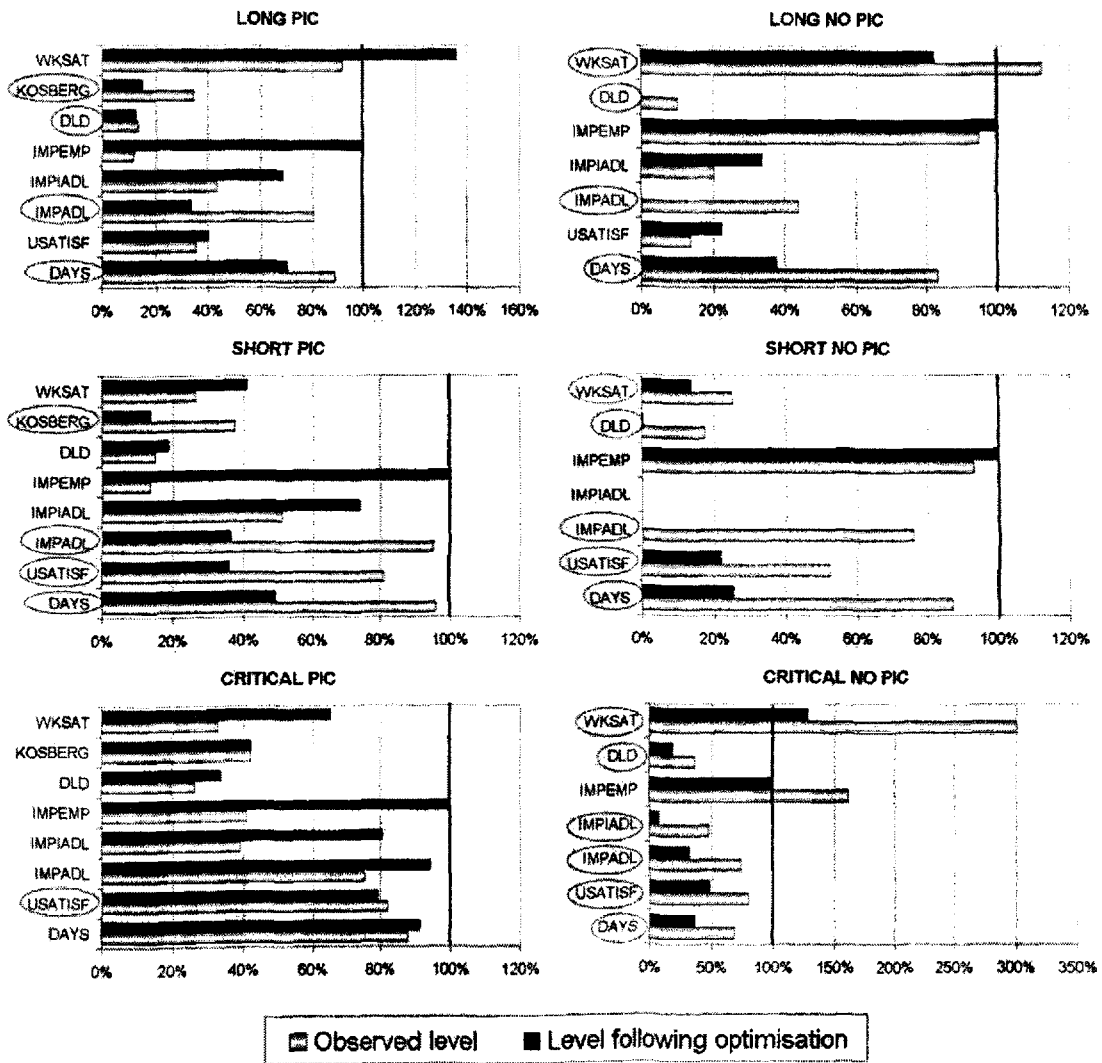
Overall, and even though a majority of values deteriorate, Figure 7.19 shows that it is the overall-budget-constrained optimisation which achieves the highest proportion of aggregate improvements in collateral outcomes (approximately 38 per cent of the total number of collateral indicators).

The nature and distribution of such improvements reflects the concentration of the bulk of resources available on users with PICs, and particularly on cases with greater levels of dependency. As a result, the proportion of collateral outcomes which deteriorates for users with PICs falls from 76 per cent in the group-budget-constrained scenario to approximately 43 per cent in the overall-budget-constrained case. Not surprisingly, however, the improvement for cases with a PIC is accompanied by a deterioration in collateral outcomes for cases without them. For them, more than 83 per cent of collateral outcomes deteriorate following the optimisation.

**Figure 7.18 Collateral outcome levels for optimisation on IMPEMP with group-budget-constrained optimisation**



**Figure 7.19 Collateral output levels for optimisation on IMPEMP with overall-budget-constrained optimisation**



As in the group-budget-constrained scenario, the indicator of IADL functioning (IMPIADL) shows the largest number of improvements amongst the six cases in the analysis.

### ***Service-budget-constrained optimisation***

The distribution of collateral outcomes identified in Figure 7.20 mirrors to a very large degree the distribution of budgets which ensued from the service-budget-constrained optimisation of IMPEMP, discussed above. Hence, as a consequence of the triplication of the resources it receives, every single one of the collateral outcomes of the critical interval need with PIC case experience a very significant improvement.

Excluding the critical interval need case without PIC, which experiences gains in three collateral outcomes, the remaining case types in the analysis suffer very significant deteriorations in collateral outcomes in the vast majority of indicators.

### **7.6.3 Overview**

#### ***Gains in outcomes***

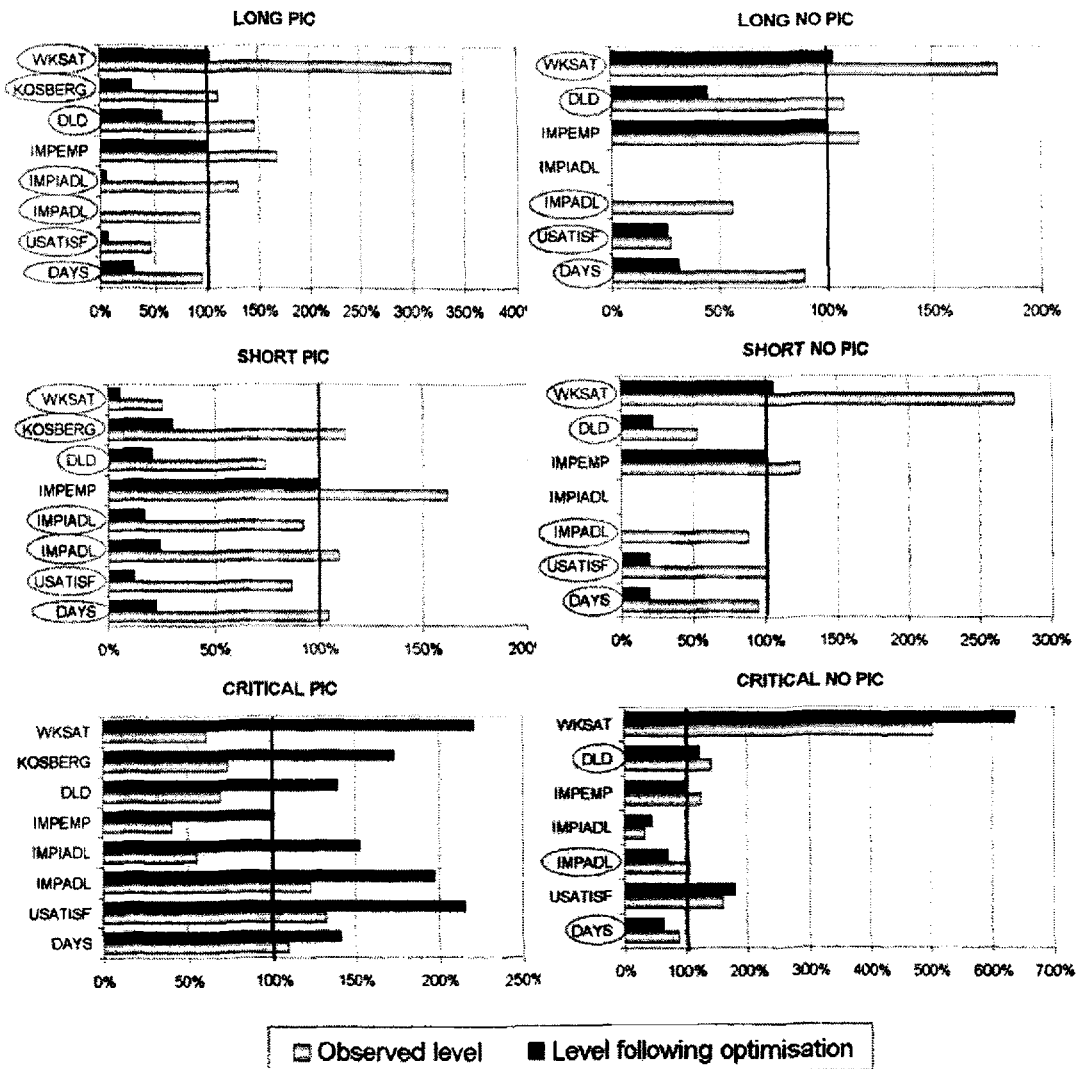
- Unless case budgets are fixed as a condition of the optimisation, care package contributions to IMPEMP appear heavily concentrated on a few case types. In particular, the overall and service-budget-constrained optimisations produce gains exclusively for cases with PICs and with critical interval need case types, respectively.
- When case budgets are fixed to their observed levels, however, the optimisation process yields substantial gains for all case types in the analysis.
- Overall, restrictions in service supply constrain to a greater degree the aggregate levels of IMPEMP achieved following optimisation than limitations in the levels of resources allocated to the different case types.

#### ***Optimum budget levels and input mixes***

- The distribution of resources following optimisation reflects very closely the allocation of outcome gains discussed above. Hence, most resources in the overall and service -budget-constrained are focused on cases with PICs and with high levels of dependency.



**Figure 7.20 Collateral output levels for optimisation on IMPEMP with service-budget-constrained optimisation**



- In terms of the mixes of services in the optimum care packages, the results indicate a significant increase in the utilisation of day care and nursing care inputs, which make up the vast majority of the resources provided.

#### *Collateral outcome levels*

- Maximising aggregate levels of IMPEMP brings about significant and widespread losses in collateral outcomes, except perhaps for IADL functioning.
- Out of the three scenarios, it is the overall-budget-constrained optimisation that produces the lowest number of losses in collateral outcomes.

## **7.7 Maximising service contributions to caregiver burden (KOSBERG)**

### ***7.7.1 Changes in input mix and levels of outcomes following optimisation***

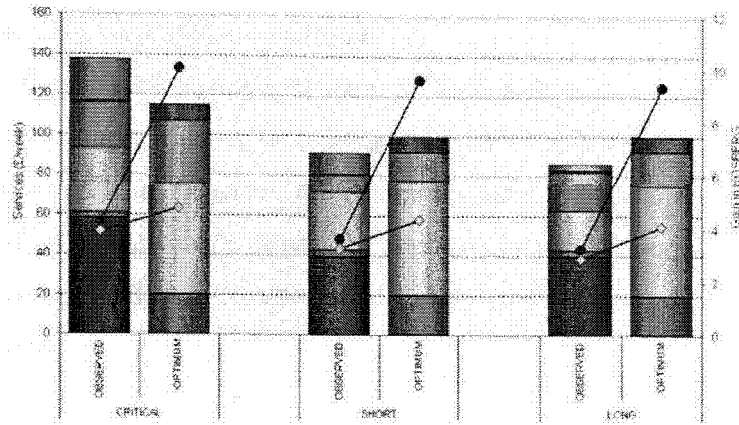
Figure 7.21 describes the changes in input mixes, budget levels and outcome levels associated with the maximisation of KOSBERG in the three scenarios postulated in the analysis.

Relative to previous diagrams, Figure 7.21 presents two particular features. Firstly, because the outcome relates exclusively to cases with informal support, the patterns are depicted only for cases with PICs. Secondly, in order to illustrate the large contribution of social work inputs, Figure 7.21 indicates separately the outcome levels achieved by care packages as a whole and those achieved by all services except social work inputs.

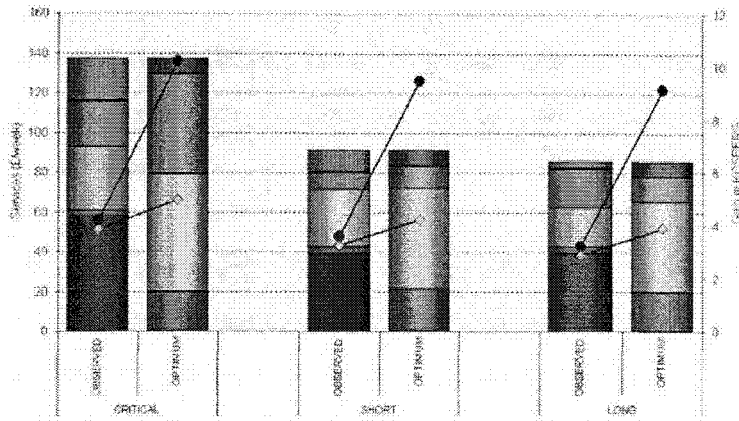
#### *Significant reductions in home care inputs*

Despite having shown, in Section 5.10, a significant effect for all clients with mild and severe cognitive impairment, the optimum care packages in scenarios where aggregate levels of services are allowed to vary do not utilise any levels of home care services. Instead, home care inputs are replaced by increased levels of the remaining social community care services. In particular, following optimisation, in both the overall and group-budget-constrained scenarios the levels of meals on wheels and social work are increased to the maximum ranges observed in the sample (£ 20 and £ 8 per week, respectively), and those of day care are at least doubled for the three cases considered (to approximately 2 sessions per week). While

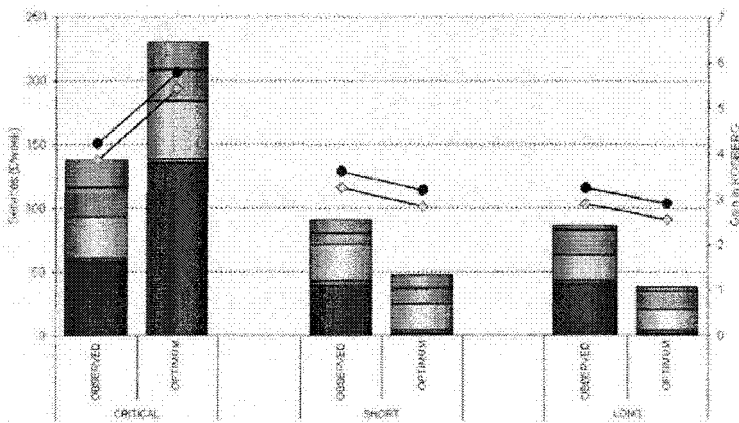
Figure 7.21 Input mix efficiency for caregiver burden (KOSBERG)



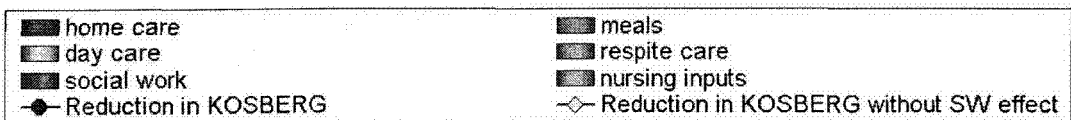
Overall-budget-constrained optimisation scenario



Group-budget-constrained optimisation



Service-budget-constrained optimisation



levels of respite care allocated to the most dependent are greatly increased following the optimisation, they are reduced somewhat for the long interval need case.

*Significant impact of service supply constraints*

The imposition of constraints on aggregate service levels affects very significantly the pattern of distribution of resources across case types and the levels and distribution of the predicted gains in KOSBERG. Hence, whereas the overall-budget-constrained case implies a slight redistribution of resources away from the critical interval case, the service-budget-constrained scenario entails a very substantial further concentration of inputs on the most dependent case type.

More importantly, however, flexibility in service supply is associated with optimum solutions that

- raise aggregate levels of KOSBERG to a much greater degree
- improve KOSBERG levels for all cases, in contrast with the patterns for the service-budget-constrained scenario.

Overall, whereas the increases in aggregate service contributions to KOSBERG in the overall and group-budget-constrained scenarios are practically identical, they are significantly higher than the improvements ensuing from the service-budget-constrained optimisation (approximately 2.4 times when social work effects are taken into account, and over 22 per cent higher when they are not).

*The large social work impact*

One of the most striking results in Figure 7.21 is the large share of the improvements in caregiver burden following optimisation due to the effect of social work inputs. Even though it is unlikely that in reality such large improvements could be realized, the results nevertheless suggest that increases in qualified (non-case management related) social work inputs are likely to represent a cost-effective alternative for improving the welfare of informal caregivers.

### **7.7.2 Collateral outcome levels**

Figure 7.22, Figure 7.23 and Figure 7.24 describe, respectively, the implications for collateral outcomes of the optimum allocation of resources for KOSBERG in the group, overall and service-budget-constrained scenarios.

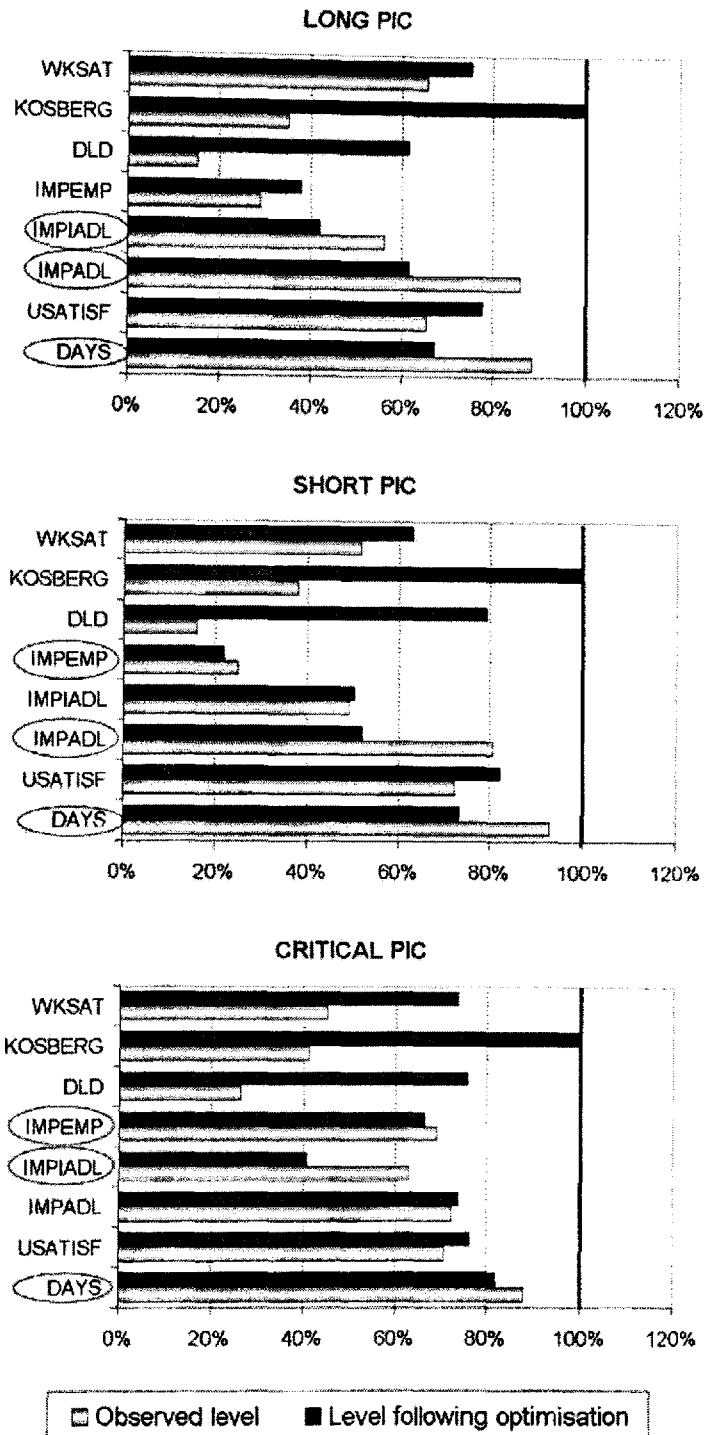
#### ***Group-budget-constrained optimisation***

Contrary to most of the examples explored above, maximising aggregate reductions in caregiver burden (KOSBERG) brings about improvements in a significant number of collateral outcome indicators for all case types. Hence, following the group-budget-constrained maximisation, almost three fifths of the indicators of collateral outcomes improve relative to their observed levels. Three indicators - the care managers' perception of the impact of the care package on the user's welfare (WKSAT), the indicator of dissatisfaction with life development (DLD) and the indicator of user satisfaction with services (USATISF) - improve for the three case types explored.

Figure 7.22 also identifies deteriorations in important collateral indicators, however. In particular, DAYS, the indicator of length of stay in the community prior to institutionalisation, deteriorates for the three case types explored following optimisation, more acutely so for the long and short interval need cases. To a smaller degree, the results also indicate the presence of a trade-off between improvements in KOSBERG and the level of achievement with respect to the user's IADL and ADL functioning, and to the user's sense of control over his or her own life.

Given some of the similarities in the composition of optimum care packages for the maximisation of DAYS and KOSBERG (both imply, for instance, large increases in day care and respite care utilisation), it is likely that by restraining somewhat the transfer of resources from home care to meals and social work inputs (two services which were not found to affect significantly the length of stay in the community) new care packages could be identified which increased simultaneously KOSBERG and DAYS for all case types.

**Figure 7.22 Collateral outcome levels for optimisation on KOSBERG with group-budget-constrained optimisation**



### *Overall and service-budget-constrained optimisations*

Not surprisingly in light of the resemblance of the utilisation patterns implied by the overall and group-budget-constrained optimisations, the patterns of changes in collateral outcomes depicted in Figure 7.23 match very closely those in Figure 7.22. The only main difference between the two optimisations refers to the deterioration in the levels of ADL functioning for the critical interval need case. This change is likely to follow from the reduction in the levels of resources allocated to the critical interval need case in the overall-budget-constrained scenario.

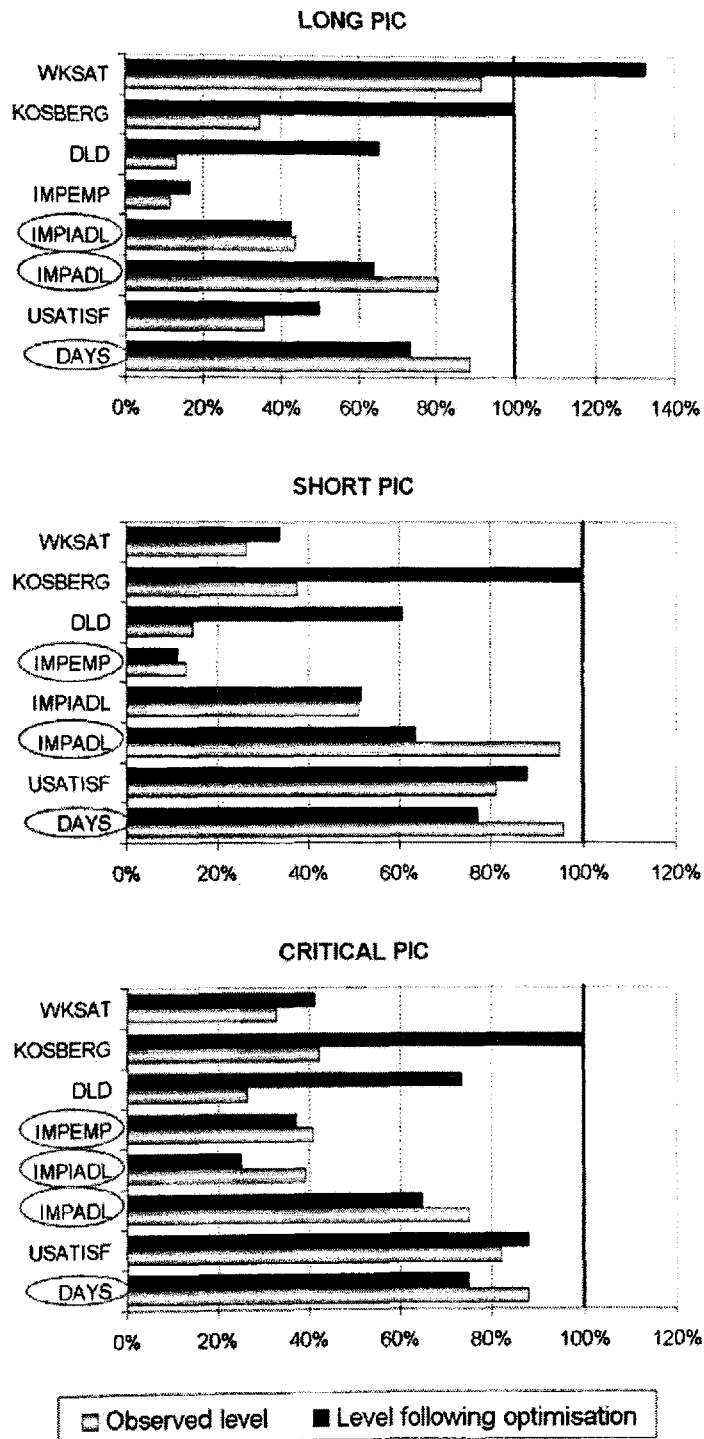
In contrast, the service-budget-constrained optimisation brings about total polarisation of the collateral benefits (see Figure 7.24). Following the concentration of most resources on critical interval need cases, practically all collateral outcomes for cases with long and short interval needs worsen relative to their observed levels, while all collateral indicators improve for the critical interval case.

### **7.7.3 Overview**

#### *Gains in outcomes*

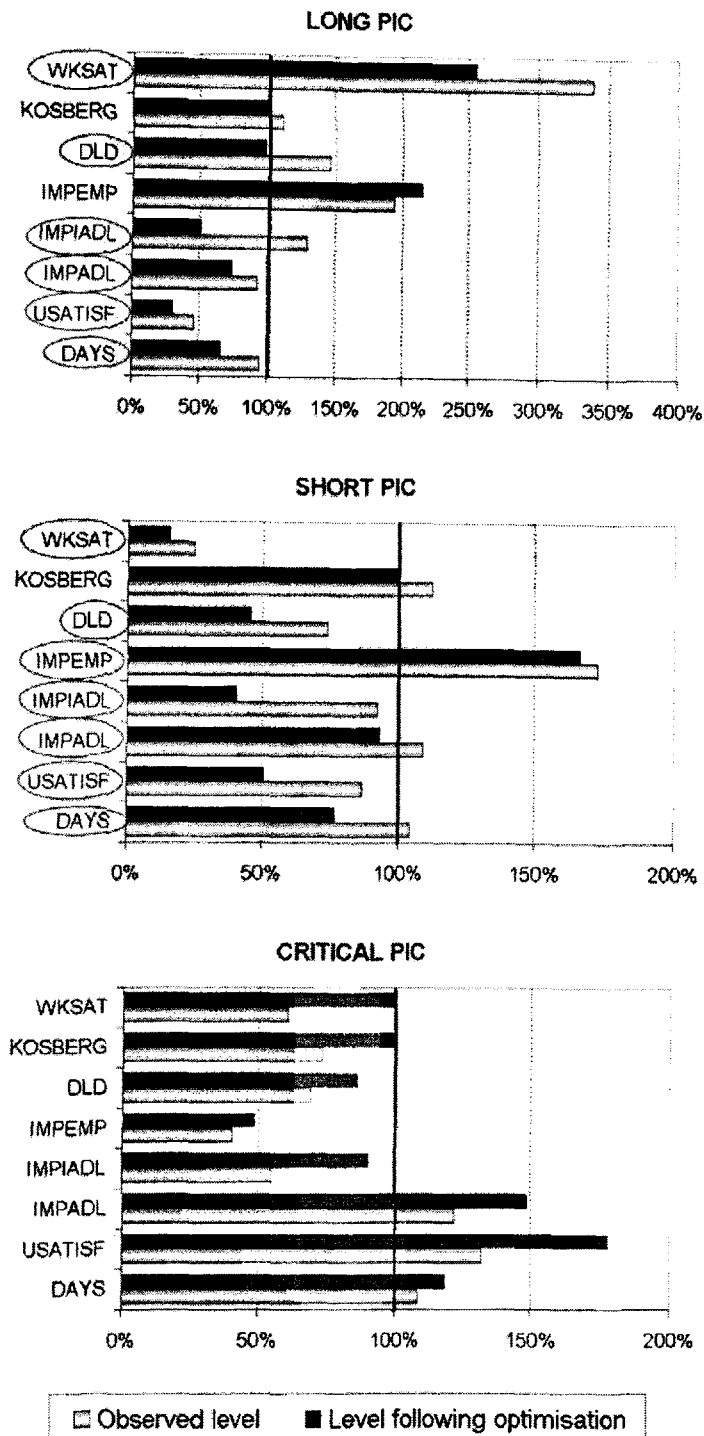
- The results show that very significant further improvements in the levels of caregiver burden can be achieved following optimisation. However, the size and distribution of such gains are heavily mediated by the flexibility in the supply of services, and particularly by the availability of higher levels of social work.
- When the scenario assumes perfect elasticity of supply, the optimisation brings about large improvements in KOSBERG over observed levels for the three case types considered. A very large share of such improvements appears to be related to the provision of modest extra amounts of social work inputs.
- When aggregate service supply levels are constrained, all gains are concentrated on the critical interval need case, with the other two case types enduring a significant worsening in the levels of KOSBERG.
- In aggregate, the service-constrained-optimisation yields significantly lower levels of gains in KOSBERG than the other two scenarios.

**Figure 7.23 Collateral output levels for optimisation on KOSBERG with overall-budget-constrained optimisation**





**Figure 7.24 Collateral output levels for optimisation on KOSBERG with service-budget-constrained optimisation**



### *Optimum budget levels and input mixes*

- The overall and group-budget-constrained optimisations yield, in aggregate and at the case level, very similar levels of service contributions to caregiver burden. However, the overall-budget-constrained scenario implies a certain redistribution of resources away from the critical interval need case.
- In contrast, the service-budget-constrained optimisation allocates most available resources on the critical interval need case.
- When service supply levels are not limited, the optimum service mixes do not contain any levels of home care. Instead, levels of social work, meals, day care and to a lesser degree respite care are considerably increased.

### *Collateral outcome levels*

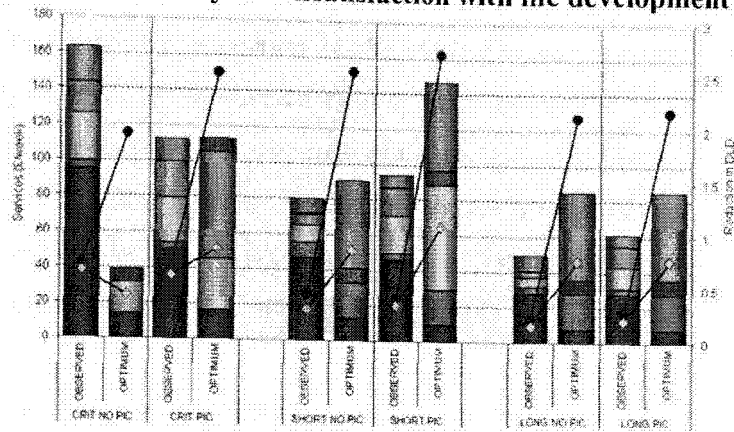
- Maximising aggregate levels of KOSBERG when service supply levels are not limited brings about improvements in a majority of collateral outcomes.
- However, the results also suggest a deterioration in important collateral outcomes, including DAYS.
- Following the service-budget-constrained optimisation, collateral outcomes improve only for the critical interval need case.

## **7.8 Maximising service contributions to dissatisfaction with life development (DLD)**

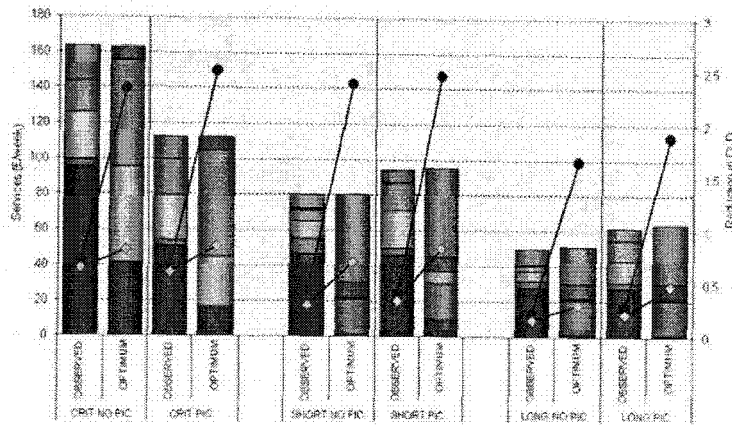
### ***7.8.1 Changes in input mix and levels of outcomes following optimisation***

The pattern of changes in service allocations and service contributions to the indicator of dissatisfaction with life development shown in Figure 7.25 are amongst the more complex so far observed.

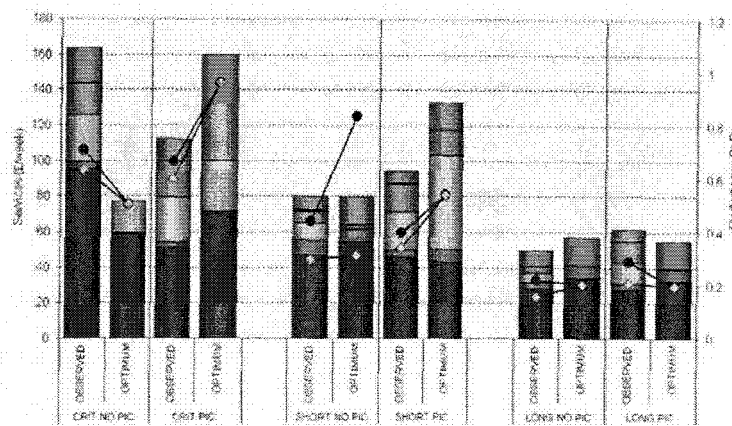
Figure 7.25 Input mix efficiency for dissatisfaction with life development (DLD)



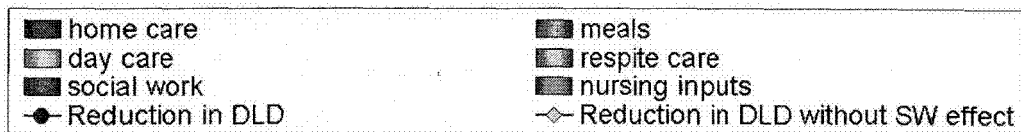
Aggregate-budget-constrained optimisation scenario



Group-budget-constrained optimisation



Service-budget-constrained optimisation



The analysis in Section 5.9 identified significant effects on DLD for all of the services explored. However, with the exception of the effect for social work inputs, most of the service productivities identified covered only a small minority of service recipients. To a large extent, it is the relatively low coverage of the productivity effects which is responsible for the observed differences in the optimum service mixes between case types. The description of the results discusses the changes in the allocation patterns in sequence of the strength of the productivity effects.

#### *The prominence of the social work effect*

As in the KOSBERG example analysed just above, the patterns of service contributions in Figure 7.25 differentiate between levels achieved with and without social work inputs. Doing so, the analysis demonstrates that by far the largest share of the very significant increases in care package contributions to DLD - following the overall and group-budget-constrained optimisations - is due to the effect of increases in social work levels.

Indeed, even though it relates specifically to users with problems undertaking heavy housework tasks, the high prevalence of such a limitation amongst users in the sample means that for the six case types considered social work shows by far the highest marginal productivity of all the services explored. In fact, the social work effect is so large that suspicions arise as to the accuracy of the productivity estimate, which as reported in Table 5.8 was only significant at the 9 per cent level. Nevertheless, the fact that, even assuming the lowest value of the confidence interval for the productivity effect, social work inputs show either the highest or second highest marginal productivity on DLD for all cases considered does suggest that it represents an important means for improving users' morale.

As in the KOSBERG optimisations, the levels of social work inputs in the optimum care packages were limited to £8 per week because of the previously discussed restriction imposed on all services to lie within the observed ranges allocated in the sample.

#### *The joint effect of meals and nursing inputs*

After social work inputs, the strongest service effect on DLD is associated with the complementarity effect between nursing inputs and meals for users with either long or short interval needs. For all such cases in the overall and user-group-budget constrained optimisations, the solution to the optimisation implies a corner solution. That is, the level of

one or both inputs is restricted by one of the constraints implied in the model, and specifically by the limitations in the allocation of service to the maximum observed level in the sample (of £ 20 and £ 50 per week for meals and nursing inputs, respectively).

As a result of the complementarity effect, the optimum care packages for the short and long interval cases in the overall and group-budget-constrained optimisations transfer resources from home care and other services to nursing inputs and meals.

#### *Increases in day and respite care inputs for the most dependent*

The restrictions mentioned above on the level of social work, meals and nursing inputs mean that the overall budget constraint is not reached by the sums allocated to such services, and that despite their significantly weaker marginal productivities on DLD, some resources are invested on other services.

In particular, mirroring the patterns for many other outcome indicators, the optimum allocations increase the levels of day and particularly respite care services. When case budgets are fixed, the optimum allocation of resources increase very significantly the levels of respite care services for the two critical interval need cases. When they are not, the optimum care packages increase respite care levels for the critical interval need with PIC case, and day care levels for the short interval need with PIC case type.

#### *Significant reductions in home care levels*

As in many of the optimisations of previous indicators, maximising aggregate levels of outcomes when service supply levels are not constrained implies reducing very considerably, and for all case types, the level of home care allocated.

#### *Variiegated pattern of service contributions to DLD*

We have noted above that the largest share of the improvements in service contributions to DLD following the optimisations are due to the very significant effect of social work inputs. Nevertheless, Figure 7.25 indicates that even without taking into account the social work effect, significant relative improvements in DLD could be expected following optimisation. The size and distribution of such gains, however, depends significantly on the context for optimisation assumed.

Hence, whereas in the group budget-constrained scenario, all cases enjoy significant improvements in the outcome following optimisation, in the overall-budget-constrained case the critical interval need without PIC case suffers a heavy loss in the level of the output. Finally, maximising DLD levels when aggregate service supply levels are limited to their observed level produces a complex pattern of gainers and losers, not straightforwardly described in terms of level of dependency or informal support. Overall, disregarding the social work effect, the overall, user and service-budget constrained optimisations improve aggregate service contributions to DLD by 116, 85 and 22 per cent, respectively.

### ***7.8.2 Collateral outcome levels***

The implications for other important outcome variables of the optimisation of the DLD indicator in the group, overall and service-budget-constrained scenarios are depicted in Figure 7.26, Figure 7.27 and Figure 7.28, respectively.

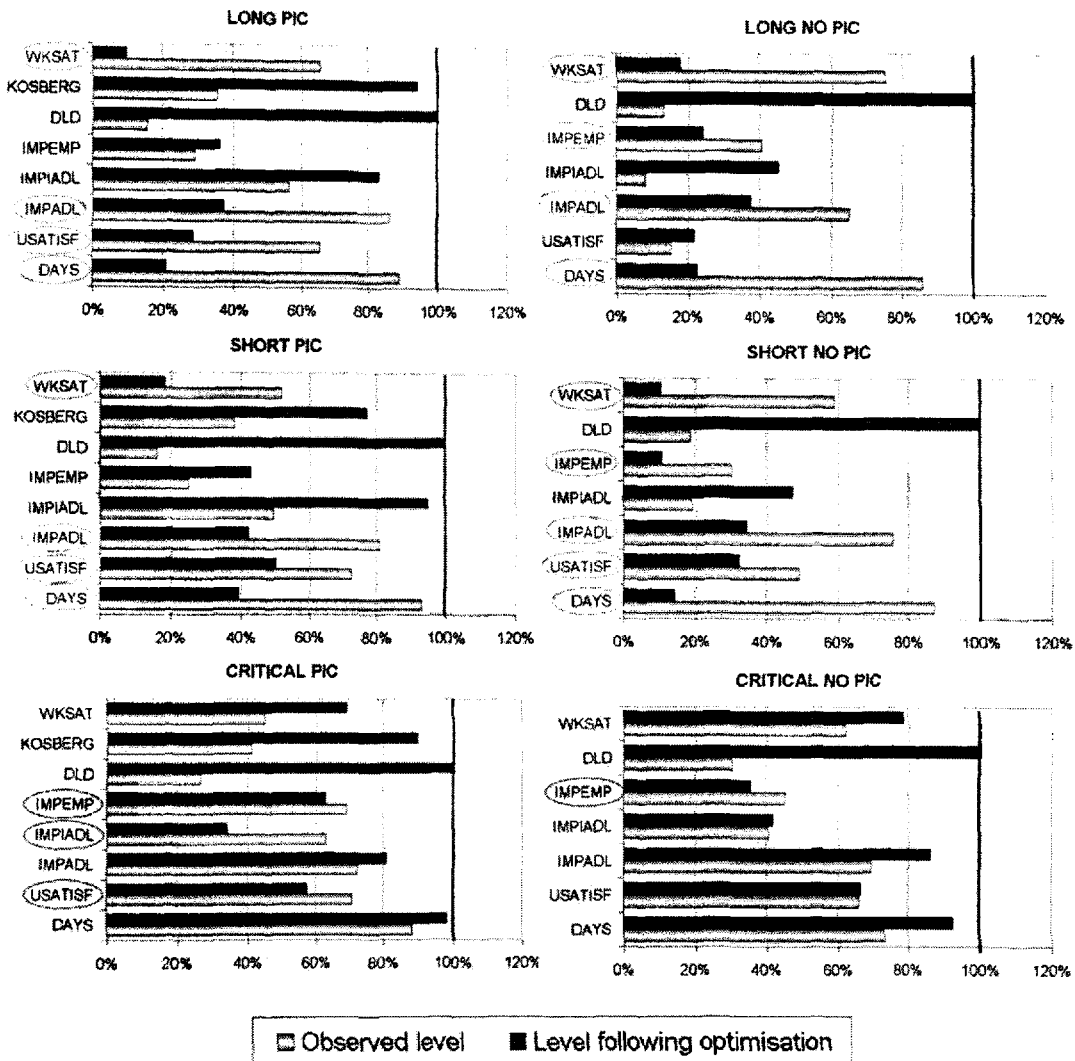
#### ***Group-budget-constrained optimisation***

##### ***Improved collateral outcomes for the most dependent***

Holding group-budgets constant, maximising levels of DLD brings about improvements in a majority of collateral outcome indicators for the two critical interval need cases (see Figure 7.26). A majority of collateral outcomes for the remaining cases, in contrast, deteriorate. In consonance with many of the findings in previous optimisations, it thus appears that substituting large amounts of home care for respite and day care for the most disabled - and particularly for those with no PIC - is key to achieving widespread improvements in most outcome indicators. Particularly noticeable is the increase in DAYS, the indicator of length of stay in the community, for which the values achieved for both critical interval need cases are close to the maximum attainable levels given the case budget constraints (that is, they are close to the 100 per cent line).

For non-critical interval need cases, some of the most important patterns include generalised losses in WKSAT (worker perception of the impact on the welfare of the care package), DAYS (length of stay in the community prior to institutionalisation) and IMPADL (ADL functioning).

**Figure 7.26 Collateral outcome levels for optimisation on DLD with group-budget-constrained optimisation**



### *Improvements in IADL functioning and caregiver burden*

In contrast, the degree of IADL functioning, IMPIADL, is found to improve for five of the six cases explored. Also, not surprisingly given the large increase in social work inputs implied by the optimum care packages, the maximisation of service contributions to DLD brings about large improvements in KOSBERG, the indicators of caregiver burden.

### *The overall-budget-constrained optimisation*

To a large extent, the pattern of improvements and deteriorations in collateral outcome levels in the overall-budget-constrained scenario reflects the changes in levels of resources implied by the optimisation (see Figure 7.27). For instance, the deterioration in all collateral outcome indicators for the critical no PIC case and the high proportion of improvements for the short interval need with PIC case mirror respectively a very large decrease and a 50 per cent increase in the budgets for the two cases.

As found in the group-budget-constrained scenario, and not unexpectedly in light of the striking similarities between the optimum care packages, the overall-budget-constrained optimisation also yields for the critical interval need case with PIC improvements in a majority of the indicators of collateral outcomes.

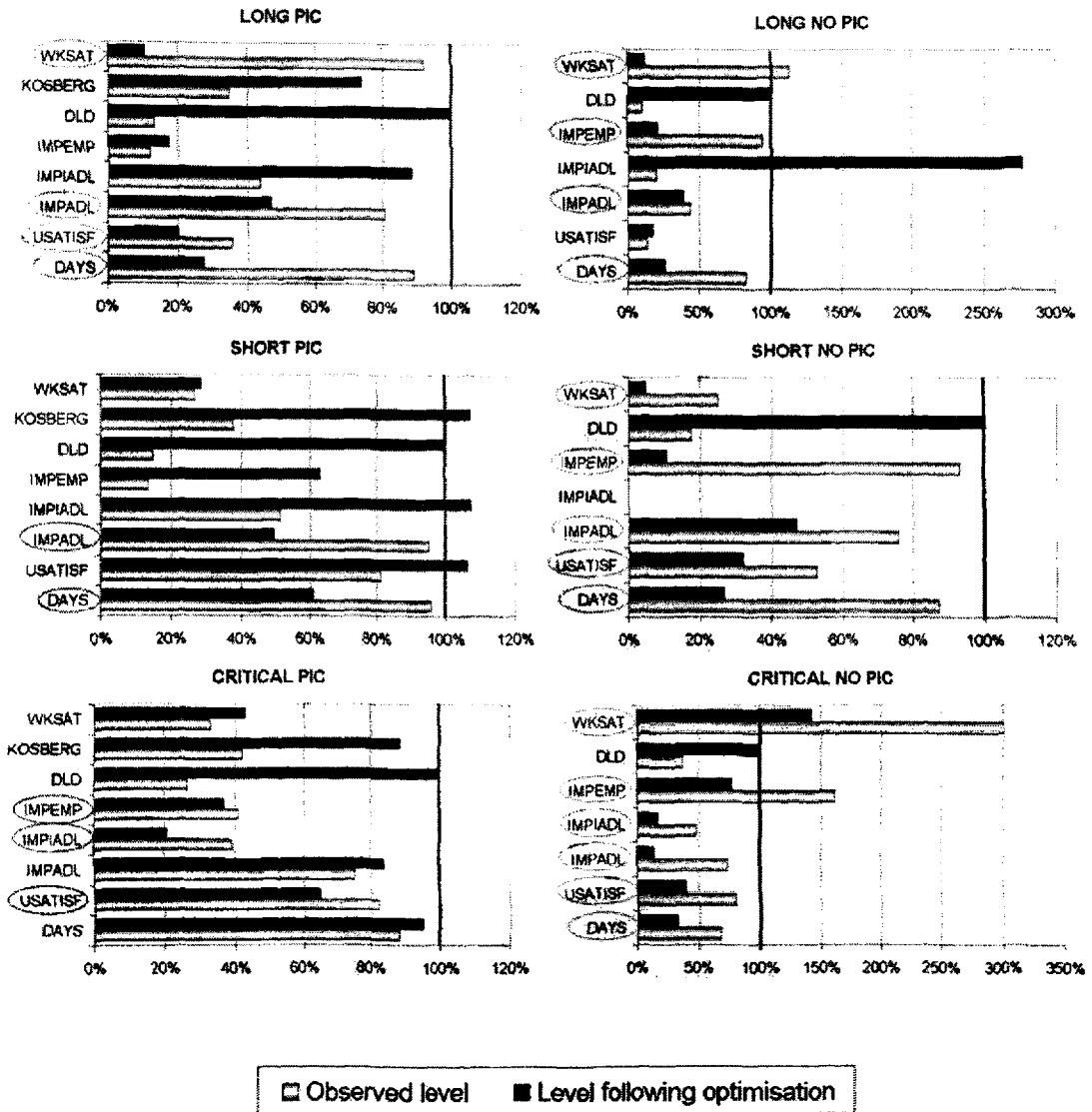
Overall, over three-fifths of the collateral outcome indicators are found to deteriorate following the overall-budget-constrained optimisation.

### *The service-budget-constrained optimisation*

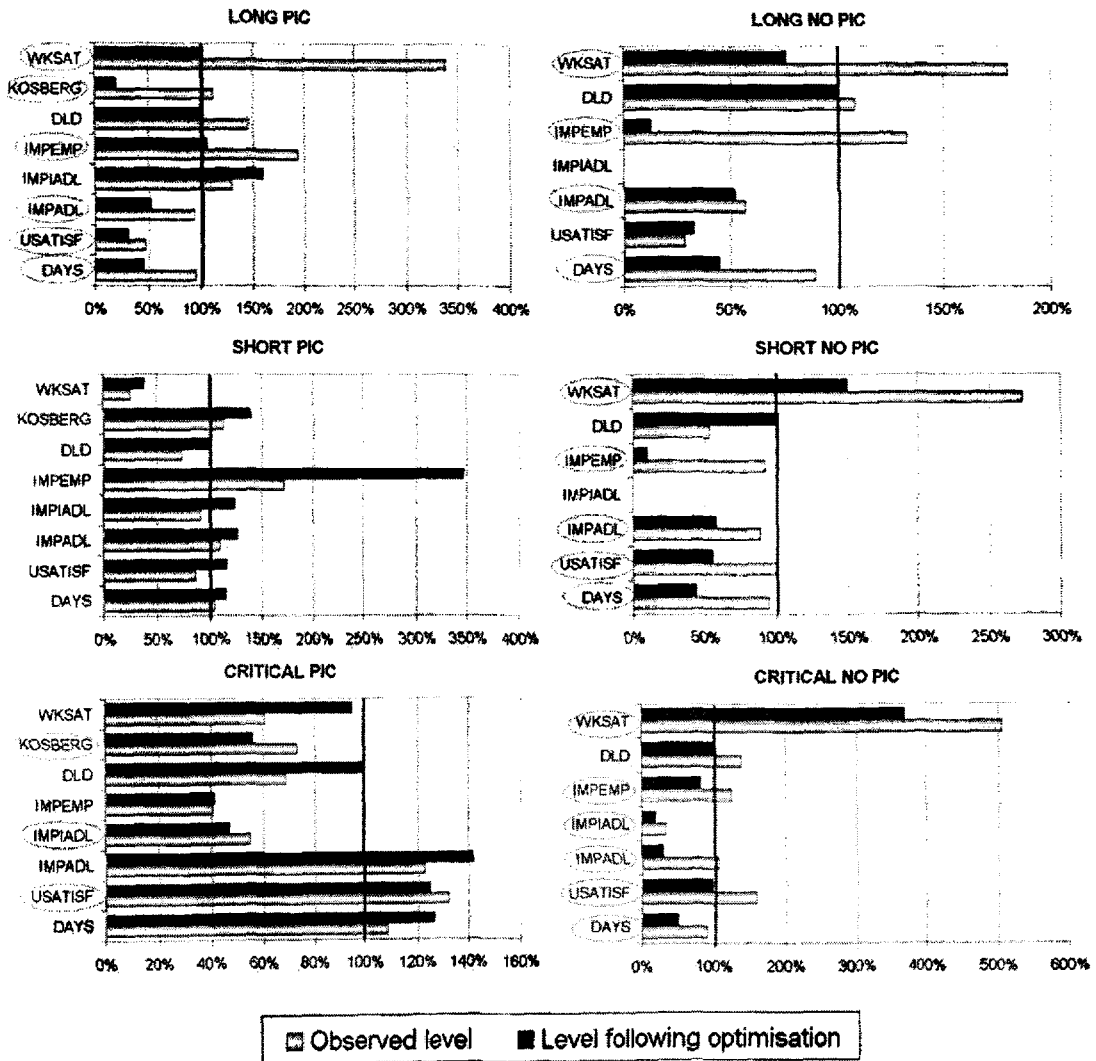
Even though it yields an equal proportion of gains in collateral outcome levels as the overall-budget-constrained scenario, maximising aggregate levels of service contributions to DLD when total service budgets are limited to their observed levels polarises the distribution of gains and losses across cases (see Figure 7.28). Specifically, whereas fewer than 15 per cent of collateral outcome indicators fall for the critical and short interval need with PIC cases, 84 per cent of them deteriorate for the remaining cases. Again, these results mimic the changes in the levels of resources following optimisation reported in Figure 7.25.



**Figure 7.27 Collateral output levels for optimisation on DLD with overall-budget-constrained optimisation**



**Figure 7.28 Collateral output levels for optimisation on DLD with service-budget-constrained optimisation**



### 7.8.3 Overview

#### *Gains in outcomes*

- As in the caregiver burden example, by far the greatest contribution to improvements in DLD levels is associated with increases in social work levels. Nevertheless, even when the effect of social work inputs is disregarded, the results suggest that significant and widespread improvements in DLD levels can be obtained by optimising the allocation of the remaining services.
- Excluding the effect of social work inputs, both the overall and service-budget-constrained optimisations imply trade-offs in DLD gains between case types. In contrast, the group-budget-constrained scenario achieves significant improvements for all case types.

#### *Optimum budget levels and input mixes*

- When they are not constrained by the conditions associated with the optimisation, the distribution of optimum budget levels does not follow a clear pattern by level of dependency or informal support.
- Overall, the strongest productivity effects correspond to social work inputs, and to the complementarity effect for the long and short interval need cases between meals and nursing inputs.
- However, because the limitation in the optimum service levels to the ranges of allocation observed in the sample, significant proportions of resources are allocated to other services as well. Hence, significant amounts of day care and respite care services are provided to certain cases, particularly to high dependency cases and to the short interval need with PIC case type.

#### *Collateral outcome levels*

- As a result of the allocation of high levels of day care and respite care services, the maximisation of DLD levels brings about improvements in many collateral outcome indicators for the two critical interval need cases, particularly in the group-budget-constrained optimisation.

- In the overall and service-budget-constrained scenarios, the distribution of gains in collateral outcomes follows closely the changes implied in budgets.

## **7.9 Maximising worker perception of care package impact on user's welfare (WKSAT)**

### ***7.9.1 Changes in input mix and levels of outcomes following optimisation***

#### *More day care and respite care*

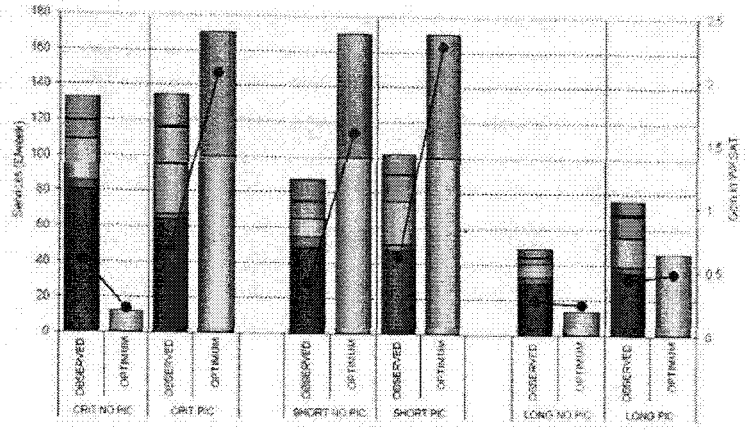
There is one clear and important implication of the optimisation results for WKSAT, depicted in Figure 7.29. In order to maximise, in the care manager's view, the impact of care packages on users' welfare, the observed patterns of service allocation ought to change radically, reducing very heavily the utilisation of home care inputs, and replacing them with much higher levels of day care and respite care (the latter service being particularly effective for the most dependent cases). That is, despite the existence of significant productivity effects on WKSAT for four out of the six services in the analysis, the optimum solutions when aggregate service supply levels are not constrained contain almost exclusively day care and respite care inputs. Whereas perhaps not to the same extreme as the results in Figure 7.29, the importance of increasing levels of day care and respite care has been a recurring theme across the discussion of many of the previous optimisations.

#### *More services for the intermediate/high dependency cases and those with informal caregivers*

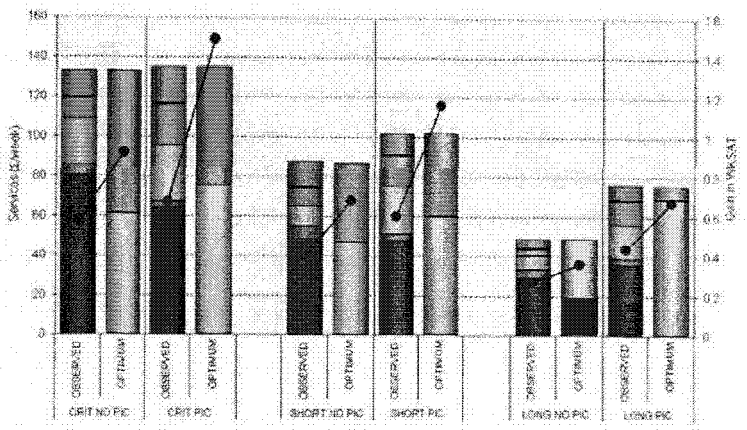
The sharp reduction following the overall-budget-constrained optimisation of the budget for the critical interval need without PIC case indicates that it is other case types, and especially the critical interval need with PIC and the two short interval need cases, that exhibit the greatest potential to benefit from increased levels of day care and respite care. For the three case types, the optimum care packages contain the maximum observed levels of day and respite care (£100 and £70 per week, respectively).

These results may reflect an implicit perception by case managers that the greatest potential for improvement is to be realised neither for very dependent users not benefiting from the

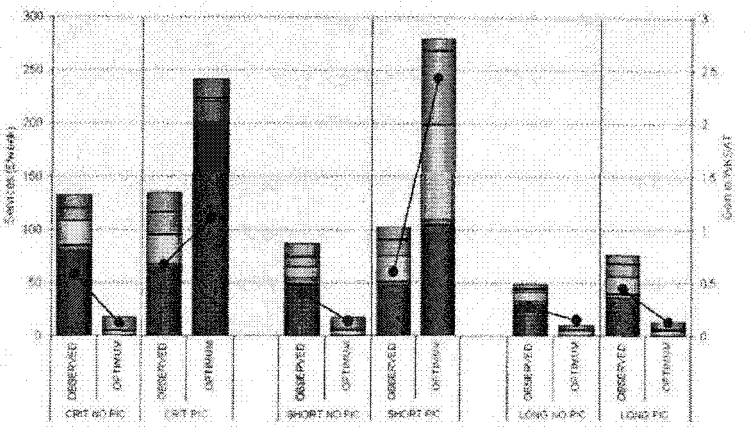
**Figure 7.29 Input mix efficiency for worker perception of impact of care package on user's welfare (WKSAT)**



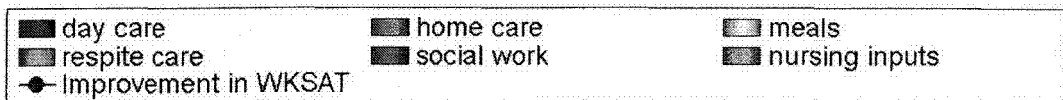
**Overall-budget-constrained optimisation scenario**



**Group-budget-constrained optimisation**



**Service-budget-constrained optimisation**



buffering effect of significant amounts of informal support, nor for relatively well-off cases, for whom limited levels of care may be all that is required to provide small improvements in their welfare up to some minimum acceptable standard. Indeed, the results of the production function for WKSAT, summarised in Figures 5.45 and 5.46, identify day and respite care inputs as particularly effective in situations where:

- the informal caregiver suffers from health problems which undermine his/her capacity to care, and where the PIC is in full time employment
- the user suffers from mild or severe cognitive impairment or was unable to wash, one of the dependency measures forming the basis for the definition for the short interval need category.

Alternatively, the fact that high dependency users without informal support receive resources over and above those implied by the optimisation could reflect a particular prioritisation of such cases by the system.

#### *The service-budget-constrained optimisation*

As has been found in most of the previous optimisations, the distribution of resources and service contributions following the service-budget-constrained optimisation differs significantly from that of the other two optimisation scenarios. In it, maximising aggregate levels of WKSAT results in the allocation of almost all the resources available to the critical and short interval need with PIC cases. On the grounds described above, all levels of day and respite care are allocated to the short interval need with PIC case. All available levels of home care and meals are concentrated on the critical interval need with PIC case, for whom the interaction effect of the two services is found to be most effective.

#### *The impact of the optimisation scenario on the distribution and size of service contributions*

Not surprisingly given the optimum allocation of resources described above, only the short and critical interval need with PIC cases achieve improvements in WKSAT following the service-budget-constrained optimisation. In the least constrained scenario, the overall-budget-constrained scenario, the results also imply trade-offs between improvements for the three case types receiving the bulk of the resources and the remaining cases. In the group-budget-constrained optimisation, however, the pattern is one of significant gains for all cases, and particularly for cases of higher dependency or with informal caregivers.

Overall, the two constraints limiting changes in group and service budgets levels appear to affect significantly the capacity of the optimisation to increase aggregate levels of service contributions to WKSAT. Whereas the overall-budget-constrained scenario increases current levels of the outcome by 130 per cent, the group and service budget-constrained optimisations do so approximately by 79 and 38 per cent, respectively.

### **7.9.2 Collateral outcome levels**

Figure 7.30, Figure 7.31 and Figure 7.32 present, respectively, the implications for the remaining outcome indicators of the changes in service allocations implied by the group, overall and service-budget-constrained optimisation of WKSAT.

#### ***The group-budget-constrained optimisation***

One of the interesting features of the analysis of collateral outcomes for the WKSAT indicator is that it should shed some light on the nature of the care managers' prioritisation of goals for different user types. Those outcome goals perceived by the care manager to be of prime importance with respect to the welfare of the user, it could be argued, would be positively correlated with the WKSAT indicator, and would therefore increase following optimisation. Such patterns are best observed in the group-budget-constrained scenario, because improvements and reductions in collateral levels are not due, by definition, to changes in budget levels across cases.

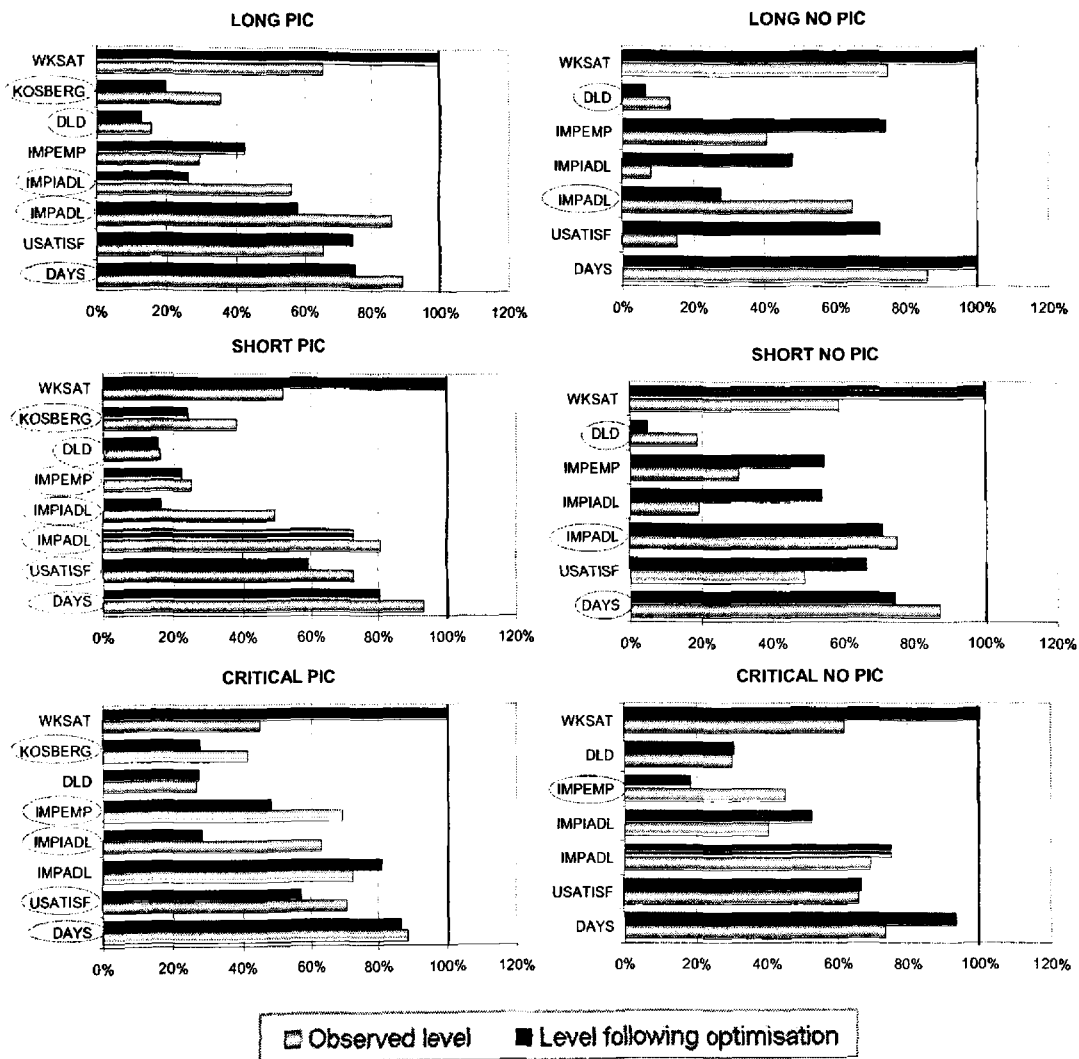
To a large degree, the proposition above appears to be supported in the group-budget-constrained scenario for the three cases without PICs. For them, as Figure 7.30 shows, maximising WKSAT within observed budgets improves a large set of important collateral outcome indicators, including USATISF, the user's degree of satisfaction with the services received, IMPIADL, the indicator of IADL functioning and for two of the three cases DAYS, the indicator of length of stay in the community.

In contrast, however, the maximisation of WKAT for cases with PIC produces reductions in a majority of collateral indicators, so that for instance caregiver stress levels (KOSBERG),

IADL functioning (IMPIADL) and the length of stay in the community (DAYS) deteriorate



**Figure 7.30 Collateral outcome levels for optimisation on WKSAT with group-budget-constrained optimisation**



for the three cases following optimisation. Most striking of all, all collateral indicators for the short interval need with PIC worsen after optimising, despite been shown above to represent one of the cases with the greatest potential for improvement with respect to WKSAT.

Exploring the patterns in detail, some hypotheses can be tentatively put forward to help interpret the results. User satisfaction and the user's sense of control over his or her own life, for instance, appear to be associated with improvements in WKSAT for users of relatively low dependency levels. In contrast, user morale (DLD) and personal care functioning (IMPADL) are positively correlated with improvements in WKSAT for the two critical interval cases, and could be argued to be a more pressing concern for the most dependent cases. In other words, the results could point out the existence of different trade-offs between improvements in outcomes across cases.

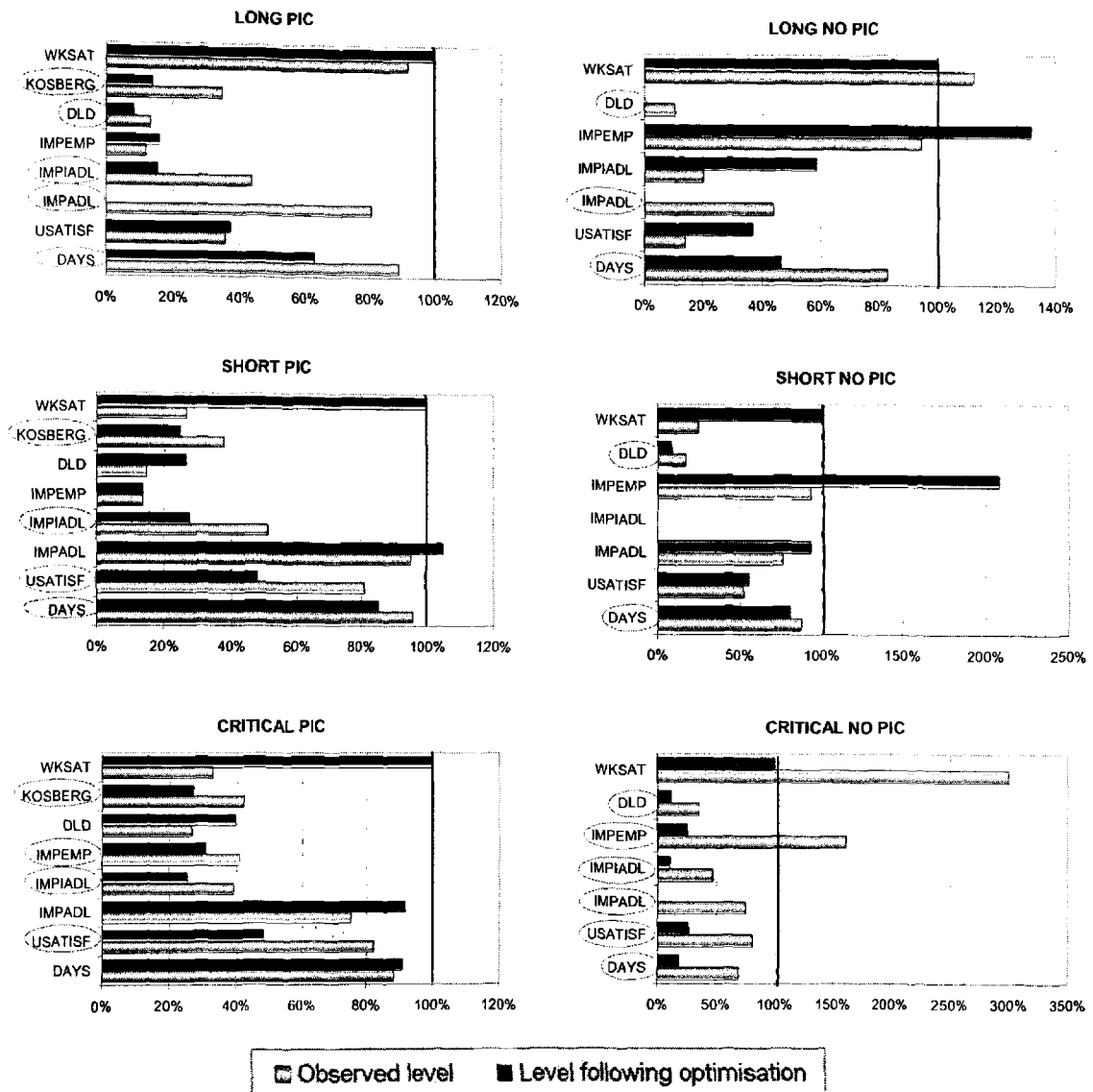
The differences between cases with and without informal caregivers could perhaps be related to care managers' perceptions of the different role for social services between cases with and without substantial levels of informal support, and the lack in the analysis of an outcome indicator (other than WKSAT) sensitive enough to capture performance with respect to such a role. The fact that service contributions to caregiver burden also deteriorate suggests, however, that the patterns are not related to issues of balancing benefits between users and informal caregivers.

#### ***Overall and service-budget-constrained optimisations***

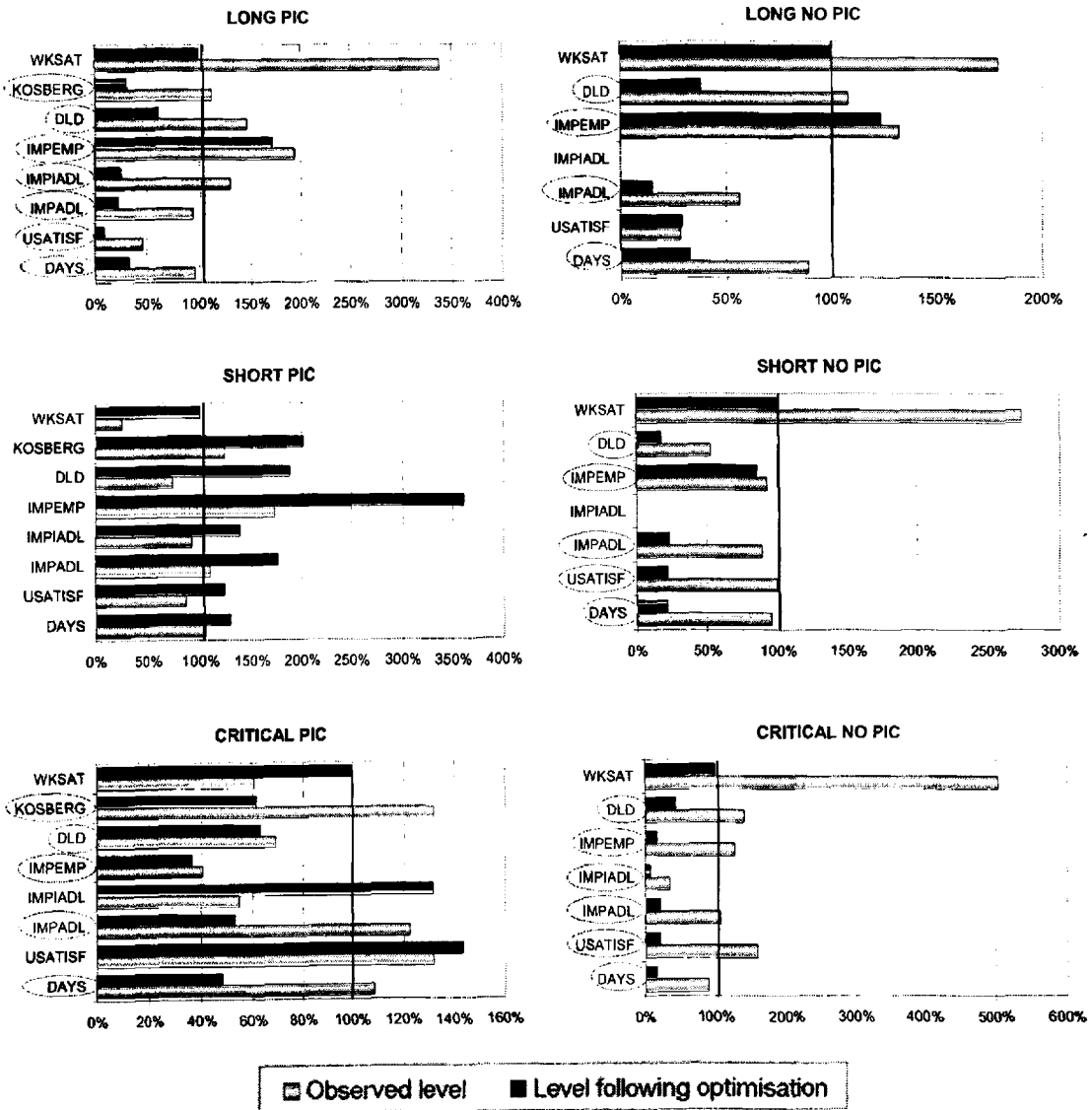
Relative to the patterns of the group-budget-constrained optimisation, the changes in collateral outcomes which follow from the overall and service-budget-constrained optimisations are easily associated with differences in the distribution of resources in the different optimisation scenarios.

Hence, the improvements shown in Figure 7.31 in the collateral outcomes for the two short interval need cases and the critical interval need with PIC, and the deterioration for the critical interval need without PIC case match the changes in budget levels in the overall-budget-constrained optimisation discussed above.

**Figure 7.31 Collateral output levels for optimisation on WKSAT with overall-budget-constrained optimisation**



**Figure 7.32 Collateral output levels for optimisation on WKSAT with service-budget-constrained optimisation**



Equally, the fact that all collateral indicators for the short interval need with PIC case type improve following the service-budget-constrained optimisation is a simple reflection that the levels of resources for the case almost triple. Interestingly, however, Figure 7.32 also shows that despite benefiting from a very substantial increase in home care levels, accounting for an almost two-fold increase in the budget levels for the case, a majority of collateral outcome indicators for the critical interval need with PIC deteriorate. Again, this finding appears to point out the ineffectiveness of home care as a means to realise widespread improvements in outcomes for the most dependent cases.

### **7.9.3 Overview**

#### *Gains in outcomes*

- The results indicate that large improvements in aggregate levels of WKSAT can be achieved. The extent of such improvements - and who benefit from them - vary with the context of the optimisation.
- In both the overall and service-budget-constrained scenarios, the solution implies a redistribution of benefits to a few users, primarily those with medium or high dependency levels and with informal support. In contrast, the group-budget constrained optimisation generates large gains in WKSAT for all case types.
- The overall-budget-constrained scenario increases observed aggregate levels of WKSAT by 130 per cent. The group and service budget-constrained optimisations do so approximately by 79 and 38 per cent, respectively.

#### *Optimum budget levels and input mixes*

- When case budgets are not constrained to their observed levels, the optimisation concentrates large proportions of the resources available on a few cases. In general, such cases are characterised by medium/high disability and by receiving support from PICs.
- When aggregate service supply levels are free to vary, the optimum care packages contain almost exclusively day and respite care inputs. This implies a heavy reduction in home care utilisation.

### *Collateral outcome levels*

- The implications of maximising WKSAT for other outcome indicators vary drastically between cases with and without PICs.
- For cases without informal caregivers, maximising WKSAT is associated with large and widespread improvements in collateral outcomes.
- For cases with PICs, however, the optimum care packages produce deteriorations in the majority of collateral outcome indicators.
- In as far as the collateral patterns for WKSAT illuminate the care manager's prioritisation of outcomes for the different case types, these results could therefore suggest that the range of outcome indicators in the analysis do not capture all of the dimensions of welfare (as perceived by care managers) for cases with informal support.

## **7.10 The optimisation results and the rest of the thesis**

Chapter 7 has presented, sequentially, the results of the optimisation for the eight outcome indicators identified in Chapter 6 with PSIC values above 15 per cent. The focus has been threefold:

- To understand the potential for improving the system's performance with respect to each of the different outcome dimensions explored.
- To map the changes in the allocation of resources required to achieve such gains in outcomes.
- To understand the nature of tradeoffs between outcomes implied by the maximisation of aggregate levels of each of the indicators in the analysis.

It can be seen that an important implication of the optimisation results is the significant effect of postulating constraints in the movement of resources between case types and, particularly, between services on the potential for improvement in aggregate levels of outcomes. Very often, also, the optimum solutions imply very large reductions in the level of home care inputs allocated, and an increase in day care and respite care services, particularly for the most dependent cases.

## **8 DERIVING POLICY IMPLICATIONS: LIMITATIONS IN THE INTERPRETATION OF THE RESULTS IN THE THESIS**

As the analyses in the thesis have shown, deriving quantitative estimates of production of welfare relationships implies achieving a delicate balance between reflecting an inherently complex process, on the one hand, and reducing it and to some degree simplifying it down to an empirically manageable configuration, on the other. There is no doubt, for instance, that more factors than those finally captured in the estimated production functions are likely to play important mediating roles in the relationship between user characteristics, services supplied and welfare levels attained. Personal user and carer motivational factors, for example, or differences in the precise nature of the tasks undertaken within broad service types are also likely to have affected the extent to which services improve the welfare of users and carers.

It is thus essential, before we examine the final policy implications to be derived from the evidence presented in the thesis, that we consider the strengths and limitations of its methodological framework. Although most of what follows has been mentioned in previous parts of the thesis, the next section pulls together the key methodological features of the thesis, and particularly their implications for the way in which its results ought to be understood. The discussion will focus on two key aspects: first, the assumption of quasi-technological determinacy embodied in the estimation methods. Second, the nature of the sample used in the analysis.

### **8.1 The quasi-technological assumption: using quantitative methods for understanding the production of welfare process in social care**

The discussion of the estimation methods in Chapter 2 and the subsequent result sections clearly illustrate the quantitative nature of the analytical and methodological frameworks used in the thesis. In short, the aim of the thesis has been to derive quantitative estimates of the relationship between characteristics of service users and carers, social care services, and the welfare levels associated, in order to address questions such as: are services being

allocated in a coherent and effective way? To what extent do they contribute to the welfare of users and caregivers? Which changes in the targeting of resources would lead to significant further improvements in the impact of resources on outcomes? At what cost?

The methods employed have borrowed heavily from microeconomic analysis, and particularly from the microeconomic analysis of the firm's production process. In doing so, the estimation process has therefore simplified reality to a significant degree, treating processes relating to human interactions as if they were technologically determinate. Overall, the assumption can be made that there exist laws which govern the key relationships within the production of welfare process, and in particular the relationship between the circumstances of cases and the impact of social care services on the welfare of users and caregivers {Knapp, 1984 #2485}. The issue for the empirical researcher is that such laws are in all likelihood of such intricacy that any attempt at their econometric estimation (i) should strive to reflect the most important features of such complexity, and (ii) should only be understood as a gross approximation to the truth, a sort of caricature of the processes being investigated. As noted in Fernández and Knapp {2004 #5113, p.175} 'human lives are thankfully much too complicated for simple reductionist quantitative models to predict exactly the changes in individual welfare that follow from care interventions'.

The complexity of the production of welfare process has been simplified during the estimation process in the thesis in three ways.

- First, and despite the long list of indicators whose effects were tested in the models (see Appendix Table 3.1), the analysis is unlikely to have covered the full spectrum of factors which may affect the relationship between resources and outcomes. Subtle yet important influences such as the nature of the relationship between users and carers, for instance, or the will of users to overcome their disability, could only be measured imperfectly, and therefore their effect captured only to a limited degree. As a result, as mentioned in the sections discussing the results, it is likely that the coefficients reported in the final models will convey effects which extend beyond the narrow definition of the indicator to which they relate. Particular inability to perform specific daily tasks, for instance, are likely to behave as markers for more complex combinations of physical or health problems.
- Secondly, the analysis has simplified the nature of the relationship between factors investigated by assuming a series of 'evaluative shortcuts'. Hence, the indicators of



service inputs and outcomes have been treated as if they were continuous. The indicator of receipt of day care, for instance, was treated as a continuous variable even though clearly fractions of sessions of the service could not be allocated<sup>46</sup>. The assumption of continuity was applied equally to the relationship between inputs and outcomes, whereby marginal changes in outcomes were assumed to follow from marginal changes in inputs. Such assumptions were implied in order to enable the analysis to speculate about the nature of changes in productivity effects at different levels of provision.

- Thirdly, simplifying devices were used during the exposition of the results. Given the vast quantity of results included, and their complex nature, figures and diagrams were used extensively for their reporting. As a consequence, however, the results might provide a false sense of accuracy and spurious elegance. It is therefore important to stress that the results only represent approximations to reality. This point is particularly pertinent with respect to the interpretation of the optimisation results, which should not be taken to depict accurately at the individual level the potential welfare attainments associated with alternative packages of care. Instead, such results should be taken to indicate, at a broad aggregate level, possible directions of change in patterns of service commissioning associated with improvements in performance.

Notwithstanding the limitations noted above, the methodology used in the thesis was designed to approximate as closely as possible the key features of the production of welfare process, and particularly those which, if ignored, would be most likely to affect significantly the reliability of the results obtained. Hence, as illustrated in Chapter 2, the thesis developed a bespoke theoretical specification of production functions which emphasised controlling for both the direct and indirect mediating influences of need factors on the productivity effects of services, by differentiating as much as possible the effect of services on different subgroups of users. Furthermore, the theoretical specification allowed for a wide range of functional forms of the relationship between needs, services and outcomes.

The implementation of the theoretical models, however, could not rely on prior evidence to specify the precise nature of user subgroups to be used in the analysis, nor the precise

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<sup>46</sup> On the other hand, the fact that the input was measured weekly and that some users were allocated less than one session per week means that fractions of units of service were observed in the sample.

functional form of the relationships postulated, and in particular that between inputs and outcomes. As noted in Chapter 2, such matters were determined during the estimation process, by contrasting a large number of alternative specifications, and selecting those which appeared to fit the observed data most efficiently. Importantly, this process did not employ a purely statistically driven device (such as the stepwise deletion of indicators) to select functional forms and indicators. The entire testing process was carried out manually, in order to ensure (i) the theoretical validity of the indicators present in the model and (ii) that no spurious effects would appear in the model as a result of variables ‘interlocking’, due to the presence of collinearity. Due to its exploratory nature, however, the analysis is therefore fundamentally a hypothesis building exercise, and one which contributes to the development of production of welfare research by establishing general propositions about the way in which the characteristics of services and those of service recipients interact.

## **8.2 The nature of the evidence: features of the ECCEP database**

If the analysis methods constitute the tools of evaluation in the thesis, the ECCEP sample represents the raw material to which they were applied. It is therefore also important, when considering the limitations and strengths of the analysis presented in the thesis, to reflect on the main features of the data analysed.

### ***8.2.1 The ECCEP sample: a cohort of new recipients of care***

Chapter 3 demonstrated the broad national representativeness of the 10 local authorities in the ECEP study, as well as that of the users included in the sample. Nevertheless, it is important to note that the ECCEP sample is made up of a cohort of new recipients of community care, and is not therefore representative of the population of older people *as a whole*. Consequently, analyses using the ECCEP sample cannot by definition inform about the likely consequences of providing services to older people not currently in receipt of care. This is because (i) the results presented only apply to older people with the characteristics of the ECCEP users, and users not in receipt are likely to be less disabled and (ii) every member of the sample is in receipt of some form of formal support, and the analysis therefore cannot identify the potential effect of ‘*any contact*’ with services. This point is of particular relevance when considering the implications of the thesis for the debate about the

appropriateness of concentrating social care resources on the most dependent older people. Indeed, whereas the thesis provides valuable evidence about the benefits of alternative distributions of resources between different types of older people in receipt of services, it cannot comment on the benefits of extending the provision of care to new types of clients.

### **8.2.2 *A limited sample size***

Despite relating to data collected in 1995, the ECCEP database still constitutes one of the most comprehensive sources of micro-level evidence on the impact of community care services on older people in England. Nevertheless, as mentioned in Chapter 3, the database has some important limitations in terms of the size of the sample, and the nature of the indicators collected.

The ECCEP sample is relatively small in size. It contains 425 cases at time 1, and fewer by the time of the second round of interviews, when data on outcomes was collected (see Appendix Table 3.2 for a full description of time 2 sample sizes). The limited size of the sample is particularly important due to the inherent heterogeneity in the characteristics of the population of older people in receipt of services, and therefore of the need stressed repeatedly in previous chapters to control for user sub-group patterns. The combination of a small sample on the one hand, and the risk of estimation bias identified in Chapter 2 associated with failures to control for subgroup effects on the other, meant that the modelling process had to strike a balance between (i) minimising the danger of over-fitting the data due to the definition of sub-groups with too few numbers, and (ii) reducing the danger of model misspecification associated with the failure to control for heterogeneity in the characteristics of cases. As a compromise, the analysis did not consider subgroups of less than 15 cases (less than 15 per cent of subgroups defined in the analysis actually included less than 30 cases). In addition, due to the reduced number of cases overall, the analysis included in the final results those effects with a significance level of 10 per cent or less (the majority of effects, however, were found to be significant at the 5 per cent level).

Throughout its exposition of the results, the thesis has reflected the varying uncertainty surrounding the coefficients estimated by reporting their confidence intervals, and for the estimates of productivities, by stating in the results tables and their illustrative figures the proportions of the sample and of recipients of the service in question affected by each

productivity effect described. In addition, the analysis endeavoured to appraise the reliability of the estimated coefficients by triangulating between the different results obtained; that is, by comparing across outcomes and/or across services whether similar patterns were reproduced systematically. Reassuringly, the results show significant consistency across the thesis. Chapter 6, for instance, noted the primary and systematic roles played by physical and mental disability factors in mediating the effect of service productivities across the twelve outcome measures explored in the analysis. A similar triangulation of the evidence for the optimisation results is presented in the following, concluding chapter.

### ***8.2.3 Limitations in the definition of outcome indicators***

Chapter 3 noted that many of the ECCEP study design features were replicated from its pre-reform prequel, the DCP study, in order to achieve broad comparability between the two sets of results. Consequently, in addition to the choice of local authorities participating in the study, the selection of many of the indicators in the ECCEP dataset was constrained by those already existing in the DCP data.

Hence, the indicators of user satisfaction with levels of services (USATISF), with services' contributions to personal care (IMPADL), to instrumental activities of daily living (IMPIADL) and to chances to socialise (SATSOC) were constructed as simple 5 or 10-level subjective rankings ranging from extreme dissatisfaction to extreme satisfaction. It is therefore likely that by using more appropriate indicators, and particularly utility-based indicators (see for instance Netten, Francis, Jones, Bebbington, 2004) the results would have been capable of describing with greater sensitivity the production of welfare relationships investigated in the thesis.

## **8.3 Policy implications and the results of thesis**

Overall, the relatively large amount of uncertainty surrounding the set of coefficients estimated due to the issues discussed above reaffirms the importance of interpreting the patterns depicted in the results globally, as broad-brush paintings rather than exact descriptions of the production of welfare process. It is therefore important, when examining

following three broad propositions:

***The implications of the results are relevant primarily at the aggregate level.***

The aim of the production function and optimisation analyses was not to develop a tool capable of designing and allocating optimum care packages to older people in different circumstances, a sort of magic recipe guide for maximising the welfare of users and carers in different circumstances, given different budget levels and welfare objectives. Instead, the aim was to derive broad evidence which could inform higher level system planning and monitoring, about what, how and why improvements in welfare are achieved by different interventions in the face of resource constraints.

***The results are characterised by wide confidence intervals, and can only hint at broad policy directions.*** Even when interpreted at the aggregate level, the estimates are surrounded by large confidence intervals. Particular emphasis should be given to patterns which are found systematically across sets of results, such as across outcome indicators or service indicators.

***The set of results are therefore principally about hypothesis forming.***

The results presented ought to provide a useful basis for the development of hypotheses for further studies, by providing a first comprehensive set of estimates of the key relationships in the production of welfare process in post-reform community care for older people. These ought to be further tested and refined using larger samples.

## 9 POLICY IMPLICATIONS

The aim of the present chapter is to relate the findings of the optimisation analysis in Chapter 7 to those of previous chapters, in order to provide an overview of the implications of the thesis for judging equity and efficiency in the allocation of post-reform community care services.

The structure of the chapter mirrors closely that of the thesis itself. Hence, Section 8.1 provides a short overview of the policy context of the community care reforms, in order to recall their policy objectives in broad terms. The findings of the utilisation analysis are reviewed, with particular attention to the evidence on the extent to which allocations are needs-led, and the system's vertical and horizontal targeting efficiency. Although valuable in its own right, the analysis of utilisation can only provide a partial view of the care system's degree of equity and efficiency, as it does not demonstrate the final impact of services on the welfare of users and their carers. Hence, Section 8.2 summarises the evidence in Chapters 5 and 6 about the service contributions to key welfare outcomes. Building on such evidence as well as on the optimisation results in Chapter 7, Section 8.3 sets out the main recommendations in the thesis for improving performance in community care services.

### 9.1 Targeting resources in the post-1993 community care system

The objectives of the community care reforms were ambitious. Lacking a long-term commitment to significant increases in expenditure, their success relied almost entirely upon achieving substantial changes in the patterns of targeting of services<sup>47</sup>.

The reforms introduced by 'Caring for People' followed a period of significant criticisms both from public bodies such as the Audit Commission and academics in the field about the

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<sup>47</sup> In real terms, community care expenditure levels increased less than 13 per cent in the period 1994 to 2003.

lack of rationale in the allocation of services. In addition to obvious equity implications, inefficiencies in the targeting of community care resources were perceived to be hampering the effectiveness with which services contributed to the welfare of older people and their carers. Chapter 1 has described how, in addition to abolishing the social security funding arrangements for residential care, the reforms focused on improving the matching of services to needs, thereby concentrating resources on the neediest cases, with the overarching objective of reducing the risk of institutionalisation. The danger, as pointed in Davies et al (1990) was that if service productivities were not improved, the net effect of the reforms would be to take away valued (if not highly effective) services from large number of recipients without achieving significant gains in welfare.

Looking at Figure 9.1, it is easily observed that at the aggregate level, important shifts in the patterns of utilisation of community care followed the implementation of the reforms in 1993<sup>48</sup>. In particular, the figure depicts both striking reductions in the number of households receiving home care from 1994 onwards<sup>49</sup>, and a sharp increase in the number of hours provided, particularly up to 1996. However, whereas the patterns in Figure 9.1 demonstrate significant increases in the average intensity of home care packages following the reforms, they do not provide evidence about the individual-level nature of the post-reform targeting patterns, and about the extent to which they conformed to the expectations laid out in the White Paper. As noted in Chapter 1, these included:

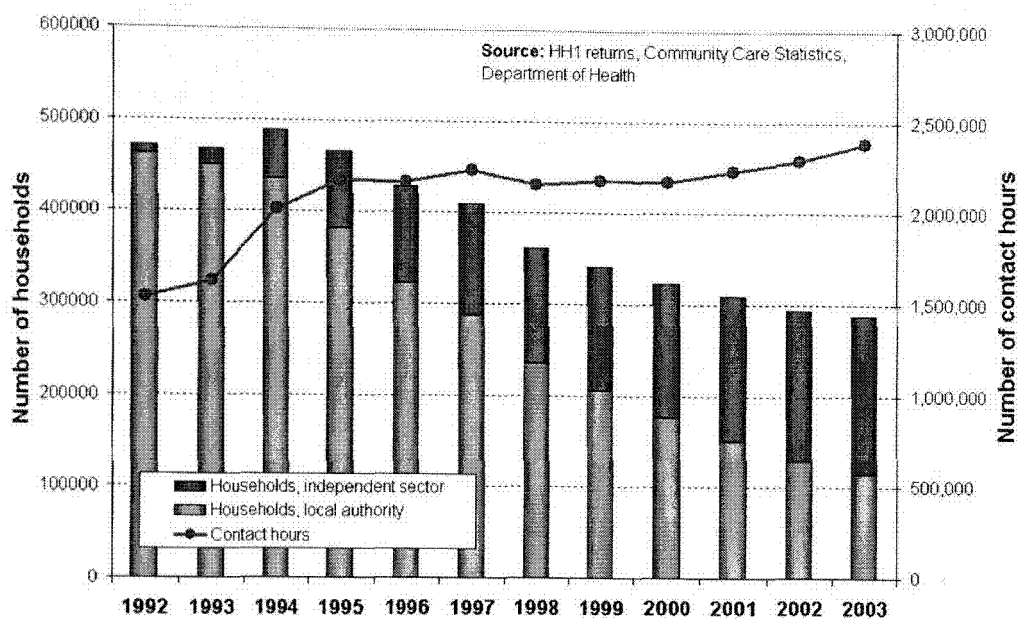
- needs-led services, whereby targeting patterns exhibit a high degree of horizontal and vertical targeting efficiency
- the prioritisation of support with personal care needs
- the provision of effective support for caregivers.

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<sup>48</sup> The figures in Figure 9.1 are based on the HH returns, which are provided by the Department of Health grouped for all client groups. The figures for older people are derived by applying expenditure weights based on expenditure returns (EX returns). Due to a lack of data, the 1994 weights were applied to 1992 and 1993 periods.

<sup>49</sup> The small increase in the numbers of home care clients between 1993 and 1994 has been linked to the transfer of social security funds for residential care to local authorities (Lewis and Glennerster, 1996).

**Figure 9.1 Number of older people households receiving home care by sector of provision and number of contact hours in England: 1993-2003**



### *Horizontal and vertical targeting efficiency*

Overall, the results in Chapter 4 confirm the existence of significant relationships between the allocation of services and a wide range of indicators of need, including physical functioning, physical and mental health problems and informal care-related factors. Compared with the results of similar analyses in the pre-reform era (for instance Davies et al. 1990; Social Services Inspectorate 1987; Webb and Wistow 1987), which showed little correlation between needs and services, the evidence in the thesis seems therefore to suggest a degree of improvement in the targeting process. Post-reform care packages appear to be significantly more ‘need-led’, and the targeting process significantly more efficient.

However, the utilisation results also suggest that considerable further improvements in targeting could still be achieved. In particular, the results show that the effect of need-related-circumstances only accounts for a minority of the variation in the levels allocated of most services.



However, judging what proportion of the variation in service receipt should be explained by the need indicators in the analysis is a complex task. For instance, the goodness of fit of the models is likely to have been undermined by the intricacy of the relationships explored and by the limitations of the need indicators used in the analysis. ‘Technicalities’ aside, the relatively small prevalence of need effects on service utilisation patterns could also be related to differences in local preferences and/or supply factors.

Figure 9.2 and Figure 9.3<sup>50</sup> illustrate two examples of the significant national variability with respect to such factors.

Arguably, the large variability in relative prices of home care and residential care indicated in Figure 9.2 is likely to generate significant differences in local service commissioning patterns. Other things equal, local authorities faced with relatively more expensive residential care are likely to allocate more resources to home care packages. Similarly, the differences in local gross expenditure levels relative to need<sup>51</sup> depicted in Figure 9.3 (which suggest marked differences in the local prioritisation of social care services for older people), are likely to lead to significant differences in patterns of service provision, and therefore to geographical inequalities in the treatment of individuals with similar needs.

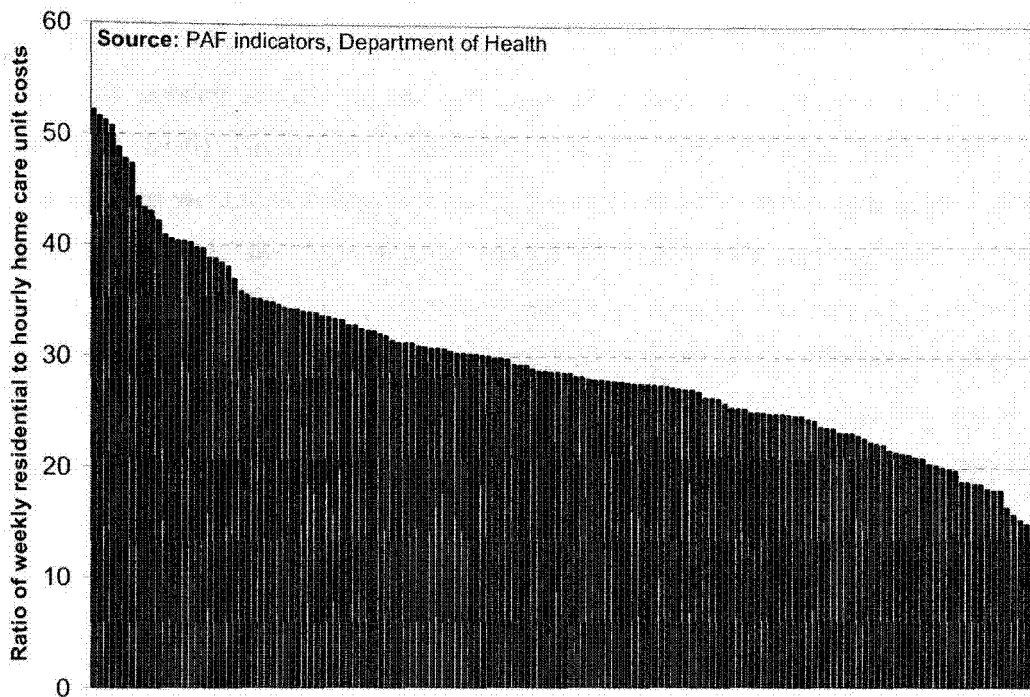
The lack of suitable data and the limited number of local authorities involved in the study prevented the analysis from exploring in detail the impact of local authority characteristics on the patterns of provision. Nevertheless, the analysis in Chapter 4 identifies a moderate degree of variability in care package intensity - controlling for need-related factors - across the 10 local authorities in the study, thus suggesting that local factors do play an important role in explaining differences in service allocation patterns.

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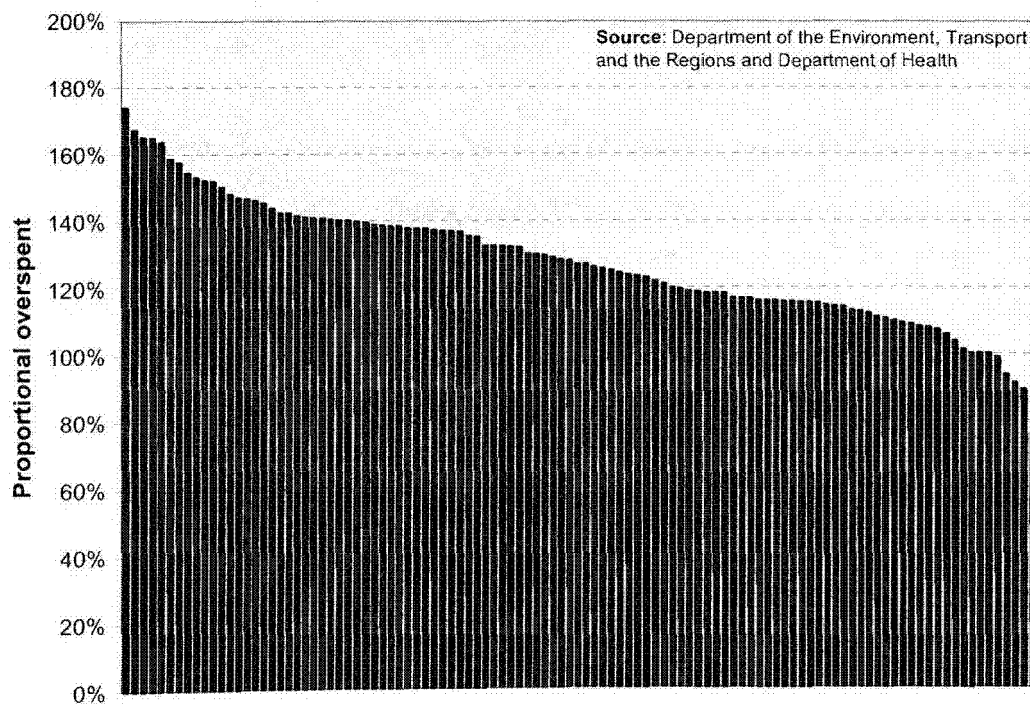
<sup>50</sup> Both figures are drawn using the closest available data to the time of the collection of the data for the study.

<sup>51</sup> This is indicated in the figure by the overall level of gross social care expenditure relative to the Standard Spending Assessment [SSA] grant level. The SSA for social services for the elderly estimates the grant allocated by central government to local authorities destined to the provision of social care services. The 1995-96 SSA included provision for residential care, day care, meals on wheels and home helps as well as relevant social work and administration costs. It was estimated using indicators of local need such as: socio-demographic indicators, rates of long-term illness, household composition and household tenure. An Area Cost Adjustment [ACA] factor was applied to account for the varying costs of providing a service in different areas.

**Figure 9.2 Ratio of residential care (weekly) to home care (hourly) unit costs across English local authorities: 1998-1999**



**Figure 9.3 Ratio of social care gross expenditure on older people to Standard Spending Assessment across English local authorities, 1995-96**



### *Assistance with personal care*

The provision of support with personal care needs is of central importance to understanding the interrelationship between community health and social care inputs. The period following the publication of the 1990 Care Act saw a significant reduction in the involvement of community nursing services in the provision of support with personal care (Lewis and Glennerster 1996). Given their traditionally 'residual' role vis-à-vis health care services, social services were forced to step in to fill the shortfall in provision thus generated (Lewis 2001). As a result, due to budgetary constraints, home care services were exhorted to concentrate their efforts on the personal aspect of care, and to reduce assistance with instrumental activities of daily living (Twigg 1997). The analysis in Chapter 4 explored some of the consequences of such historical developments by comparing the factors associated with the provision of home and district nursing care inputs in order to understand the nature and extent of differences in the support provided by the two services.

The results provide mixed evidence about the extent to which, by the time of the data collection, the redistribution of tasks between home carers and district nurses had taken place. In terms of home care inputs, the results identify significant effects of both health problems and IADL functioning on the levels allocated of the service, thus suggesting that home carers provide support with both personal and domestic tasks. The evidence regarding nursing care inputs appears equally ambiguous, as the service levels provided are found to increase significantly with both health and ADL problems.

Overall, the results do not suggest therefore strict demarcations in the caring functions of district nurses and home care workers, which appear to have retained, respectively, some of their original role as providers of domestic and personal care support. The relative balance between the different caring functions, however, is difficult to assess from the patterns of utilisation described in Chapter 4, because of the risk associated with interpreting at face value the effect of indicators which might be acting as surrogate markers for combinations of factors<sup>52</sup>.

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<sup>52</sup> This uncertainty in the interpretation of effects, ubiquitous across social care analyses, is due to the high degree of correlation between indicators of need. Fernández, J-L., and M. Knapp. 2004. "Production relations in social care." in *Long-Term Care: Matching Resources to Needs*, edited by M Knapp, J-L. Fernández, A Netten, and D Challis. Aldershot: Ashgate..

### *Community care services and informal carers*

Chapter 1 noted the particular attention paid to the role of informal carers by the 1989 White Paper and subsequent legislation (Department of Health 1989; Department of Health 1995; Department of Health 1999). As a result, Chapter 1 argued, the government's discourse about informal carers has evolved from a view of informal carers primarily as providers of support for dependent older people to a view which acknowledges their entitlement to a full assessment of their needs and their potential role as co-users of the services.

Overall, the large number of informal care-related effects identified in the analysis in Chapter 4 suggests a rich interplay between formal and informal inputs. Their existence certainly contradicts the assumptions implied by Twigg's 'superseded' carer model, whereby assessment processes would disregard informal support networks when setting-up care packages (Twigg 1992b). Instead, the results indicate that the recognition of informal carers by formal services as 'resources', 'co-workers' or 'co-clients' depends on the circumstances surrounding the case.

In particular, the results show that the levels of formal support (particularly from day care and respite care) increase in situations where carers most require it: when they suffer from very significant levels of stress, and when the caregiver is either the spouse or co-resides with the user (such carers typically suffer from the greatest levels of stress and are most likely to be physically dependent themselves). The analysis in Chapter 4 also suggests, however, that formal resources are generally lower, other things being equal, when users benefit from high levels of informal care support, and particularly with housework or shopping tasks.

It is likely that a strong component of the motivation to provide support for informal carers responds to instrumental concerns and the need to sustain the provision of informal care inputs. Nevertheless, the overall picture depicted by the results differs therefore significantly from the pre-reform situation described in Pickard (2001) whereby local authorities would tend to treat informal caregivers purely as resources and to assume that no support was required where informal inputs were being provided.

## **9.2 How much do services contribute to users and carers' welfare?**

The rationale for extending the analysis beyond service utilisation and exploring directly the contribution of care packages to final outcomes lies in the fact that service levels do not exhibit simple, homogeneous linear relationships with welfare outcomes. Indicators of service provision therefore represent at best imperfect proxies of service contributions to the welfare of users and their carers.

However, as Chapters 5 and 6 have highlighted, assessing the performance of services in terms of their contribution to final outcomes is marred by complications, generated by factors such as

- the overwhelming influence of NRCs on outcome levels
- the lack of clear policy statements about desirable combinations of outcomes for users and carers with different need-related circumstances
- the existence of significant mediating effects of NRCs on service productivities and of returns to scale and complementarity effects.

### ***9.2.1 The overwhelming influence of need factors on outcomes***

The productivity results confirm the main hypothesis in the weak proposition of the Production of Welfare framework introduced in Chapter 2: consistently, for all outcome indicators explored, services appear to play a secondary role in explaining outcomes relative to the influence exerted by need factors. As a result, the sample average contribution of services to outcomes across the twelve indicators explored in Chapters 5 and 6 is estimated to account at most for one third of the levels observed. Whereas it is hardly surprising that services only explain a small proportion of the variation in indicators such as 'days spent in the community' or 'levels of caregiver stress', the pervasiveness of the influence of need factors is such that the same phenomenon is observed for indicators directly defined in terms of the effect of services, such as the indicator of satisfaction with the services received.

The dominance of need factors over variations in outcomes has important implications. In particular, it suggests that estimations of the impacts of services on users' and carers' welfare based on raw outcome indicators are likely to be significantly biased. In some cases, such as for 'days in the community' or 'caregiver stress', the influence of need effects is such that the results actually imply a negative correlation between raw outcome indicators and levels of services contributions to welfare (see Figure 5.3 and Figure 5.35). In those examples - as for the vast majority of outcomes explored - judging service performance across cases by observing final outcome levels (and thus not discounting for the influence of need factors) therefore provides a completely erroneous picture of actual service contributions to welfare.

At the aggregate level, the dominance of the effect of NRCs on outcomes also has important implications for the design of performance monitoring systems. Indeed, the significant heterogeneity in need across English local authorities (Leyland 2004; Social Exclusion Unit 2005; Woods et al. 2005) is likely to be responsible for a significant amount of variation in local performance. In fact, the relevance of controlling for local circumstances has been recognised to some extent in the design of social care performance indicators [PI] relating to unit costs (Commission for Social Care Inspection 2004). For such indicators, the definition of the ranges associated with the five different levels of performance (the performance 'bands'), has been modified to take into account which of the four Area Cost Adjustment<sup>53</sup> [ACA] groups a local authority belongs to.

'As costs vary across the country, different bands are set for each group of councils rather than a single set of bands being set for England as a whole' (Commission for Social Care Inspection 2004, p. 219).

But the results in Chapters 5 and 6 indicate that controlling for local demand factors when developing measures of local performance is as important as accounting for supply conditions. That is, in the same way that assessing service contributions to outcomes for individual users requires accounting for the influence of need factors, understanding the relative performance of local councils through the use of PIs requires discounting the effect

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<sup>53</sup> The Area Cost Adjustment factors were designed for the purpose of adjusting central grants to Local Authorities for the varying costs of providing a service in different areas. Overall, English local authorities are grouped into four ACA clusters.

of variations in local socio-economic and other need characteristics. For instance, local circumstances would be expected to generate large variations in the rates of ‘admissions of supported residents aged 65 or over to residential/nursing care: supported admissions of older people to permanent residential and nursing care per 10,000 population aged 65 or over’, the key PI designed to measure institutionalisation (Commission for Social Care Inspection 2004, p. 219). To the extent that factors such as demographic characteristics, local deprivation levels, rates of disability, housing tenure and household composition are not incorporated in the definition of the PI, or their influence discounted through the use of regression-based methods, establishing performance on the basis of the raw values will provide a distorted picture of the relative achievements of authorities.

To some extent, it could be argued that the effect of variations in local need on performance indicators are limited by the fact that larger grants are allocated to local authorities faced with greater need. However, such a compensating mechanism is unlikely to fully account for the variability in local need. First, services cannot be expected to achieve (or even to aim for) equality of final outcome across all clients, because of technical feasibility and cost-effectiveness constraints. In many examples of outcome indicators, as mentioned above, users in the critical interval need category or with severe cognitive impairment were predicted to experience worse outcome levels, despite the fact that (i) they receive much greater levels of resources and (ii) it is for them that services make the greatest contributions to outcomes. Secondly, a large component of expenditure is financed by locally raised funds, the size of which is highly variable (see Figure 9.3) and is linked to many factors in addition to local need (Powell and Boyne 2001). In as far as variations in expenditure are part of the ‘democratic accountability’ ethos of local public services, outcome levels should not be expected to be equal across local authorities.

Overall, however, probably the most important factor explaining the adoption of raw performance indicators is the lack of information with which to discount the effect of need factors. An important implication of the thesis’ analysis is therefore the need for individual-level, geographically representative, routinely collected sources of data of the type used in the present study, which would enable local need to be incorporated into the design of performance monitoring systems.

### **9.2.2 Significant service contributions to key policy outcomes**

The analysis did not have the benefit of specific policy statements about *required* levels of outcomes, defining for instance desired lengths of stay, satisfaction levels, or reductions in carer burden for users and carers in different circumstances. The discussion of service productivities was therefore structured around two broad indicators of service impact: the level of cover of the productivity effects (COP) and the proportional service input contributions (PSIC). In terms of both COP and PSIC levels, the results in Chapter 5 and 6 are generally compatible with a view of community services that are successfully producing benefits of central policy relevance for substantial proportions of users. However, the results also point up important shortfalls in the effectiveness of services with respect to arguably more peripheral outcome dimensions in terms of reform policy, particularly improvements in morale and opportunities to meet people and to socialise.

Significantly, the best performance was identified for the two outcomes argued in Chapter 1 to represent the main priorities of the reforms - reducing institutionalisation and improving caregiver welfare. For these two indicators, services were found to achieve substantial PSIC levels and their effect estimated to cover the vast majority of service recipients. Other key outcome indicators for which the results suggest substantial and widespread improvements include the user's sense of empowerment, improvements in IADL and ADL functioning and satisfaction with services.

These patterns are in sharp contrast with descriptions of the pre-reform system. Particularly, the application of similar methods to closely comparable evidence during the mid 1980s identified significantly weaker and much less prevalent service productivity effects (Davies et al. 1990). Based on the Domiciliary Care Project (DCP) study introduced in Chapter 3, such analyses reported that approximately a quarter of the sample did not benefit from improvements in any of the outcome indicators explored (including reduction in institutionalisation, life satisfaction, morale, and need shortfall). Six months following assessment, less than a fifth of DCP cases reported that services played a key role in enabling them to carry on living in the community. In the context of the reforms, such a widespread lack of service productivities had dangerous implications: by concentrating available resources on the neediest and reducing the numbers of recipients, the reforms ran the risk of



not achieving significant improvements in welfare while generating significant dissatisfaction because of the withdrawal of services from low-dependency cases. As the authors noted:

‘Unless large investments are made and successfully yield high returns, the implicit policy of allowing most of the increase in demand for care to be met by raising levels of community services risks serious diswelfares and concomitant political opprobrium as the inevitable scandals break’

(Davies et al. 1990, p.400).

It is therefore important to speculate about the factors likely to have contributed to the improvement of community care service productivities.

### *Changes in patterns of targeting*

The community care reforms were intended to bring about important changes in two key targeting features. First, as indicated in Figure 9.1, their implementation led to a very sharp concentration of resources on a reduced number of households. Hence, by 1995-1996, the period during which the evidence for the study was collected, the number of home care hours purchased in England had increased by approximately 40 per cent relative to 1992 levels, while the number of households receiving them had decreased by 10 per cent. In particular with respect to the goal of reducing institutionalisation, the concentration of resources on the most dependent cases may have succeeded in raising productivities simply by refocusing resources on users at greater risk of institutionalisation. The results in Chapter 5, for instance, suggest that the highest marginal productivities of the three services found to extend stays in the community, and particularly of day care and respite care services, are associated with high need cases.

Secondly, as mentioned above, the evidence on service utilisation in Chapter 4 indicates that the design of care packages in the post-reform system responds substantially to the nature of the circumstances of users and their carers. As noted by Warburton and McCracken (1999, p.25), in the post-reform system ‘there is evidence that care packages for older people living at home are more efficiently meeting needs, and that services are benefiting a wider range of people’. Despite a lack of clear rationale for the design of local case management processes (Challis et al. 1998), the centralisation of assessment and service allocation processes around

case managers is likely to have played an important part in achieving such improvements. Indeed, the evidence used to support the findings from the Royal Commission on Long Term care noted, in reference to the post-reform patterns,

‘a more planned approach to the social care of older people, facilitated by the widespread development of care management procedures’ (Warburton and McCracken 1999, p.26)

and that

‘the new funding and assessment processes have successfully enabled the development of service patterns broadly in keeping with the White Paper’s objective of enabling more people to remain in their own homes’ (Henwood and Wistow 1999, p.21).

Improvements in the tailoring of packages of care to the circumstances of users and carers are therefore also likely to have contributed to raising the contribution of formal resources to the welfare of the recipients of care.

### ***Changes in the nature of the support provided***

Providing assistance with personal care activities such as dressing and washing is fundamental to enabling very dependent older people to stay in their homes. Arguably, the concentration of home care inputs on such tasks instead of on support with IADL functioning such as housework or shopping may have increased the effectiveness of home care services in preventing institutionalisations. As noted above, it is difficult to infer from the associations between needs and services identified in Chapter 4 the extent to which home care services focused exclusively on the provision of support with personal care tasks by the time of the collection of evidence of the study. Certainly, the results suggest that home care services did provide significant support with ADL activities<sup>54</sup>.

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<sup>54</sup> More recent studies of the home care service have also noted that although multiple types of support are provided by the services, the core tasks of the service relate to personal care support, with in some instances

Overall, the wisdom of concentrating resources on personal support remains a hotly debated issue. In particular, considerable concerns have been expressed about the long term impact of depriving low-dependency users from highly valued support with IADL tasks. Such an argument has been articulated on two fronts. First, commentators have suggested that low-level packages of care may have preventive effects, by slowing down potential deteriorations in dependency. Such arguments are often couched in efficiency terms, arguing that the cost of low-level care packages may actually be offset by their buffering effect on future service consumption. For instance, Chapter 1 noted the view in *Modernising Social Services* that ‘some people who would benefit from purposeful interventions at a lower level of service ... are not receiving any support. This increases the risk that they in turn become more likely to need much more complicated levels of support as their independence is compromised. That is good neither for the individual nor, ultimately, for the social services, the NHS and the taxpayer’ (Department of Health 1998, para. 2.6). Similar concerns have been expressed in the academic literature (Clark, Dyer and Horwood 1998; Qureshi et al. 1998).

The second (related) argument in favour of providing support with IADL activities is based on the high value attributed to such support by users themselves, arising from its impact on their quality of life through providing opportunities to socialise and improving levels of morale.

‘The fact that the user is able (very slowly) to get up in a morning and get themselves to bed at night doesn’t mean they don’t get depressed looking at housework they are unable to do. To have someone there for one or two hours once a week (or more often fortnightly) was often quite a lift to their spirits.’

(Wolverhampton Pensioners' Consortium, in Nocon, Qureshi and Thornton 1997, p.7)

Indeed, there is significant evidence which confirms the importance attached by older people to receiving IADL support, and in particular assistance with housework (Qureshi et al. 1998). For instance, Clark, Dyer and Horwood (1998) have noted that the appearance of their home is particularly important to older women, as their public and private identities as competent

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home carers undertaking support with domestic tasks in their own time Francis, J, and A Netten. 2003. "Quality in home care: client and provider views." in *PSSRU Discussion Paper 2017*. Kent..

adults appear closely linked to it. In addition, they observed that the relationships older people develop with home carers can be as important as the practical assistance thereby obtained and can make it easier for them to accept such help.

Interestingly, it is precisely for outcomes related to user morale and opportunities to socialise that Chapter 6 showed the poorest service performance. Hence, the lowest observed proportional service contributions (accounting for less than 15 per cent of the variation) were observed for four of the five indicators relating to the two outcome dimensions. In addition, limited proportions of the sample appeared to be affected by the productivity effects.

### *Clarity of purpose about the objectives of the reforms*

Partly a reflection of the then dominant new managerialist culture in public services, and partly the product of delays in the implementation of the white paper, the 1993 reforms were accompanied by a wealth of policy guidance. As noted by Lewis and Glennerster (1996)

‘There was more guidance given to local authorities in interpreting the purposes of this legislation than for any other recent statute. It took the form not just of Departmental circulars but glossy manuals written by management consultants and guidance for practitioners written by the Social Work Inspectorate. There should, at least, have been no doubt what the government wanted to achieve’ (p.10).

The clarity of purpose of the reforms is reflected in the homogeneity in the prioritisation of outcomes across local authorities demonstrated in the ECCEP study. As indicated in Chapter 6, the ECCEP study surveyed the priorities attributed by 134 managers and practitioners in the 10 participating local authorities to a set of policy objectives and means listed in Appendix Tables 6.1 and 6.2<sup>55</sup>. The results of the survey showed significant consistency in perceptions across both local authorities and hierarchical levels. Overall, ‘a real chance for more users to stay at home rather than enter a care home’, ‘empowerment, choice and control over their own lives for users’ and ‘support for family carers to enable them to have respite’

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<sup>55</sup> Separately, all means and objectives were ordered between 1 and 7, given their priority (the mean or outcome perceived as most important was given a rating of 1). All means or outcomes rated in more than the 6th position were given a rating of 7.

were perceived respectively as the first, second and third most important objectives at the time of the reforms. In particular, 'a real chance for more users to stay at home rather than enter a care home' was rated as the first priority in 7 of the 10 local authorities and as either the first or close second priority in 9 out of the 10 local authorities.

Not surprisingly, the survey highlighted differences in the rating of politically sensitive means, such as the provision of mainstream domiciliary care by independent providers, or the targeting of charges on those most able to make contributions (see Appendix Table 6.2). However, it did not find significant differences in the ratings of either means or priorities between professional groups (respondents were grouped into senior managers, middle managers, and practitioners). That is, the results suggest considerable homogeneity in the perception of priorities across hierarchical levels of the social services departments, and therefore do not imply the existence of a significant 'implementation gap' (Lipsky 1980).

Overall, the evidence in the thesis about the effect of clarity of purpose of the reforms on their success in contributing significantly to the welfare of users and carers is certainly circumstantial. Nevertheless, simplicity and clarity of goals and priorities have been identified as key factors accounting for receptivity and change in health care services, and so should not be discarded as one of the sources of improvements in service productivities (Pettigrew, Ferlie and McKee 1992).

### ***9.2.3 Greater service contributions to welfare for the most dependent cases***

As important as understanding the impact of services on outcomes is evaluating the distribution of such welfare gains. Overall, the results in Chapter 5 and 6 show that for most outcome indicators the largest service welfare contributions are attained for the most dependent users and their carers (this finding is best illustrated in Figure 6.3 for the eight outcome indicators for which services were found to achieve the greatest proportional contributions). In part, such a pattern is explained by the fact that greater levels of resources are concentrated on those in greatest need. In addition, the analysis identified several features of the production of welfare process which played a key role in explaining the pattern of distribution of benefits across service users:

- heterogeneity of service productivities across outcomes and user groups
- high substitutability between services

- evidence of returns to factor effects

### *Variability in the contribution of services across outcomes and user groups*

Every one of the six services explored was found to yield benefits to all of its recipients. However, not all services yielded improvements in all outcome indicators, or for all user groups.

Overall, the findings suggest that home care, day care and respite care are the services with by far the most widespread productivity effects, and the services yielding the greatest service contributions to outcomes. Hence, the productivity effects of the three services are associated in Chapter 5 with at least ten of the twelve outcomes investigated, and involve a majority of service recipients. To a large extent, this finding reflects the much greater share of resources consumed by home care, day care and respite care (about five times the levels of resources consumed by nursing visits, meals on wheels and social work inputs). In addition, however, this pattern reflects the apparent relative specialisation of nursing inputs, meals on wheels and social work inputs on the production of a subset of outcomes. This is most evident in the case of social work inputs, which affect exclusively, yet very significantly, three of the four mental health-related outcome indicators.

In terms of intensity of contribution, Figure 6.2. confirmed the predominance of home care as the foundation of care package contributions to most outcomes. However, the results indicate that the proportional contribution of home care is reduced significantly for the most dependent cases for several outcome indicators, and especially for the indicator of length of stay in the community. Indeed, for the more dependent users or those suffering from cognitive impairment, day care and respite care services appear to contribute a similar number of 'extra' days in the community to home care, in spite of accounting for a much smaller share of care package costs.

One of the key findings of the production function modelling in Chapter 5 is the confirmation that, as hypothesised by the production of welfare framework, services appear to affect users significantly differently depending on factors such as dependency levels, the nature of informal support networks or the presence of particular health problems. Overall, only 11 per

cent of the productivity effects identified in the estimations relate to the whole sample of service users, rather than to particular sub-groups.

Such heterogeneity in service productivities has important implications for assessment. Indeed, it suggests that services which are most effective for some users may not be so for others, and therefore the need for relatively sophisticated - and potentially resource-intensive - assessment procedures: assessments which would allow the need-related-characteristics of users and carers to be thoroughly assessed, thus avoiding potentially wasteful 'standard' packages of care.

Since the reforms, the government has placed considerable effort on the development of improved (and nationally consistent) assessment processes, particularly through the proposals contained in the Single Assessment Process [SAP] (Department of Health 2001; Department of Health 2003a). In many respects, the recommendations in SAP draw from the experience of the Kent case management experiments in the late 1970s, mentioned in Chapter 2 (Challis and Davies 1986; Davies and Challis 1986). Most importantly, SAP recognises - to a much greater extent than the case management guidance in *Caring for People* - that for case management to be cost-effective, the intensity of the assessment process needs to match the need-related-characteristics of users and carers. Indeed, one of the conclusions of the case management evaluations in the 1970s had been the need to target appropriately intensive assessments (the most input-intensive form of assessment), particularly on users at high risk of institutionalisation (Challis and Davies 1986; Davies and Challis 1986).

There is considerable evidence that, following the implementation of the reforms, the design of case management arrangements at the local level has lacked a clear overarching logic. with 'service users with similar needs but in different local authorities [having] very different experiences of the care management process' (Challis et al. 2002; Weiner et al. 2002, p. 436). Government has therefore concentrated its efforts on providing an overall framework within which local assessment structures can be developed. Crucial to such a framework is the development of differentiated care management services, with different levels of care management becoming linked to four broad types of assessments (contact assessment; overview assessment; specialist assessments; and comprehensive assessment). Starting from the collection of basic personal information, the length and breadth of the assessment would therefore depend on whether the assessor identifies problems such as 'evidence of

forgetfulness, disorientation, tearfulness, imbalance or mobility needs, sensory needs, relationship difficulties, and the like' (Department of Health 2003b, p.14). Overall, depending on the nature of the case, the SAP therefore recommends the exploration of up to 9 domains and 36 sub-domains of user and caregiver needs, compatible with the factors identified as determining levels of service utilisation and as mediating service productivity effects.

In fact, despite the very high prevalence of user-subgroup effects, the results of the 12 production functions suggest a reassuring degree of consistency in the nature of the mediating effects across outcome indicators. Compared to the substantial list of potential markers whose effects were explored (reported in Appendix Table 3.1), only a moderately small number of factors are found to discriminate between the effects of services. Overall, dependency and informal care-related factors appear the most prevalent mediating factors, particularly for home care and meals on wheels, the two more 'traditional' types of services. For day care and respite care (the 'newer' services), other important mediating factors relate to the effect of mental health-related factors.

#### ***Complementarity and substitutability between services***

The specification of the production function models in Chapter 2 argues that a key factor likely to shape service contributions to welfare is the degree and nature of the interaction between service effects. It defined two types of interactions: complementarity effects, whereby the impact of services depends on the levels of other services allocated; and input substitutability effects, indicating the degree to which a given improvement in outcomes can be achieved by different combinations of services.

Largely, the results reject the existence of strong complementarities between services (approximately 10 per cent of effects implied service complementarities). In contrast, they suggest a high degree of substitutability (almost 4 of the 6 services explored showed significant independent effects per outcome indicator). In other words, services appear to operate largely independently of one another.

The policy relevance of the lack of complementarity and the existence of significant substitutability between services is two-fold. At the individual case level, it implies the absence of 'magic' recipes of particularly effective combinations of services, and therefore the existence of greater opportunities for care packages to match the needs of particular cases.



That is, the evidence suggests that a wide range of alternatives are open to care managers when designing care packages to produce desired levels of outcomes. Secondly, at the local authority level, the observed patterns imply fewer restrictions for those engaged in service commissioning. As a result, the mix of services provided should be able to reflect, for instance, the relative local prices of services. Using economic terminology, the lack of service complementarity, coupled with significant service substitutability, would be expected to translate into a local demand which is significantly *elastic* to changes in the prices of individual services.

Although the evidence clearly points towards the existence of very limited complementarities between services, it is also worth noting that this finding may be due to limitations in sample size and to a relatively narrow service range. Indeed, given that about two fifths of the users in the sample received exclusively one of the six services explored, care packages containing particular combinations of services may not have been observed in sufficient numbers to allow their effect to be identified in the production functions. Also, the fact that one third of the district nursing effects identified involved other social care services does suggest the need for effective coordination between community-based health and social care services.

### *The patterns of returns to factor*

Chapter 2 observed the critical implications of the patterns of returns to factor for the benefits derived from concentrating resources – either on particular users or on particular services – and therefore for designing targeting policies and care packages. Overall, while the nature of returns to factor can vary across services and outcomes, the large majority of productivity effects identified in the thesis exhibit either diminishing or constant returns to scale. Of particular policy interest are the patterns exhibited by day care and home care services.

The results in Chapter 5 show that day care services yield significant and widespread contributions to welfare for most outcome indicators. However, for a majority of such effects, the results suggest that marginal returns fall sharply as levels of provision increase. As argued in Chapter 6, this finding is likely to be due to users' feelings of frustration at being 'trapped' in a day care centre, when utilisation levels of the service are high. In the words of a day care service user,

'There's nowt wrong about the place don't get me wrong, but you get a bit bored'.  
(Bamford and Bruce 2000, p. 555)

The very significant impact of caregiver stress and cognitive impairment on day care utilisation, identified in Chapter 4, suggests that very high levels of provision of the service might often be primarily aimed at improving the welfare of caregivers, rather than at maximising user satisfaction. Nevertheless, the literature has demonstrated that many carers recognise this tension and experience a sense of guilt when users spend large amounts of time in day care (McLaughlin and Glendinning 1994; Pickard 2004; Twigg 1992b). Whereas some users are likely to always remain hesitant about spending large amounts of time in day care, investments in the development of 'meaningful and relevant activities which provide service users with a sense of achievement' could therefore constitute an effective means of further raising day care service productivities (Bamford and Bruce 2000, p. 555). As the National Service Framework for older people notes

'Older people ... receiving day care should be able to participate in a range of stimulating group or one to one activities. ... Older people should be offered a choice of activities matched to their needs and preferences.' (Department of Health 2001, para. 7.11)

Not surprisingly given the high levels of the service allocated, a majority of home care effects also exhibit decreasing returns to factor. However, for a number of outcome indicators relating to user satisfaction and relational aspects of life, the marginal productivities of home care inputs are found to increase with levels of provision. This variability in the patterns of returns to factor of home care is important, because it suggests that the effectiveness of very high levels of the service depends on the nature of the outcomes intended. As noted in Chapter 6, home care is the one service allocated in sufficient quantities in a user's home for a personal relationship to develop between the front line practitioner and the service user. So whereas it is not surprising that the marginal effects of home care may decrease rapidly for outcome indicators such as the length of stay in the community or levels of functioning, providing high levels of home care may allow highly valued personal user/carer relationships to grow.

What emphasis is placed on social rather than functional aspects of care is likely to depend crucially on the balance of power between users, carers and front line professionals during the setting-up of the care package. This fact is particularly important in the context of the strong emphasis placed by the labour government on promoting direct payments for older people. In the words of the minister with responsibility for older people's services, the government expects the expansion of direct payments to lead to 'a fundamental shift in the balance of power between professionals, services and those accessing them' (Ladyman 2004).

Significant changes in the allocation of resources are likely to follow. In particular, the available evidence strongly suggests that older people in receipt of direct payments commission inputs almost exclusively from personal assistants, at the expense of other services such as day care (Clark, Gough and Macfarlane 2004; Glasby and Littlechild 2002). In addition, such inputs are often employed for tasks precisely of the type which the community care reforms implied should not be emphasised, such as assistance with domestic tasks or shopping.

Empowering older people by placing them at the helm of the commissioning process can be applauded. However, without the commitment of significant additional resources to community care, it is possible that the significant expansion of direct payments for older people will bring about important changes in the balance of outcomes achieved. Particularly, the likely changes in the nature of the services provided may result, for the reasons just outlined, in a trade-off between the system's performance with respect to user satisfaction and to the goal of reducing institutionalisations. The potentially significant resource implications of increasing direct payments is recognised for instance in the 2005 Green Paper '*Independence, Well-being and Choice*', which states that

'giving people greater control over how their needs are met and the services they require raises genuine concerns about whether greater pressures will be placed on existing budgets'. (Department of Health 2005a, para. 6.9)

### *Service contributions to welfare and average care package productivities*

To a large extent, the higher service contributions to welfare observed for the more dependent users relate to the fact that, as the utilisation analysis shows, more dependent users receive more resources. However, the discussion above has highlighted that the extent to which resources translate into welfare improvements for users and caregivers depends crucially on the effectiveness of the care packages provided, and therefore on factors such as the mediating effect of need-related factors and the patterns of returns to factor exhibited by services. An important question for judging equity and efficiency in the system is therefore the extent to which the observed distribution of welfare contributions responds primarily to variations in resources or to differences in the effectiveness of care packages.

In that sense, the results in Chapter 6, which show a clear negative correlation between service contributions (greatest for the most dependent cases) and the average productivity of care packages, beg important equity and efficiency questions of the observed resource allocation process. Indeed, the evidence indicates that the levels of services allocated to cases of high dependency exceed those that would be implied by allocation policies aimed at maximising aggregated outcome levels, and so that they can only be justified on the grounds of differences in the prioritisation of cases. Investigating the extent to which the observed distribution of resources can indeed be justified on equity grounds was the primary objective of the optimisation analysis.

### **9.3 Improving equity and efficiency in community care: implications from the optimisation analysis**

Chapter 2 hailed the optimisation analysis as the ultimate tool for judging equity and efficiency in the allocation of resources: based on the estimated production functions, and given a set of constraints about the availability of resources, optimisation methods illustrate either how to maximise outcome levels from available resources, or how to minimise the cost of achieving some desired outcome targets. In the thesis, however, the optimisation analysis has been limited by the lack of information with which to define reliably an aggregate social welfare function incorporating the relative valuation of outcomes for different users and caregivers. As a result, optimisations have been carried out separately for each of the twelve

outcome indicators available, with the aim of achieving the maximum possible aggregate level of each individual outcome. While highlighting what changes would be required for improving performance with respect to the different outcome dimensions, the 'single output maximand' assumption implies a degree of ambiguity in the interpretation of the optimisation results. Broadly speaking, such ambiguity springs from the fact that differences between observed and optimum outcome levels (and between observed and optimum care packages) can be construed either as evidence of inefficiencies in the allocation of resources or as the result of implicit equity prioritisations. Significant underachievement with respect to the maximum attainable levels of a given outcome for a certain user group, for instance, could be assumed to indicate:

- that inputs have been used inefficiently, and that more of the outcome could have been achieved with the available resources
- that more of the outcome was not achieved because resources were used for the production of higher levels of the outcome for other users for whom the outcome was more highly valued, or for the production of other more valued outcomes for the user group in question
- a combination of the two.

Deriving policy implications from the results of the optimisation analysis therefore requires the observer to take a stance about to the nature of the differences between observed and optimum patterns.

### ***9.3.1 The world upside-down: the system's implicit prioritisation of outcomes and users***

This section examines the policy implications of the optimisation results assuming that the observed allocation of resources is optimal, and therefore that the optimisation solutions are purely indicative of the system's prioritisation patterns. Its rationale stems from the differences observed in Chapter 7 between the optimum care packages associated with the maximisation of the different outcome indicators. As indicated above, the existence of such differences means that apparent inefficiencies in the allocation of resources with respect to individual outcomes can in fact reflect the need to improve particular combinations of outcomes or to prioritise the production of different outcomes for different users. In addition, even if the observed distribution of resources was to originate primarily from inefficiencies in

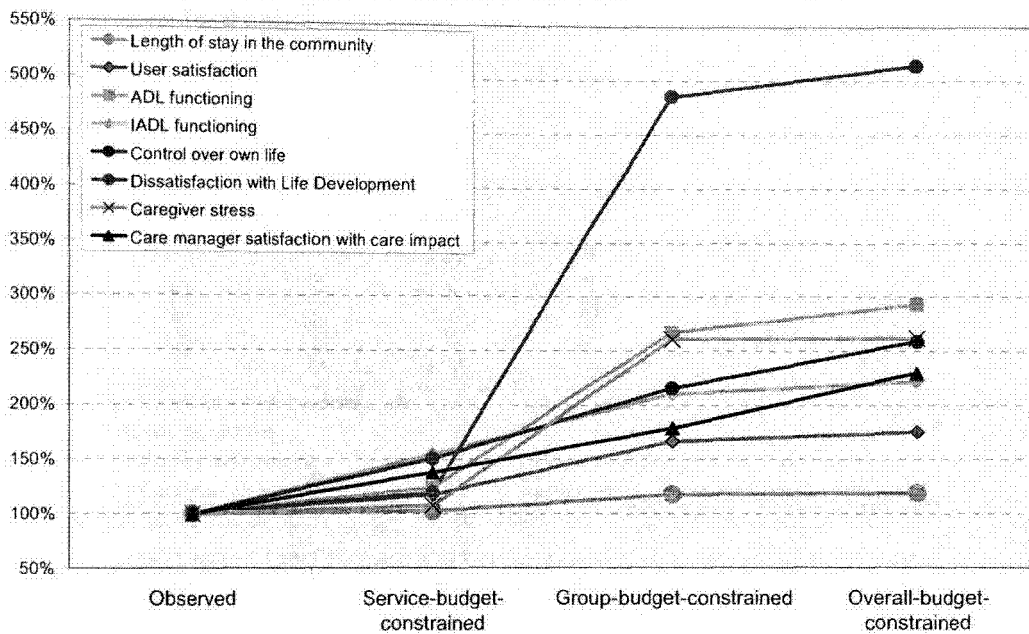
the allocation process, assuming such a perspective allows the analysis to consider explicitly the equity biases thus derived. As noted in Chapter 2, this exercise amounts therefore to testing the degree to which the system's implicit prioritisation of cases and outcomes succeeds in passing the 'test of intuition' (LeGrand 1991, p.41).

The process used for deriving implicit equity valuations from observed patterns makes use of the fact that the degree of prioritisation of a given outcome dimension is likely to be reflected in the extent to which the system utilises resources in order to produce its maximum achievable levels. In other words, the analysis assumes that because of the emphasis placed on them, the levels of highly valued outcomes would not be increased, following optimisation, to the same extent as those of less valued outcomes. As a result, the analysis assumes the implicit ranking of outcomes to follow inversely the ranking of proportional increases in outcomes following optimisation.

#### *A system focused on reducing institutionalisation*

Figure 9.4 depicts proportional gains in aggregate outcome levels following optimisation for the eight outcome indicators explored in Chapter 7. Clearly, regardless of the optimisation scenario postulated, the figure confirms 'length of stay in the community' as the outcome indicator with the smallest proportional increase following maximisation, and therefore as the outcome with the highest overall implicit valuation. Such a 'revealed' preference for keeping users in the community appears to be highly compatible with the stated preferences of managers and practitioners in the 10 ECCEP local authorities discussed above, who rated consistently such an objective as the central goal of their departments at the time of the reforms. Although the results may be partly due to the presence of decreasing returns to scale, which cause marginal improvements in length of stay to be increasingly difficult, the clarity of the patterns suggests them to be the product of more than just the nature of the output's production relations. Furthermore, their significance is underlined by the sharp falls in length of stay associated with the optimisation of most other outcome indicators, and highlighted in Chapter 7's collateral outcome figures. The focus on reducing institutionalisation in Caring for People, it thus appears, has been translated to a very large extent into practice.

**Figure 9.4 Proportional gain in aggregate outcome levels following optimisation**

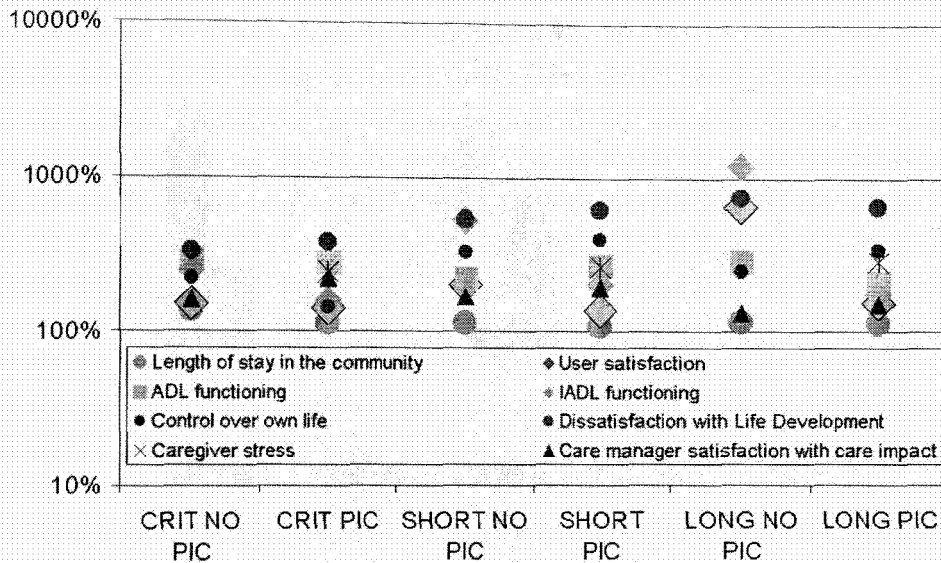


Together with length of stay in the community, improving user satisfaction with services also appears as a consistently highly valued outcome dimension. For other outcomes, however, their implicit degree of prioritisation depends on the optimisation scenario, and most significantly on whether the aggregate supply of services is constrained to its observed level. Hence, whereas the indicator of reductions in caregiver burden appears as the system's second implicit priority in the service budget-constrained scenario, it becomes one of the least prioritised objectives in the other two optimisations. As for dissatisfaction with life development, such a change is primarily due to the effect of changes in the availability of social work inputs.

As indicated in Figure 9.5, the patterns of prioritisation between outcomes do not vary significantly across case types<sup>56</sup>. In particular, for each of the six case types postulated, extending days in the community clearly appears as the outcome with the highest implicit valuation.

<sup>56</sup> The figure is only presented for the group-budget-constrained optimisation because of the complexity of the interpretation of the figures for the other two scenarios, which portray changes in outcomes following both changes in optimum input mixes and in optimum budget levels.

**Figure 9.5 Proportional gains in outcomes for different user types following the group-budget-constrained optimisation**



*A system which prioritises dependent users without informal support*

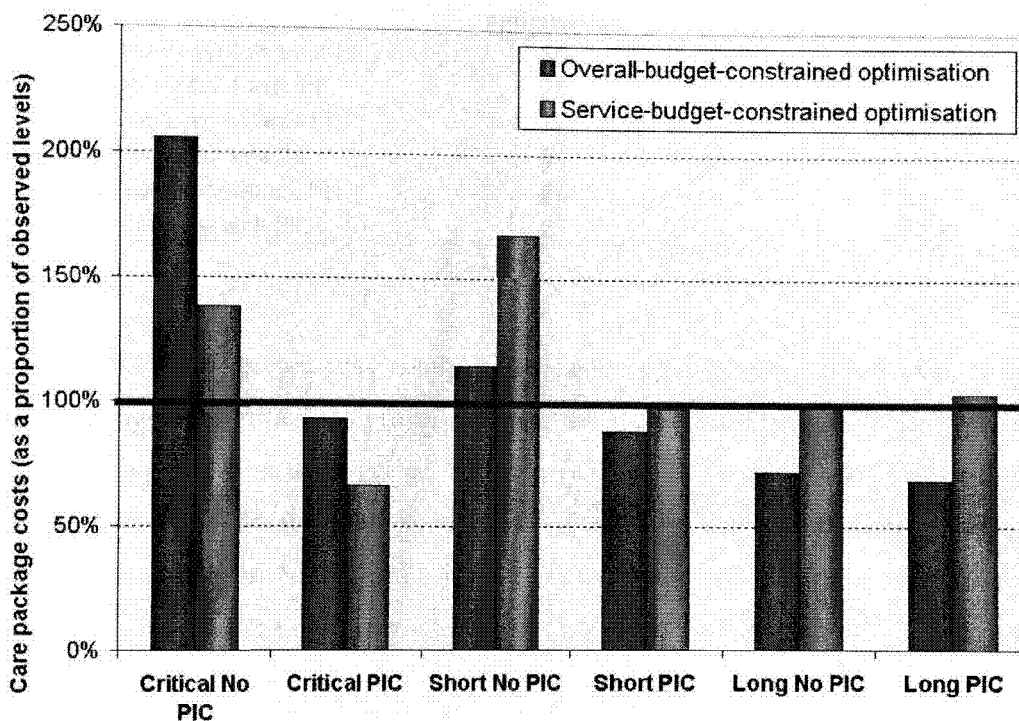
Due to the lack of an aggregate outcome indicator, the implicit prioritisation of cases is assumed to be reflected by the extent to which observed budgets exceed those that would be implied by the optimum solutions. Highly prioritised cases, it is hypothesised, would benefit from levels of resources above those implied by the efficiency criteria embodied in the optimisation process.

Following such rationale, Figure 9.6 depicts the ratio of observed to optimum care packages for different case types<sup>57</sup>. In the figure, values above and below the 100 per cent line represent, respectively, situations where the observed care package exceeds or falls short of the average of optimum care packages.

<sup>57</sup> That is, for each case and optimisation scenario, the figure reports the ratio of the observed care package to the average of the care packages derived from the eight optimisations.



Figure 9.6 Average ratio of observed to optimal budget for different user types



Generally, the implicit valuations in Figure 9.6 reflect the expected patterns, given the lower average productivities of the care packages allocated to very dependent cases. Hence, Figure 9.6 suggests that in the two optimisations scenarios which allow transfers of resources between users, maximising aggregate outcome levels implies on average significant reductions in the resources allocated to some of the medium and high-dependency cases. However, the results suggest that in addition to dependency, the implicit prioritisation of cases also depends significantly on the availability of informal support. In fact, Figure 9.6 shows that it is only critical and short interval need cases *without* informal support that experience a reduction in their average budget across optimisations. An identical pattern is reflected in Table 9.1, which indicates the *proportion* of optimisations resulting in reductions in the budget allocated to the different case types. In particular, Table 9.1 shows that a very large majority of the optimum solutions in the overall and service-budget-constrained scenarios imply reducing the budget of the ‘critical interval need without PIC’ case.

**Table 9.1 Proportion of reductions in budget for different case types following optimisation (for the eight main outcome dimensions)**

	Overall-budget-constrained optimisation	Service-budget-constrained optimisation
Critical interval need without PIC	86	71
Critical interval need with PIC	25	25
Short interval need without PIC	71	57
Short interval need with PIC	50	62
Long interval need without PIC	43	57
Long interval need with PIC	25	62

The fact that they receive consistently higher budgets than those that would be defensible purely on aggregate efficiency grounds is therefore a sign that, implicitly at least, the system is prioritising resources in favour of moderate and high-dependency users without informal support. However, if they appear as the clear implicit ‘winners’ of the observed distribution of resources, who the ‘losers’ are depends on the nature of the social care system, and specifically on whether the supply of services is assumed to be constrained.

In the face of supply constraints, Figure 9.6 implies that on average the ‘excess’ budgets allocated to short and critical interval need users without informal support are achieved exclusively by allocating sub-optimal budgets to critical interval need users with informal support. In other words, the results imply that on average the differences between observed and optimum care packages are due to transfers of resources between medium and high-dependency cases. Crucially from the point of view of the debate about the need for concentrating resources on the neediest, the observed and optimum care packages of low-dependency cases appear, on average, to be of a very similar size. If no constraints in the supply of services are assumed, however, the implications of Figure 9.6 are somewhat different. Specifically, the patterns for the overall-budget-constrained optimisation suggest that the prioritisation of short and critical interval cases without informal support is achieved at the expense of reductions in the budgets of the two low-dependency cases.

Arguably, if the system is to depart from allocative criteria based on the maximisation of aggregate welfare, it ought to do so by prioritising users in greatest need. On such grounds, the direction of the implicit equity bias highlighted by the results does not seem, theoretically at least, to be indefensible. Furthermore, the results in Chapter 5 suggest that for major outcome indicators such as ‘days in the community’ and ‘caregiver burden’ the greater

service contributions enjoyed by the most dependent cases are not sufficient to make up for the welfare shortfalls due to their higher needs.

Whereas the direction of the bias in the allocation of services could be argued to be the correct one, it is much more difficult to gauge whether its extent is equally defensible. In particular, two factors need to be explored:

- the opportunity costs, in terms of losses in welfare, implied by the ‘over-concentration’ of resources on some users
- the implications of the patterns observed for the role of caregivers in the production of welfare process, and in particular for their dual role as providers and potential co-clients of the services, with needs of their own.

#### *The role of informal caregivers in the production of welfare*

The optimisation results reaffirm previous suggestions in the analysis that services are allocated to cases with the expectation that informal caregivers will contribute significantly to improving users’ welfare. Furthermore, the evidence suggests this to be the case particularly for caregivers looking after the most dependent cases, and thus for caregivers exposed to the highest levels of stress.

As noted above, the utilisation analysis shows that whereas services provide extra resources for cases where caregivers are under significant amounts of stress, fewer resources are allocated to cases benefiting from high levels of informal support, *ceteris paribus*. The evidence in Figure 9.6 complements those findings by illustrating that amongst medium and high-dependency cases, significantly more resources relative to those implied by the optimum solution are allocated to cases without informal support. Such patterns are likely to respond to the implicit assumption that the shortfalls in welfare gains for users with informal caregivers would be compensated by the effect of informal care inputs.

Given recent progress in the recognition of the rights of caregivers to an assessment of their own needs (Department of Health 1995; Department of Health 1999), it is unlikely that the system will revert in the near future to the pre-reform view of caregivers primarily as a source of support - in the early eighties, the government position regarding informal care had been

that “care in the community must increasingly mean care by the community” (Department of Health and Social Security 1981, para. 1.9). Nevertheless, recent remarks from ministers relating to the development of a ‘New Vision for Adult Social Care’ suggest that, given the budgetary constraints faced by public services, informal support networks will be encouraged by government to remain as the principal source of support for dependent older people. This instrumental role of informal support is illustrated for instance by the questions for consultation aimed at supporting the development of the ‘new vision’, which enquire ‘what more can be done in adult social care to build the capacity of families and communities to provide care and support’, and wonder how to ensure that ‘social services support the capability and capacity that already exist in individuals, families and communities’ (Department of Health 2005, para. 1.3).

Again, it is important to stress that the results of the production functions indicate that in spite of significantly larger service contributions to their welfare, caregivers looking after the most difficult cases (very dependent users or users suffering from severe cognitive impairment) are subject to significantly higher overall levels of caregiver burden (see Figure 5.35). Particularly for the very dependent cases, the reliance on informal sources of care to provide the lion’s share of the caring efforts is therefore sometimes likely to lead to very significant and potentially unacceptable deteriorations in the welfare of caregivers. Table 9.2, for instance, shows that even excluding informal support with companionship, the average level of informal support in the sample represents approximately three times the level of support provided by home care services to critical interval need users, and approximately two times the level of home care inputs for long and short interval need cases.

So whereas it is probably right that, other things being equal, users who do not benefit from informal support receive special attention, further consideration should be given during the planning of care packages to the needs of informal carers, and particularly of those looking after the most difficult cases. This is particularly the case in the light of the very significant effects on caregiver burden identified for day care and respite care services, and particularly for social work inputs<sup>58</sup>.

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<sup>58</sup> Other studies have also identified encouraging positive effects on the welfare of caregivers of for instance psychoeducational and psychotherapeutic interventions on caregivers Sorensen, S., M. Pinquart, and P.

**Table 9.2 Hours of support per week provided by home care and PIC by interval need level of the user**

	Critical interval need	Short interval need	Long interval need
<b>Informal Care</b>			
Companionship	13	12	6
Housework	3	3	2
Meal preparation	6	3	2
Medical care	5	1	0
Personal care	7	2	1
Shopping	2	2	2
Total informal care	38	27	16
<b>Home care</b>	8	5	4

*Limited opportunity costs implied by the observed distribution of resources across cases*

Understanding the policy implications of the observed allocation of resources also involves examining the extent to which, by over-concentrating resources relative to the optimum solution on users of moderate and high disability without informal support, the system forgoes significant aggregate improvements in outcomes. An indication of such opportunity cost can be derived from Figure 9.4 by comparing the outcome levels achieved by the overall-budget-constrained optimisation (the least constrained scenario) with those attained by the group-budget-constrained optimisation.

Overall, Figure 9.4 suggests that the aggregate losses in outcomes implied by the observed distribution of budgets are relatively small. For instance, for five of the eight outcome measures explored, the aggregate outcome levels achieved in the group-budget-constrained scenario are estimated to attain over 95 per cent of the levels associated with the overall-budget-constrained optimisation. The fact that little appears to be lost in terms of aggregate outcome levels by concentrating resources on the neediest reveal that the observed patterns of distribution of resources are, from an efficiency point of view, broadly defensible. Prioritising dependent users without informal support does not generate significant losses in aggregate welfare contributions.

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Duberstein. 2002. "How effective are interventions with caregivers? An updated meta-analysis." *Gerontologist* 42:356-372..

It would be wrong, however, to interpret the findings as implying that it is inappropriate to provide more services to low-dependency users. Overall, the answer to such a question will depend on normative judgements about whether the valuation of the improvements in outcomes thus obtained is greater than the costs they imply. In addition, it is important to note that the results are specific to the six services explored in the analysis. Although the case in favour of low-level packages of care is most often argued in terms of the provision of low levels of assistance with domestic tasks, services not included in the analysis such as aids and adaptations could prove particularly effective in supporting low-dependency users. Also, given that the sample is constituted exclusively of users of social services, it is important to keep in mind that the results cannot inform policy about the likely benefits of extending services to older people who, at the time of data collection, did not receive formal assistance.

#### *The importance of achieving flexibility in the supply of services*

Figure 9.4 shows that constraining aggregate service mixes, as implied by the service-budget-constrained scenario, affects much more significantly the system's capacity to produce outcomes than ruling out changes in group budgets, as specified in the group-budget-constrained scenario. Significant rewards, it thus seems, would be reaped by changing substantially the mix of services commissioned.

Of course, the degree of improvement in cost-effectiveness which would follow from changes in commissioning patterns would depend on the ability of local commissioners to manage the process of change without generating significant increases in input costs. Indeed, it is likely that some of the potential improvements in outcomes would be lost because of the resource implications of the increases in unit costs which would be required in order to raise service supply levels. Overall, however, the evidence available suggests that social care supply curves tend to be significantly elastic: that is, that relatively small changes in prices are sufficient to bring about substantial increases in levels of supply (Fernández and Forder 2002; Forder et al. 2004).

But what are the changes in aggregate service mixes required in order to maximise outcomes? Figure 9.7 shows that the results of both the overall and group-budget constrained optimisations involve, on average, drastic reductions in the levels of home care for all case

types, and increases in the rest of services<sup>59</sup>. In particular, the results entail significantly higher day care and respite care levels (for the more dependent users), as well as noticeable increases in nursing inputs for the least dependent users. Furthermore, some of the larger changes in service mix appear to be highly consistent across outcome indicators. For instance, Table 9.3 shows that home care services are reduced in practically all optimum care packages, while day care levels are increased in over two-thirds of them. For critical interval need users, and particularly for those with informal carers, respite care is also found to increase in a large majority of optimum care packages.

**Table 9.3 Proportion of increases in service levels following optimisation (percentage)**

	Critical No PIC	Critical PIC	Short No PIC	Short PIC	Long No PIC	Long PIC	Total Average
<b>Group-budget-constrained scenario</b>							
Home care	0	0	0	0	0	0	0
Meals	14	50	29	50	29	50	38
Day care	100	63	86	63	71	63	73
Respite care	57	63	43	50	29	13	42
Social work	14	25	14	25	14	25	20
Nursing inputs	43	38	43	50	57	50	47
<b>Overall-budget-constrained scenario</b>							
Home care	0	13	0	0	0	13	4
Meals	29	50	29	50	29	50	40
Day care	43	75	71	75	71	63	67
Respite care	29	75	43	50	29	13	40
Social work	14	25	14	25	14	25	20
Nursing inputs	14	25	29	50	43	50	36

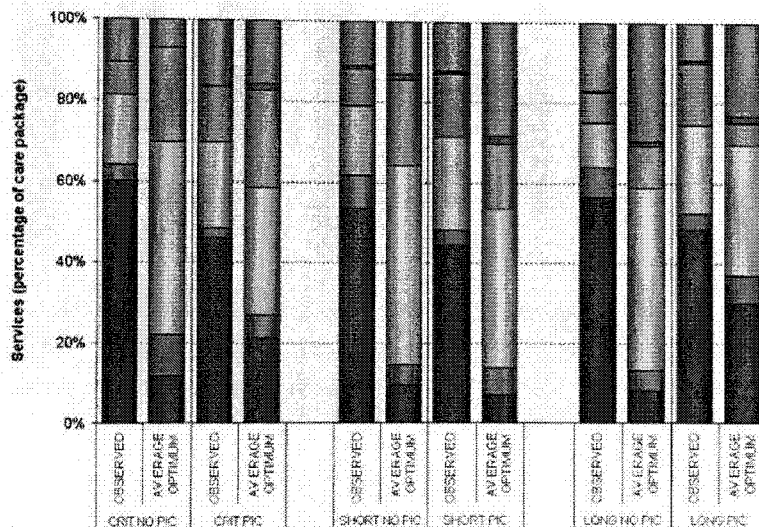
An important question is therefore whether the apparent consistent over-reliance on home care as the central pillar around which care packages are designed is the product of shortages in the supply of other services, or of user and/or professional biases in favour of home care. At the national level, there is little quantitative evidence to suggest that significant efforts have been made to change the balance of community care services commissioned. For instance, as illustrated in Figure 9.8, the proportion of gross social services expenditure invested on day care services in England has only increased from 12 to 14 per cent in the eight year period between 1994-95 and 2002-03. In the period 1997-98 and 2002-03<sup>60</sup>, the

<sup>59</sup> The results for the service-budget-constrained scenario are not depicted in the figure because by definition such scenario prevents changes in aggregate service levels.

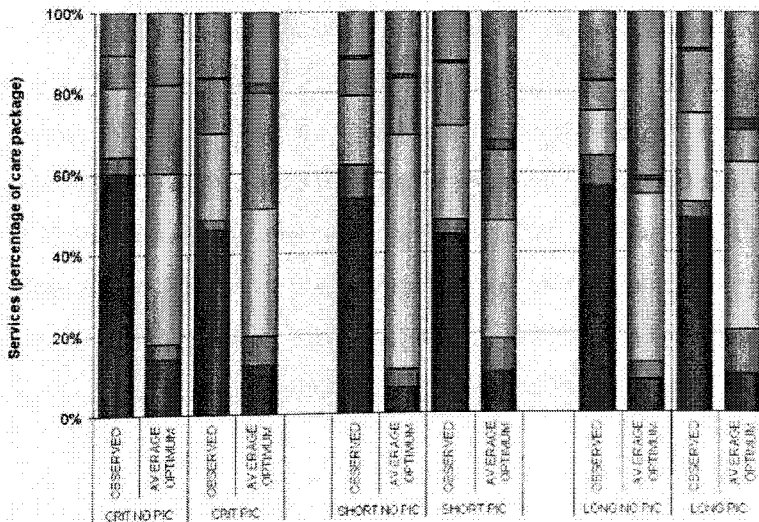
<sup>60</sup> No data were available from the Department of Health to explore the trends prior to 1997-98.

number of short-term admissions into residential care for older people, indicative of the level of respite care provision, actually fell by 6 per cent. This is in spite of the fact that the first objective listed in the 1989 white paper was to 'develop domiciliary day and respite services to enable people to live in their own homes wherever feasible and sensible' (Department of Health 1989, para.1.11).

**Figure 9.7 Average changes in input mixes following optimisation**



**Overall-budget-constrained scenario**

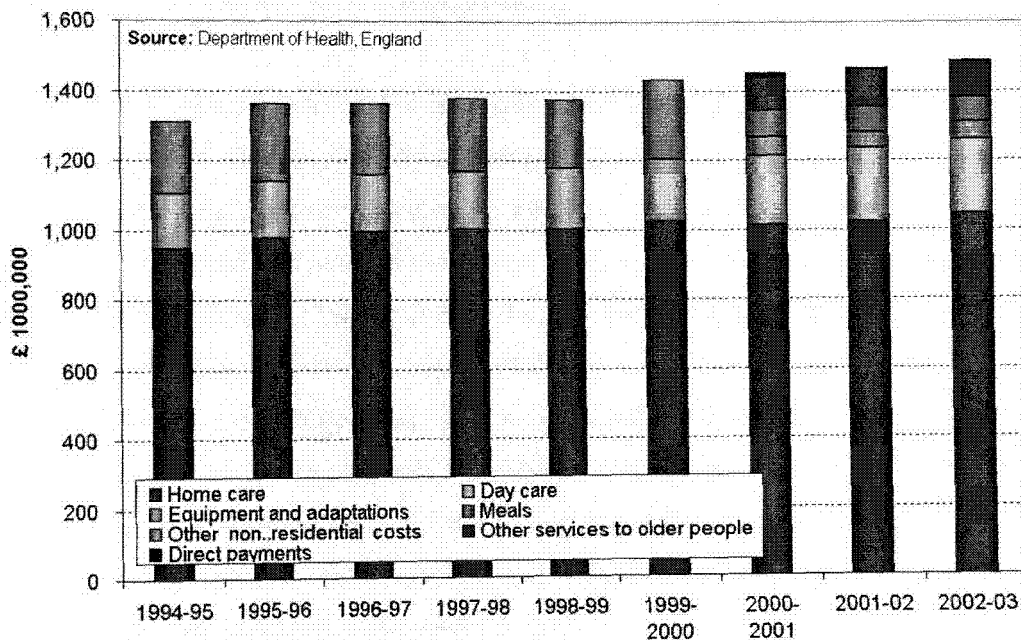


**Group-budget-constrained scenario**

■ home care ■ meals ■ day care ■ respite care ■ social work ■ nursing inputs



**Figure 9.8 Real terms gross expenditure in community care services for older people in England - 1994/95 2002/03**



Given the extent of changes achieved over the same period in other white paper commissioning-related objectives, and most notably the rapid expansion of private provision (see Figure 9.1), it is tempting to conclude that no significant policy effort has been directed towards expanding the provision of day care and respite care services. In practice, some policy instruments have in fact worked against their development, by equating community care with home care services. Most notably, the Department of Health's definition of the key performance indicator designed to capture the level of provision of intensive community care packages has been defined exclusively in terms of the number of hours of home care received per client (Commission for Social Care Inspection 2004). Clearly, such a performance indicator generates a powerful disincentive to provide forms of community-based support other than home care.

Whereas defining an alternative indicator of intensity of service provision which encompasses the spectrum of community-based services would have been more complicated, expenditure-based indicators, in particular, could have been used as an alternative. Their main limitation, how to account for the effect of local variability in prices, could have been

addressed by using the ACA groupings of authorities, as discussed in Section 9.2.1 in the context of performance indicators relating to unit costs. Thus, the fact that such indicators have not been considered is perhaps indicative that community care services are primarily perceived to be about providing home care inputs.

The low policy priority ascribed to developing day care services has been reflected in SSI inspection reports. They have noted, for instance, that day care services enjoy a 'low profile and are neither organised nor based on an adequate understanding of current needs' (Social Services Inspectorate and Audit Commission 2001, p. 6). Often located in residential care homes, day care provision has traditionally failed to provide specialised support and has been situated 'where services have developed rather than where they are needed' (Social Services Inspectorate and Audit Commission 2001, p. 6). As a discretionary service, day care services for older people have been vulnerable to changes in budgetary pressures, and have suffered from 'short-term decision-making' (Social Services Inspectorate and Audit Commission 2002, p. 5). They have 'evolved over the years without a clear strategic direction or plan that directly relates the service to wider aims'.

Still, government continues to call for increases in the provision of day care and respite care. The need for the provision of short-breaks - including out of hours and weekend provision - for users suffering from mental health problems was stressed, for instance, in the National Service Framework (Department of Health 2001, para 7.52). In fact, the National Framework included commitments to extend respite care services to benefit a further 75,000 carers and those they care for. In addition, it proposed that a performance indicator be created which measures the rates of older people receiving overnight respite care commissioned by social services departments. However, increases in respite care provision have been targeted primarily to younger client groups, and particularly to users with learning disabilities. For them, Department of Health statistics indicate that service levels have risen by 7% in the period 2001-02 and 2003-04 alone. Given the results of the optimisation analysis outlined above, achieving similar increases in service levels for older people could therefore play a very significant role in improving the effectiveness of community care resources.

### ***9.3.2 If you don't know where you are going, you will probably end up somewhere else...***

#### ***Implications of existing ambiguities in the definition of service objectives***

Whereas many of the changes in care packages implied by the optimisations are similar between the different outcome measures, the results in Chapter 7 also indicate that maximising different outcomes can lead to important differences in for instance the use of meals on wheels, nursing and qualified social work inputs. As a result, as illustrated by the collateral outcome diagrams in Chapter 7, improvements in the system's performance with respect to a particular outcome dimension can imply significant deteriorations in performance with respect to others. Faced with such trade-offs, recommending strategies for improving welfare requires knowledge about society's relative prioritisation of outcome dimensions for different users and caregivers. The lack of such knowledge, it has been noted, generates significant ambiguities in the interpretation of the optimisation results. At a broader level, it generates uncertainty for all stakeholders involved about what is to be expected of services, what their objectives are, and how performance is to be judged.

Of course, the government produces a steady flow of policy statements relating to the objectives of services. However, such statements are typically articulated at a very high level of generality, and around keywords or guiding principles compatible with a wide array of specific, practice-level objectives. Even the 1989 white paper 'Caring for People', with its relatively specific overall aim of developing services to 'enable people to live in their own homes' included the (reasonable) qualifying proposition 'wherever feasible and sensible'. As a result, the practical implementation of the objective of enabling people to live in their own homes would have been subject to, for instance, variations in local and/or professional perceptions of risks, or to the prioritisation of local resources. Clearer examples still of vagueness in policy statements about service objectives are found in the 1998 White Paper 'Modernising Social Services', which framed its discussion of welfare objectives around the concept of 'user independence' and which stated the guiding principle of adult social services to be

' that they provide the support needed by someone to make most use of their own capacity and potential' (Department of Health 1998, para 2.5).

All of the outcomes explored in the thesis could be argued to contribute significantly to such a guiding principle, by improving morale, control over own life, physical functioning, extending the users' chances of remaining in the community, etc. And yet, the results in Chapter 7 highlight that the maximisation of different outcome dimensions can yield significantly different distributions of resources and therefore of outcomes. The usefulness of such policy statements for 'Production of Welfare' studies appears to be confined primarily to the selection of outcome dimensions to be explored, as opposed to the derivation of conclusions about the appropriateness of observed combinations of outcomes.

The lack of specificity in policy statements relating to final service objectives is, in several respects, understandable. It is likely to be partly the fruit of the significant heterogeneity in the nature of cases referred to social services, and thus of the difficulties involved in defining narrow policy objectives for each of them. In addition, some of the vagueness might stem from the local nature of social care services, and so from the expectation that the support they provide ought to be determined, to some extent at least, by local preferences (Robson 1966).

As a result, however, the ambiguity in central government statements about final objectives is likely to have contributed to what *'Modernising Social Services'* claimed constitutes unacceptable inconsistencies in 'standards of treatment and who gets what services' (Department of Health 1998, para 2.25). In fact, the 1998 white paper recognised the need for clearer central guidance about objectives, noting that 'social services need direction if they are to serve people better' (Department of Health 1998, para 7.5). However, despite claims that 'this is the first time that any Government has laid out explicitly its expectations of social services' (Department of Health 1998, para 7.5) both the set of national objectives for social services and the performance management framework developed subsequently defined service objectives at a high level of generality, or in terms of an inconsistent set of intermediate outputs (Commission for Social Care Inspection 2004; Department of Health 2000b).

If government is unlikely to provide specific guidance about the final objectives of services for users in different circumstances, significant advances in our understanding of the system's performance could be derived by improving the design of outcome measures for use in both academic evaluations and by government performance monitoring systems. Despite a relatively small sample and the limitations of the available need and outcome indicators, the

results in the thesis demonstrate that the application of quantitative analysis methods holds the potential to illuminate equity and efficiency aspects of community care services. However, providing more definite answers to the question of how best to allocate resources would be conditional on the availability of improved outcome indicators, and particularly on the periodic collection of large scale, longitudinal surveys of service users.

Since the collection of ECCEP evidence, significant research has been carried out exploring the nature of dimensions of outcomes specific to social care services for older people (Glendinning 2004; Nocon, Qureshi and Thornton 1997; Qureshi et al. 1998). However, with the exception of Netten et al (2002), no attempts have yet been made to derive overall social care outcome indicators which reflect users and/or societal preferences over combinations of outcomes dimensions. Generating such indicators would also allow clearer definitions of the purpose of social care services to emerge, and thus firmer guidance to be given about what social care services are expected to achieve, and about how to achieve it.

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## **APPENDICES**

### **Appendix 3.1. Defining interval need categories**

Originally by Isaacs and Neville (1976), the interval need typology classifies older people into four groups.

- The non-dependent group
- The long interval need group: older people requiring infrequent assistance, at predictable times
- The short-interval need group: older people requiring assistance at frequent but predictable intervals
- The critical interval need group: older people in need of frequent assistance at unpredictable times.

No users in the ECCEP sample were deemed to belong to the non-dependent group. Hence, they were allocated to the three remaining groups on the basis of the following algorithm:

***Critical interval need group:*** users with at least one of the following problems

- Needs help getting into/out of bed/chair
- Needs help getting to/using toilet
- Loses control of bladder at least once a day
- Loses control of bowels at least once a day
- Inappropriate/anti-social/violent/risky behaviour

***Short interval need group:*** users not in the critical interval need category and with at least one of the following problems

- Needs help getting complete wash/bath/shower
- Needs help preparing, cooking or serving a main meal
- Needs help preparing a light snack

***Long interval need group:*** users not in the critical or short interval need group

**Appendix Table 3.1 Explanatory variables used in the modelling**

Variable	Description	Mean
<b>Need-Related Circumstances</b>		
<i>Physical disability</i>		
CANTBED	User cannot go to bed by him/herself	0.184
CANTEAT	User cannot eat by him/herself	0.104
CANTGROC	User cannot buy groceries by him/herself	0.816
CANTHHWK	User can't do heavy housework by him/herself	0.906
CANTLHWK	User can't do light housework by him/herself	0.577
CANTMEAL	User can't prepare meals by him/herself	0.595
CANTTOIL	User cannot go to toilet by him/herself	0.177
CANTWASH	User cannot wash him/herself	0.546
CANTWHND	User cannot wash hands by him/herself	0.146
INTNEED	Isaac's and Neville interval need level	1.031
INTLNG	User belongs to long interval need category	0.379
INTSHT	User belongs to short interval need category	0.273
INTCRIT	User belongs to critical interval need category	0.348
UADLS	Count of problems with ADLs (user perception)	1.365
UIADLS	Count of problems with IADLs (user perception)	4.055
WADLS	Count of problems with ADLs (CM perception)	1.782
WIADLS	Count of problems with IADLs (CM perception)	2.462
<i>Mental health</i>		
KATSCORE	Katzman cognitive impairment score	10.666
KATZMAN	Katzman cognitive impairment level	0.594
PGC	PGC lack of morale score	8.706
WBEHAV	User is perceived by CM to presents behavioural difficulties	0.106
WCOGIMP	User is perceived by CM to be cognitively impaired	0.279
WDEPR	User is perceived by CM to be depressed	0.135
WLOWMOR	User is perceived by CM to have low morale	
AL		0.507
<i>Other health problems</i>		
WCANCER	User suffers from cancer	0.061
WCORONAR	User has coronary problems	0.215
WHEALTH	Count of number of health problems	2.853
WINCONT	User presents incontinence of urine or faeces	0.177
WSKEL	Count of muscular and skeletal problems	0.506

St. Dev.	Min	1st Quartile	Median	3rd Quartile	Maximum	Valid No
0.388	0	0	0	0	1	397
0.305	0	0	0	0	1	396
0.388	0	1	1	1	1	397
0.292	0	1	1	1	1	395
0.495	0	0	1	1	1	395
0.492	0	0	1	1	1	395
0.382	0	0	0	0	1	396
0.499	0	0	1	1	1	394
0.354	0	0	0	0	1	397
0.853	0	0	1	2	2	425
0.486	0	0	0	1	1	425
0.446	0	0	0	1	1	425
0.477	0	0	0	1	1	425
1.542	0	0	1	2	5	397
2.158	0	2	4	6	7	397
1.485	0	0	2	3	4	422
1.534	0	1	2	4	5	422
9.988	0	2	6	20	28	419
0.811	0	0	0	1	2	419
4.621	0	5	8.5	12	19	384
0.308	0	0	0	0	1	416
0.449	0	0	0	1	1	423
0.342	0	0	0	0	1	423
0.501	0	0	1	1	1	416
0.240	0	0	0	0	1	423
0.411	0	0	0	0	1	423
1.569	0	2	3	4	9	423
0.382	0	0	0	0	1	423
0.634	0	0	0	1	3	423



Variable	Description	Mean	St. Dev.	Min	1st Quartile	Median	3rd Quartile	Maximum	Valid No
WSTROKE	User had stroke	0.191	0.394	0	0	0	0	1	423
WULCER	User has ulcerated legs or pressure sores	0.083	0.276	0	0	0	0	1	423
<i>Informal care related factors</i>									
CAGE	PIC age	44.793	29.786	0	0	53	68	90	323
CCPBEAR	Problem felt by PIC during caring: loss of earnings	0.034	0.181	0	0	0	0	1	236
CCPBEMB	Problem felt by PIC during caring: embarrassment	0.021	0.144	0	0	0	0	1	236
CCPBFAM	Problem felt by PIC during caring: not enough time for family	0.097	0.297	0	0	0	0	1	236
CCPBFIN	Problem felt by PIC during caring: financial cost	0.042	0.202	0	0	0	0	1	236
CCPBFRI	Problems PIC caring: do not see enough of friends	0.093	0.291	0	0	0	0	1	236
CCPBHLP	Problem felt by PIC during caring: unable to help other dependent	0.025	0.158	0	0	0	0	1	236
CCPBJOB	Problem felt by PIC during caring: loss of job	0.021	0.144	0	0	0	0	1	236
CCPBLEI	Problem felt by PIC during caring: loss of leisure	0.186	0.390	0	0	0	0	1	236
CCPBNB	Problem felt by PIC during caring: count	1.203	2.156	0	0	0	1	11	236
CCPBPHY	Problem felt by PIC during caring: physical effort	0.161	0.368	0	0	0	0	1	236
CCPBREL	Problem felt by PIC during caring: strain on relationship	0.102	0.303	0	0	0	0	1	236
CCPBSTR	Problem felt by PIC during caring: stress	0.186	0.390	0	0	0	0	1	236
CCPBWOR	Problem felt by PIC during caring: loss of sleep due to worry	0.102	0.303	0	0	0	0	1	236
CCPPBSLE	Problem felt by PIC during caring: loss of sleep due to attention required by user	0.089	0.285	0	0	0	0	1	236
CEMPLOY	PIC is employed or a student	0.254	0.436	0	0	0	1	1	323
CHADHLPB	PIC had health problems at time of user's referral to SSD	0.424	0.495	0	0	0	1	1	323
CHAFFECT	PIC health affects caring	0.321	0.468	0	0	0	1	1	221
CLOVE	PIC cares because of love	0.797	0.403	0	1	1	1	1	236
CUPBBUR	Problem felt by user during caring: user feels a burden on others	0.076	0.266	0	0	0	0	1	236
CUPBEMB	Problem felt by user during caring: user feels embarrassment	0.021	0.144	0	0	0	0	1	236
CUPBIND	Problem felt by user during caring: user complains from loss of independence	0.089	0.285	0	0	0	0	1	236
CUPBNB	Problem felt by user during caring: count	0.369	0.901	0	0	0	0	5	236
CUPBPRI	Problem felt by user during caring: user complains from loss of privacy	0.038	0.192	0	0	0	0	1	236
CUPBSTR	Problem felt by user during caring: user is stressed	0.097	0.297	0	0	0	0	1	236
INFCOMP	Companionship informal help (hrs/wk)	10.976	18.470	0	1.375	3.333	10	83.333	193
INFHWK	Housework informal help (hrs/wk)	2.880	6.493	0	0	0.25	2.75	56	214
INFMED	Medical informal help (hrs/wk)	2.219	9.341	0	0	0	0	83.333	228
INFPCP	Personal care informal help (hrs/wk)	3.460	10.047	0	0	0.2333	3	83.333	213
KOSBNBPB	Kosberg PIC stress score	3.514	4.205	0	0	2	6	17	323
OCMEAL	Main PIC does meals	0.383	0.487	0	0	0	1	1	420
OCMEAL	Other informal carer than PIC prepares meals	0.105	0.307	0	0	0	0	1	420
UPIC	Presence of informal PIC (user perception)	0.807	0.395	0	1	1	1	1	425
USERBEN	Help provided for users benefit	0.810	0.393	0	1	1	1	1	300
WCARISK	Number of risks PIC is subject to	1.535	1.327	0	1	1	2	6	230
WCASERV1	Count of number of services aimed at helping PIC	1.862	1.721	0	0	2	3	8	305

Variable	Description	Mean	St. Dev.	Min	1st Quartile	Median	3rd Quartile	Maximum	Valid No
WCBALANC	Caregiver is perceived to be balanced (by CM)	0.413	0.493	0	0	0	1	1	230
WCENGULF	Caregiver is perceived to be engulfed (by CM)	0.148	0.356	0	0	0	0	1	230
WCLOFEM	PIC is a close female relative	0.454	0.498	0	0	0	1	1	401
WCSTRESS	PIC is perceived to be stressed by CM	0.481	0.500	0	0	0	1	1	418
WCUCONFL	Interests of user and caregiver are perceived by CM to be in conflict	0.144	0.352	0	0	0	0	1	236
WCUPOOR	PIC and user have a poor relationship	0.063	0.242	0	0	0	0	1	416
WPIC	Presence of an informal PIC (CM perception)	0.795	0.404	0	1	1	1	1	425
WPICLIVI	PIC lives with user	0.359	0.480	0	0	1	1	1	395
WPOUSE	PIC is spouse	0.120	0.325	0	0	0	0	1	401
<i>Poverty and material environment factors</i>									
HOUSBEN	User receives housing benefit	0.193	0.395	0	0	0	0	1	419
INCOME	User income level	1.973	0.484	1	2	2	2	4	328
INCSUPP	User receives income support	0.205	0.404	0	0	0	0	1	419
PENSION	User receives pension	0.711	0.454	0	0	1	1	1	419
UOWNSHS	User owns house (alone or with others)	0.336	0.473	0	0	0	1	1	250
VEXED	User is vexed by charging	0.152	0.361	0	0	0	0	1	151
WFINPB	User has financial problems	0.134	0.341	0	0	0	0	1	410
WHEATPB	Presence of heating problems	0.037	0.188	0	0	0	0	1	410
WHOUSPB	Presence of housing problems	0.259	0.438	0	0	0	1	1	410
WPERSENV	Number of personal environmental problems	0.488	0.813	0	0	0	1	4	410
WWIDENV	Number of wider environmental problems	0.190	0.517	0	0	0	0	4	410
<i>Other mediating factors</i>									
AGE	User's age	80.855	7.325	65	75	81	86	98	394
ATTALL	User receives attendance allowance	0.313	0.464	0	0	0	1	1	419
CATARISK	Number of cataclysmic risks with at least 50% chances of happening	1.337	1.145	0	1	1	2	6	196
CURRENT	Case known to SSD before present major review	0.466	0.499	0	0	0	1	1	423
DETERISK	Number of risks with more than 50% probability of deterioration	1.904	1.885	0	0	1	3	8	271
FROMHOSP	Whether referral to SSD straight from hospital.	0.271	0.445	0	0	0	1	1	425
KEEPHOME	CM perception of extent to which help will keep user at home in future	1.631	0.569	0	1	2	2	2	268
MALE	User is male	0.265	0.442	0	0	0	1	1	419
PALLCARE	Formal help intended as palliative care	0.007	0.081	0	0	0	0	1	304
SHORTINT	Care plan designed as a short intervention	0.153	0.361	0	0	0	0	1	183
STILSET	CM still setting up care plan at moment of T1 interview	0.060	0.238	0	0	0	0	1	300
UALONE	User lives alone	0.614	0.487	0	0	1	1	1	425
UCONFIDE	User has confident	0.812	0.391	0	1	1	1	1	325
UFEARS	Count of users fears	1.589	1.726	0	0	1	3	7	419
UMARRIED	User is married	0.199	0.400	0	0	0	0	1	376
UPERCENT	User level of reaction against placement in residential or nursing care facility	3.958	1.061	1	3	4	5	5	333
WPERSREL	Number of personal relationship problems	2.087	1.615	0	1	2	3	8	416
WURELIAN	User over-reliant on others compared with users in similar circumstances	-0.351	0.849	-1	-1	-1	0	1	188

Variable	Description	Mean	St. Dev.	Min	1st Quartile	Median	3rd Quartile	Maximum	Valid No
WUSERISK	Number of risks to user	3.407	2.582	0	1	3	5	14	302
<b>Intermediate outputs (services)</b>									
DC_WCOST	Weekly cost, day care	20.855	35.843	0	0	0	33	165	413
HC_WCOST	Weekly cost, home care	47.645	50.695	0	8.42	33.68	69.46	353.6	409
MW_COST	Weekly cost, delivered meals	3.614	6.365	0	0	0	5.6	29.1	410
NV_WCOST	Weekly cost, nursing visits	13.251	36.273	0	0	0	12.5	350	358
RE_WCOST	Weekly cost, respite care	13.396	33.018	0	0	0	7	243.5	407
SW_WCOST	Weekly cost, social worker input	0.542	1.561	0	0	0	0	9	125
TOTW_COST	Total health and social care weekly package cost	115.81	118.84	0	39.08	88.41	152.88	1092	422

Note: The unit costs used to express service levels in monetary terms, and to aggregate services in cost terms were extracted from (Netten and Dennett 1995). They are: hourly cost home care £8.42; day care cost per session £3.3; cost of respite care day £54; cost per hot meal £2.8; cost per frozen meal £1.9; hourly cost of social work input £27; hourly cost nursing visits £25.

**Appendix Table 3.2 Outcome indicators used in the production functions**

VARIABLE	DESCRIPTION	QUESTION ASKED	No	MEAN	SD	MIN	PERCENTILES			MAX
							25	50	75	
DAYS	Number of days living at home prior to admission to institutions for long term care	Number of days spent in the community. Starts from assessment until admission to residential care facility. If the user is still in the community, number of days is the count of days between the assessment and the day of interview (these are truncated observations). For those who are still in the community the 25 <sup>th</sup> percentile is 637 days (21 months), 50 <sup>th</sup> percentile is 676 days (22 months) and the 75 <sup>th</sup> percentile is 702 days (23 months). 42% of the users (who were assessed) had left the community.	274	517	226	1	334	621	689	1114
IMPADLS	Improvement in ADL functioning ascribed by user to the effect of social services	Thinking back over the last 6 months, how much would you say the help you received from social services has improved your personal cleanliness and hygiene, including your ability to use the toilet?	143	6.8	3.3	1.0	5.0	8.0	10.0	10.0
IMPIADLS	Improvement in IADL functioning ascribed by user to the effect of social services	Thinking back over the last 6 months, how much would you say the help you received from social services has improved the cleanliness of your house and room + the quality and quantity of food and drink?	152	13.1	6.1	1.0	9.0	14.0	19.0	20.0
USATISF	Degree of satisfaction of user with services received	How satisfied are you (user) with the service you are receiving?	195	2.1	0.7	1.0	2.0	2.0	3.0	3.0
PGC	Overall lack of morale; PGC score	Do you see enough of your friends and relatives? As you get older do you feel less useful?	241	8.4	4.7	0.0	4.0	8.0	12.0	19.0
GDL	General dissatisfaction with life score; GDL	As you get older are things better than expected? Is life hard for you most of the time? Are you satisfied with your life today? When things go wrong does it affect you a lot?	236	2.7	1.7	0.0	1.0	3.0	4.0	6.0
DLD	Dissatisfaction with life development score; DLD	Do you (user) have as much energy as you did, last six months? Does life seem to get worse as you get older? As you get older do you feel less useful? Are you as happy as you were when you were young?	238	1.2	0.8	0.0	1.0	2.0	2.0	2.0
KOSBERG	Kosberg carer burden scale		163	3.9	3.9	0.0	1.0	2.0	6.0	16.0

VARIABLE	DESCRIPTION	QUESTION ASKED	No	MEAN	SD	MIN	PERCENTILES			MAX
							25	50	75	
IMPEMP	User felt control over own life score	Do you (user) feel free to run your life the way you want? Do you often feel helpless? Do you ever worry about loosing your independence and other people making decisions for you?	195	1.5	1.9	0.0	1.0	1.0	2.0	3.0
IMPREL	Degree to which user considered social services to have improved how well user gets on with family and friends	Thinking back over the last six months how much the user says the help s/he has received from social services has improved how well s/he gets on with family and friends?	181	7.5	3.0	1.0	6.0	9.0	10.0	10.0
SATSOC	Degree of satisfaction of user with chances to meet people	How satisfied are you with your chances to meet people and socialise?	209	3.8	1.0	1.0	3.0	4.0	5.0	5.0
WKSAT	Worker rating of degree to which social services improved the welfare of the user	To what extent has all the help the user received significantly improved or maintained his/her welfare?	319	2.8	0.8	0.0	2.0	3.0	3.0	4.0

**Appendix Table 4.1 Impact of cognitive impairment factors on indicators of physical dependency**

	<b>canttoil</b>		<b>cantmeal</b>		<b>canteat</b>	
	<b>Coef.</b>	<b>t</b>	<b>Coef.</b>	<b>t</b>	<b>Coef.</b>	<b>t</b>
Katzman cognitive impairment score	-0.00463	-0.64	0.006494	0.7	-0.00783	-1.38
Katzman cognitive impairment score, squared	0.000595	2.37	0.000223	0.68	0.000599	3.02
CM perceives user to be cognitively impaired	-0.05259	-1.14	0.040163	0.67	0.00854	0.23
Constant	0.116898	3.58	0.467582	11.06	0.060265	2.34
Adj. R2	9%		8%		10%	

	<b>uadls</b>		<b>uiadls</b>		<b>cantbed</b>	
	<b>Coef.</b>	<b>t</b>	<b>Coef.</b>	<b>t</b>	<b>Coef.</b>	<b>t</b>
Katzman cognitive impairment score	0.004986	0.17	0.05836	1.48	-0.0047	-0.63
Katzman cognitive impairment score, squared	0.001697	1.68	0.000935	0.68	0.000476	1.82
CM perceives user to be cognitively impaired	-0.19638	-1.06	0.027739	0.11	-0.00738	-0.15
Constant	1.011273	7.7	3.255062	18.25	0.135948	4.01
Adj. R2	10%		15%		5%	

	<b>wadls</b>		<b>wadl_iad</b>		<b>wiadls</b>	
	<b>Coef.</b>	<b>t</b>	<b>Coef.</b>	<b>t</b>	<b>Coef.</b>	<b>t</b>
Katzman cognitive impairment score	0.015291	0.53	0.029642	0.61	0.014351	0.47
Katzman cognitive impairment score, squared	0.000328	0.32	0.000345	0.2	1.68E-05	0.02
CM perceives user to be cognitively impaired	0.267866	1.43	0.493757	1.57	0.225891	1.15
Constant	1.451596	10.99	3.700754	16.72	2.249158	16.18
Adj. R2	4%		4%		1%	

	<b>cantlhwk</b>	
	<b>Coef.</b>	<b>t</b>
Katzman cognitive impairment score	0.00047	0.05
Katzman cognitive impairment score, squared	0.00038	1.14
CM perceives user to be cognitively impaired	0.004276	0.07
Constant	0.492269	11.43
Adj. R2	5%	

Models estimated as OLS regressions. N=419 cases.

## Appendix 5.1 Estimation results of the production functions and alternative model specifications.

### Users' length of stay in the community (DAYS)

#### Tobit estimation results

Normal exit from iterations. Exit status=0.

```

+-----+
| Limited Dependent Variable Model - CENSORED |
| Maximum Likelihood Estimates                |
| Dependent variable          DATCLOT         |
| Number of observations      274            |
| Iterations completed        5              |
| Log likelihood function     -900.6251      |
| Threshold values for the model:            |
| Lower=-infinity            Upper=GONED     |
| ANOVA based fit measure =  2.400163       |
| DECOMP based fit measure =  .592521      |
+-----+

```

Variable	Coefficient	Standard Error	b/St.Er.	P[ Z >z]
Primary Index Equation for Model				
Constant	1558.574100	308.33492	5.055	.0000
KATSCORE	-8.664306823	3.1967148	-2.710	.0067
WCUPOOR	-258.0071497	94.208448	-2.739	.0062
UPERCENT	73.37166672	24.084246	3.046	.0023
AGE	-10.85624698	3.5111945	-3.092	.0020
CANTBED	-202.6510486	71.208275	-2.846	.0044
WCANCER	-268.3957457	111.45221	-2.408	.0160
WINCONT	-157.3542347	59.821107	-2.630	.0085
CANTLHWK	-142.5801887	57.510400	-2.479	.0132
VEXED	207.0732680	102.62919	2.018	.0436
WALONE	-127.1272157	60.882587	-2.088	.0368
CUPBEMB	-547.3739716	186.43136	-2.936	.0033
WUSERISK	-20.66892980	10.308832	-2.005	.0450
INTLONG	98.07926463	56.120075	1.748	.0805
LHC_HHWK	33.72697656	14.169012	2.380	.0173
DC_COG	-241.2686172	92.637042	-2.604	.0092
DC_NPIC	-286.8599293	101.23330	-2.834	.0046
LDC_KATM	65.29146546	25.410259	2.569	.0102
LDC_OTH	32.60472316	17.726299	1.839	.0659
RE_ALON	-123.2042747	73.562383	-1.675	.0940
RE_CRIT	-209.3207848	95.258669	-2.197	.0280
REC_HREL	-6.248436520	2.0539131	-3.042	.0023
REC_RELI	-5.191569159	1.5632838	-3.321	.0009
LRE_HIAD	67.72321272	27.239524	2.486	.0129
REC_BEHA	8.531538810	2.5346437	3.366	.0008
LRE_WASH	55.83239736	23.697814	2.356	.0185
Disturbance standard deviation				
Sigma	300.5183890	21.973630	13.676	.0000

**Results from identical specification of DAYS model using Cox regression (that is, modelling the probability of institutionalisation rather than the length of stay in the community).**

	<b>B</b>	<b>SE</b>	<b>Sig.</b>	<b>Exp(B)</b>
<b>CANTBED</b>	.796	.304	.009	2.217
<b>CANTLHWK</b>	.704	.276	.011	2.022
<b>INTLONG</b>	-.454	.266	.088	.635
<b>KATSCORE</b>	.025	.014	.073	1.025
<b>WCANCER</b>	1.359	.496	.006	3.894
<b>WINCONT</b>	.767	.250	.002	2.154
<b>WCUPOOR</b>	1.602	.372	.000	4.961
<b>CUPBEMB</b>	2.992	.730	.000	19.923
<b>UPERCENT</b>	-.308	.111	.005	.735
<b>AGE</b>	.060	.016	.000	1.062
<b>VEXED</b>	-.339	.460	.462	.713
<b>WALONE</b>	.500	.272	.067	1.648
<b>WUSERISK</b>	.100	.043	.019	1.106
<b>DC_COG</b>	.943	.382	.014	2.569
<b>DC_NPIC</b>	1.428	.422	.001	4.169
<b>RE_ALON</b>	.483	.336	.150	1.621
<b>RE_CRIT</b>	.954	.402	.018	2.596
<b>LHC_HHWK</b>	-.188	.067	.005	.829
<b>LDC_KATM</b>	-.243	.105	.020	.784
<b>LDC_OTH</b>	-.195	.092	.035	.822
<b>REC_HREL</b>	.042	.009	.000	1.043
<b>REC_RELI</b>	.031	.006	.000	1.032
<b>LRE_HIAD</b>	-.339	.117	.004	.713
<b>REC_BEHA</b>	-.040	.011	.000	.961
<b>LRE_WASH</b>	-.220	.098	.025	.802



# Degree of satisfaction of user with the services received (USATISF)

## OLS estimation results

Source	SS	df	MS	Number of obs =	197
Model	37.6737627	16	2.35461017	F( 16, 180) =	5.77
Residual	73.4733541	180	.408185301	Prob > F =	0.0000
				R-squared =	0.3390
				Adj R-squared =	0.2802
Total	111.147117	196	.567077126	Root MSE =	.63889

satv2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
pgc	-.0467488	.0107909	-4.33	0.000	-.0680417	-.0254559
over85	-.3947783	.1121794	-3.52	0.001	-.6161342	-.1734224
wcancer	-.4773401	.2207918	-2.16	0.032	-.9130133	-.041667
canteat	-.5608088	.270501	-2.07	0.040	-1.09457	-.0270479
wcogimp	.4201046	.1293496	3.25	0.001	.164868	.6753411
dc_wcost	.0213937	.0055191	3.88	0.000	.0105032	.0322842
dccst2	-.0001848	.0000531	-3.48	0.001	-.0002895	-.0000801
dc_chaf	-.6385628	.2993933	-2.13	0.034	-1.229335	-.0477906
hc_hous	-.2598345	.1171828	-2.22	0.028	-.4910633	-.0286058
hcc_wal2	.0000242	9.74e-06	2.49	0.014	5.01e-06	.0000434
lhc_wpic	.0583551	.0263238	2.22	0.028	.0064121	.110298
nv_wcost	-.0055509	.0022112	-2.51	0.013	-.0099142	-.0011876
re_skel	-.3405064	.1678874	-2.03	0.044	-.671787	-.0092259
rec_mar3	9.11e-07	4.73e-07	1.93	0.056	-2.18e-08	1.84e-06
m_katm	-.3744271	.1822846	-2.05	0.041	-.7341167	-.0147375
lm_groc	.0829393	.0471741	1.76	0.080	-.0101461	.1760248
_cons	2.460771	.1287207	19.12	0.000	2.206775	2.714766

. ovtest

Ramsey RESET test using powers of the fitted values of satv2  
 Ho: model has no omitted variables  
 F(3, 177) = 0.70  
 Prob > F = 0.5509

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity  
 Ho: Constant variance  
 Variables: fitted values of satv2  
 chi2(1) = 0.49  
 Prob > chi2 = 0.4842

. linktest

(sum of wgt is 1.9479e+02)

Source	SS	df	MS	Number of obs =	197
Model	38.0043036	2	19.0021518	F( 2, 194) =	50.40
Residual	73.1428132	194	.37702481	Prob > F =	0.0000
				R-squared =	0.3419
				Adj R-squared =	0.3351
Total	111.147117	196	.567077126	Root MSE =	.61402

satv2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	1.662428	.7145129	2.33	0.021	.2532173	3.071639
_hatsq	-.1545016	.1650082	-0.94	0.350	-.4799419	.1709387
_cons	-.6804928	.7588829	-0.90	0.371	-2.177213	.8162273

**Ordinal regression estimation results**

	Estimate	Sig.
[SATV2 = 1.00]	-2.553	.000
[SATV2 = 2.00]	-1.213E-02	.976
PGC	-.141	.000
OVER85	-1.176	.002
WCANCER	-1.563	.044
CANTEAT	-1.853	.046
WCOGIMP	1.485	.001
DC_WCOST	7.287E-02	.000
DCCST2	-6.381E-04	.000
DC_CHAF	-2.311	.022
HC_HOUS	-.827	.030
HCC_WAL2	9.231E-05	.014
LHC_WPIC	.204	.020
NVC_PRCO	-3.225E-02	.005
RE_SKEL	-1.115	.034
REC_MAR3	4.104E-06	.121
M_KATM	-1.244	.037
LM_GROC	.315	.043

Link function: Logit.

**Model Fitting Information**

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	412.950			
Final	328.271	84.679	16	.000

**Goodness-of-Fit**

	Chi-Square	df	Sig.
Pearson	335.524	370	.900
Deviance	325.538	370	.954

**Pseudo R-Square**

Cox and Snell	.353
Nagelkerke	.400
McFadden	.204

# Improvement in number of personal care functions of daily living ascribed by the user to the social services (IMPADL)

Regression with robust standard errors

Number of obs = 145  
 F( 11, 133) = 6.10  
 Prob > F = 0.0000  
 R-squared = 0.3220  
 Root MSE = 2.8538

impadls	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
wpic	2.970735	.6601823	4.50	0.000	1.66492	4.27655
cantgroc	-1.616148	.6178456	-2.62	0.010	-2.838223	-.3940738
cemploy	-1.320196	.7677817	-1.72	0.088	-2.838838	.1984469
wlowmora	-1.139451	.4795456	-2.38	0.019	-2.087974	-.1909287
pgc	-.1159333	.0630447	-1.84	0.068	-.2406333	.0087667
dc_walo	-2.991773	.7751788	-3.86	0.000	-4.525046	-1.458499
lhc_ualo	.3304877	.1496903	2.21	0.029	.0344062	.6265693
rec_fh	.0612435	.0296101	2.07	0.041	.0026759	.1198111
nv_sp	-4.894397	1.763889	-2.77	0.006	-8.383301	-1.405493
lnv	.3526499	.1676931	2.10	0.037	.0209594	.6843403
ldr	.3451472	.1222887	2.82	0.005	.1032649	.5870295
_cons	7.11707	1.017714	6.99	0.000	5.104071	9.130069

. ovtest

Ramsey RESET test using powers of the fitted values of impadls

Ho: model has no omitted variables  
 F(3, 130) = 1.69  
 Prob > F = 0.1724

. linktest

(sum of wgt is 1.4331e+02)

Source	SS	df	MS	Number of obs =	145
Model	515.718572	2	257.859286	F( 2, 142) =	33.85
Residual	1081.82452	142	7.61848251	Prob > F =	0.0000
Total	1597.54309	144	11.0940492	R-squared =	0.3228
				Adj R-squared =	0.3133
				Root MSE =	2.7602

impadls	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	1.270085	.6556403	1.94	0.055	-.025992	2.566162
_hatsq	-.0213635	.0509595	-0.42	0.676	-.1221008	.0793737
_cons	-.7721229	2.034042	-0.38	0.705	-4.793039	3.248794

## Improvement in housework and other instrumental care functions of daily living ascribed by the user to the social services (IMPIADL)

Source	SS	df	MS	Number of obs =	154
Model	1902.56118	10	190.256118	F( 10, 143) =	6.89
Residual	3946.23074	143	27.5960191	Prob > F =	0.0000
				R-squared =	0.3253
				Adj R-squared =	0.2781
Total	5848.79191	153	38.2273981	Root MSE =	5.2532

impiadls	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
upercent	-.9894167	.4407205	-2.24	0.026	-1.860585	-.118248
cantgroc	-3.001791	1.14269	-2.63	0.010	-5.260538	-.7430437
chaffect	-5.076799	1.711514	-2.97	0.004	-8.459934	-1.693663
walone	-2.074561	1.11136	-1.87	0.064	-4.271376	.1222553
hc2_crit	.0002037	.0000817	2.50	0.014	.0000423	.0003652
lhc_wpic	.6943405	.2619111	2.65	0.009	.1766229	1.212058
dc_alon	-5.075454	1.273094	-3.99	0.000	-7.591968	-2.558939
dcc_fh	.1196456	.0503458	2.38	0.019	.0201274	.2191637
mc_clof	.2759521	.1228176	2.25	0.026	.0331794	.5187248
nvc_upic	.0879391	.0311726	2.82	0.005	.0263204	.1495578
_cons	19.84764	2.274321	8.73	0.000	15.35201	24.34328

. ovtest

Ramsey RESET test using powers of the fitted values of impiadls

Ho: model has no omitted variables

F(3, 140) = 0.58  
Prob > F = 0.6304

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of impiadls

chi2(1) = 2.96  
Prob > chi2 = 0.0853

. linktest

(sum of wgt is 1.5208e+02)

Source	SS	df	MS	Number of obs =	154
Model	1923.49545	2	961.747723	F( 2, 151) =	37.00
Residual	3925.29647	151	25.9953408	Prob > F =	0.0000
				R-squared =	0.3289
				Adj R-squared =	0.3200
Total	5848.79191	153	38.2273981	Root MSE =	5.0986

impiadls	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	1.558479	.6332199	2.46	0.015	.3073641	2.809594
_hatsq	-.0217141	.0241969	-0.90	0.371	-.0695223	.0260942
_cons	-3.321162	4.027429	-0.82	0.411	-11.27855	4.636228

## User felt control over own life score (IMPEMP)

Source	SS	df	MS	Number of obs =	197
Model	63.3121767	13	4.87016744	F( 13, 183) =	8.75
Residual	101.865991	183	.556644758	Prob > F =	0.0000
				R-squared =	0.3833
				Adj R-squared =	0.3395
Total	165.178167	196	.842745752	Root MSE =	.74609

impemp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
pgc	-.0816999	.0120759	-6.77	0.000	-.1055259	-.0578739
wskel	.3330428	.0851062	3.91	0.000	.1651273	.5009582
intneed	.3792706	.104875	3.62	0.000	.1723511	.5861902
cantgroc	-.3330277	.15763	-2.11	0.036	-.6440335	-.0220218
wwidenv	-.2223558	.109408	-2.03	0.044	-.4382191	-.0064924
ldc	.069058	.0336385	2.05	0.042	.0026888	.1354272
lhc_crit	.1189696	.0481829	2.47	0.014	.0239041	.2140351
mc_toil	.0666899	.0267621	2.49	0.014	.013888	.1194918
re_bed	-.9784348	.4753467	-2.06	0.041	-1.9163	-.0405701
re_cstr	-.5020846	.2123242	-2.36	0.019	-.9210028	-.0831665
lre_had	.3163257	.124318	2.54	0.012	.0710448	.5616066
nvc_chaf	.0156762	.0062126	2.52	0.012	.0034186	.0279338
ndc_katm	.0008713	.0003574	2.44	0.016	.000166	.0015765
_cons	1.755215	.2507574	7.00	0.000	1.260467	2.249962

. ovtest

Ramsey RESET test using powers of the fitted values of impemp  
 Ho: model has no omitted variables  
 F(3, 180) = 1.08  
 Prob > F = 0.3578

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity  
 Ho: Constant variance  
 Variables: fitted values of impemp  
 chi2(1) = 0.27  
 Prob > chi2 = 0.6054

. linktest

(sum of wgt is 1.9479e+02)

Source	SS	df	MS	Number of obs =	197
Model	63.313124	2	31.656562	F( 2, 194) =	60.29
Residual	101.865043	194	.525077543	Prob > F =	0.0000
				R-squared =	0.3833
				Adj R-squared =	0.3769
Total	165.178167	196	.842745752	Root MSE =	.72462

impemp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	.9844068	.3781667	2.60	0.010	.2385609	1.730253
_hatsq	.0048523	.1142156	0.04	0.966	-.2204115	.2301161
_cons	.010923	.2961355	0.04	0.971	-.5731354	.5949815

## Overall lack of morale: the PGC score (PGC)

Source	SS	df	MS	Number of obs =	243
Model	2122.06498	15	141.470999	F( 15, 227) =	9.44
Residual	3400.68579	227	14.9809947	Prob > F =	0.0000
				R-squared =	0.3842
				Adj R-squared =	0.3436
Total	5522.75077	242	22.8212842	Root MSE =	3.8705

pgc_2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
ufears	.8635523	.1462984	5.90	0.000	.5752758 1.151829
wbehav	-5.987455	1.104295	-5.42	0.000	-8.163435 -3.811475
intneed	-2.55107	.5479547	-4.66	0.000	-3.630798 -1.471342
fromhosp	-1.833799	.5910906	-3.10	0.002	-2.998525 -.6690728
cemploy	1.831868	.6723276	2.72	0.007	.507067 3.156669
vexed	6.064839	1.314912	4.61	0.000	3.473845 8.655833
infmed	.1716437	.0520401	3.30	0.001	.0691003 .2741872
lip_had	-1.882122	.6113864	-3.08	0.002	-3.086841 -.6774043
ip2_sht	-.0387079	.0181268	-2.14	0.034	-.0744262 -.0029896
re_wor	7.933255	3.332958	2.38	0.018	1.365763 14.50075
re2_fh	-.0004364	.000259	-1.68	0.093	-.0009468 .000074
rec_sle	-.1150056	.0489997	-2.35	0.020	-.211558 -.0184533
sw_long	2.019591	.8369602	2.41	0.017	.3703865 3.668796
swc_walo	-.8772618	.4182248	-2.10	0.037	-1.701361 -.0531627
hcc_clof	-.0270411	.0083577	-3.24	0.001	-.0435097 -.0105725
_cons	9.944825	.7571603	13.13	0.000	8.452864 11.43679

. ovtest

Ramsey RESET test using powers of the fitted values of pgc\_2  
 Ho: model has no omitted variables  
 F(3, 224) = 0.34  
 Prob > F = 0.7982

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity  
 Ho: Constant variance  
 Variables: fitted values of pgc\_2  
 chi2(1) = 0.36  
 Prob > chi2 = 0.5494

. linktest

(sum of wgt is 2.4082e+02)

Source	SS	df	MS	Number of obs =	243
Model	2125.70559	2	1062.85279	F( 2, 240) =	75.09
Residual	3397.04519	240	14.154355	Prob > F =	0.0000
				R-squared =	0.3849
				Adj R-squared =	0.3798
Total	5522.75077	242	22.8212842	Root MSE =	3.7622

pgc_2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
_hat	1.170649	.3462543	3.38	0.001	.4885638 1.852735
_hatsq	-.0097862	.0192963	-0.51	0.613	-.047798 .0282256
_cons	-.6579631	1.490701	-0.44	0.659	-3.59449 2.278564

## General dissatisfaction with life (GDL)

Source	SS	df	MS	Number of obs =	241
Model	290.699597	18	16.1499776	F( 18, 222) =	8.38
Residual	427.606167	222	1.9261539	Prob > F =	0.0000
				R-squared =	0.4047
				Adj R-squared =	0.3564
Total	718.305764	240	2.99294068	Root MSE =	1.3879

gdl	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ufears	.3219744	.0541693	5.94	0.000	.2152226	.4287263
wurelian	.4108192	.1913667	2.15	0.033	.0336913	.787947
wstroke	.832797	.2621205	3.18	0.002	.3162342	1.34936
wspouse	-.8061269	.4028639	-2.00	0.047	-1.600054	-.0122001
uiadls	.1423716	.0541584	2.63	0.009	.0356413	.2491018
cantwhnd	-1.056661	.370461	-2.85	0.005	-1.786731	-.3265904
vexed	1.224267	.4735071	2.59	0.010	.2911229	2.157411
upercent	.2418207	.0910622	2.66	0.008	.0623638	.4212777
wbehav	-1.616812	.4197325	-3.85	0.000	-2.443982	-.7896424
ihc_walo	-.2421565	.078997	-3.07	0.002	-.3978366	-.0864764
ipc_had	-.0377193	.017385	-2.17	0.031	-.0719801	-.0034586
hcc_clof	-.0070774	.0032223	-2.20	0.029	-.0134276	-.0007272
dc_crit	1.503393	.4053386	3.71	0.000	.7045895	2.302197
ldc_fh	-.2484881	.1209852	-2.05	0.041	-.4869145	-.0100617
dcc_had	-.0175995	.0094581	-1.86	0.064	-.0362386	.0010396
m_alon	.7785266	.2489921	3.13	0.002	.2878361	1.269217
mc_long	-.0564687	.0257922	-2.19	0.030	-.1072977	-.0056398
re2_marr	-.0002114	.0001047	-2.02	0.045	-.0004177	-5.04e-06
_cons	1.004845	.4337273	2.32	0.021	.1500955	1.859595

. ovtest

Ramsey RESET test using powers of the fitted values of gdl  
 Ho: model has no omitted variables  
 F(3, 219) = 0.59  
 Prob > F = 0.6238

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity  
 Ho: Constant variance  
 Variables: fitted values of gdl  
 chi2(1) = 0.24  
 Prob > chi2 = 0.6264

. linktest

(sum of wgt is 2.3847e+02)

Source	SS	df	MS	Number of obs =	241
Model	290.706828	2	145.353414	F( 2, 238) =	80.90
Residual	427.598935	238	1.79663418	Prob > F =	0.0000
				R-squared =	0.4047
				Adj R-squared =	0.3997
Total	718.305764	240	2.99294068	Root MSE =	1.3404

gdl	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	.9811498	.3073488	3.19	0.002	.3756784	1.586621
_hatsq	.0033454	.0527316	0.06	0.949	-.1005349	.1072257
_cons	.0225113	.4252491	0.05	0.958	-.8152215	.8602441

## Dissatisfaction with life development score (DLD)

(sum of wgt is 2.3945e+02)

Source	SS	df	MS	Number of obs =	242
Model	65.5970591	22	2.9816845	F( 22, 219) =	6.90
Residual	94.6964493	219	.432403878	Prob > F =	0.0000
				R-squared =	0.4092
				Adj R-squared =	0.3499
Total	160.293508	241	.665118292	Root MSE =	.65757

dld	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
ufears	.1532446	.0261995	5.85	0.000	.1016093 .20488
vexed	.6943842	.2335744	2.97	0.003	.2340428 1.154726
wbehav	-.6877643	.2896176	-2.37	0.018	-1.258559 -.1169698
intneed	-.3178511	.0674046	-4.72	0.000	-.4506959 -.1850063
income	-.2839024	.1227541	-2.31	0.022	-.525833 -.0419718
wpic	-.4580434	.1169794	-3.92	0.000	-.688593 -.2274939
inft	-.0045741	.0016867	-2.71	0.007	-.0078984 -.0012499
cemploy	.3381361	.124113	2.72	0.007	.0935272 .5827449
wuhlthpb	.0561488	.0361149	1.55	0.121	-.0150285 .1273261
uownshs	-.2567354	.1114443	-2.30	0.022	-.4763759 -.0370948
dc_groc	.3062837	.1223582	2.50	0.013	.0651335 .547434
dcc_clof	-.0083192	.0027904	-2.98	0.003	-.0138187 -.0028196
ldc_beha	-.1617763	.0885581	-1.83	0.069	-.3363116 .0127589
hc_cstr	.2167613	.1135337	1.91	0.058	-.0069971 .4405198
lhc_skel	-.0738945	.0259742	-2.84	0.005	-.1250858 -.0227031
lhc_toil	-.1113813	.0435209	-2.56	0.011	-.1971547 -.025608
re_strk	.4147067	.2085593	1.99	0.048	.0036665 .8257469
re2_marr	-.0001295	.0000477	-2.71	0.007	-.0002236 -.0000355
rec_fh	-.0101377	.0038766	-2.62	0.010	-.017778 -.0024974
sw_prqd	.312507	.0885196	3.53	0.001	.1380477 .4869663
swc_hhwk	-.2095494	.093604	-2.24	0.026	-.3940294 -.0250693
nmc_sht	-.0007008	.0004047	-1.73	0.085	-.0014984 .0000969
_cons	2.253289	.3203585	7.03	0.000	1.621908 2.884669

. ovtest

Ramsey RESET test using powers of the fitted values of dld

Ho: model has no omitted variables

F(3, 216) = 5.54

Prob > F = 0.0011

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of dld

chi2(1) = 1.29

Prob > chi2 = 0.2552

. linktest

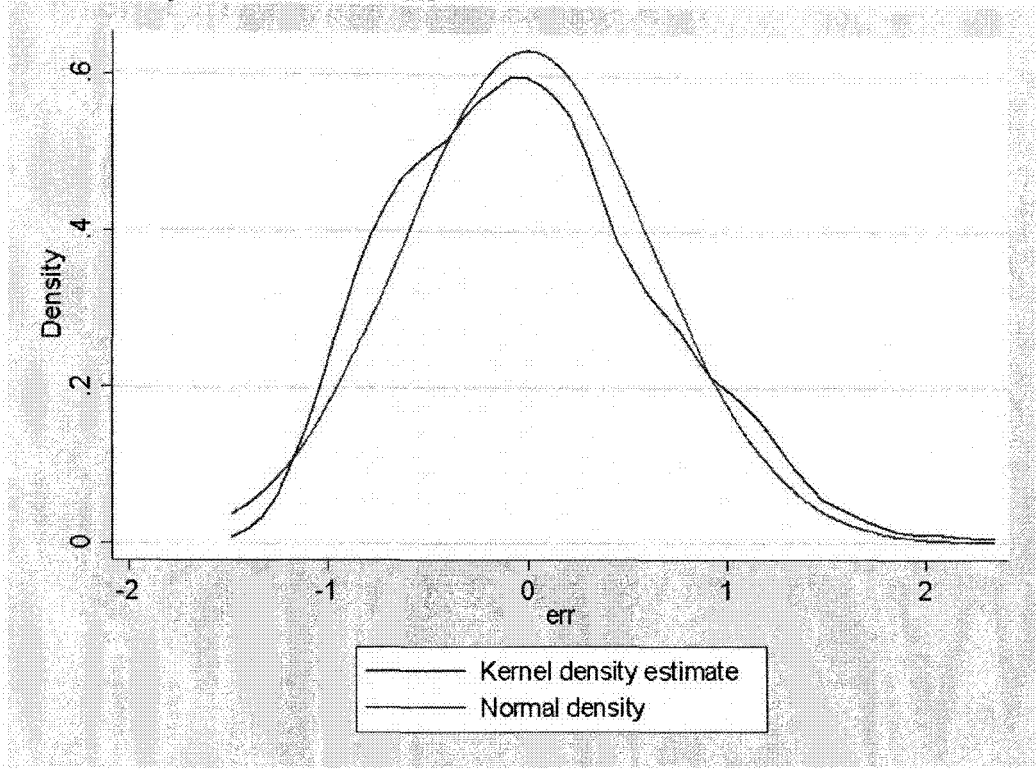
(sum of wgt is 2.3945e+02)

Source	SS	df	MS	Number of obs =	242
Model	67.3200182	2	33.6600091	F( 2, 239) =	86.53
Residual	92.9734902	239	.389010419	Prob > F =	0.0000
				R-squared =	0.4200
				Adj R-squared =	0.4151
Total	160.293508	241	.665118292	Root MSE =	.62371

dld	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
_hat	1.562096	.2779679	5.62	0.000	1.014516 2.109676
_hatsq	-.2265533	.1076499	-2.10	0.036	-.4386171 -.0144896
_cons	-.2869557	.1727863	-1.66	0.098	-.6273342 .0534228



Kernel density function of residuals



# Kosberg carer burden scale (KOSBERG)

Regression with robust standard errors

Number of obs = 161  
 F( 18, 142) = 16.43  
 Prob > F = 0.0000  
 R-squared = 0.5649  
 Root MSE = 2.7766

kos	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
wiadls	.580115	.1473294	3.94	0.000	.2888725	.8713574
cupbstr	3.081657	1.108126	2.78	0.006	.8911011	5.272213
mcmeal	1.609786	.4399353	3.66	0.000	.7401175	2.479455
hc_kats	2.472964	.7143245	3.46	0.001	1.06088	3.885049
hc_clof	2.670053	.5312231	5.03	0.000	1.619926	3.720181
hc2_katm	-.0001601	.0000763	-2.10	0.038	-.0003109	-9.29e-06
hc3_katm	4.68e-07	2.22e-07	2.11	0.037	2.88e-08	9.07e-07
dc_uben	4.094775	.6292303	6.51	0.000	2.850905	5.338644
dcc_kats	-.0791459	.024379	-3.25	0.001	-.1273385	-.0309533
dcc_kts2	.0006474	.0001582	4.09	0.000	.0003347	.0009601
ldc_cemp	-.5384103	.2036591	-2.64	0.009	-.9410059	-.1358148
re_hrsk	5.319755	.8084789	6.58	0.000	3.721546	6.917965
re_cemp	1.590195	1.108264	1.43	0.154	-.6006329	3.781024
rec_reli	-.0216294	.0100598	-2.15	0.033	-.0415157	-.001743
lre_cog	-.5471062	.2465773	-2.22	0.028	-1.034543	-.0596694
sw_wcost	-.6550904	.1639137	-4.00	0.000	-.9791168	-.3310641
dh2	-1.36e-08	7.27e-09	-1.87	0.063	-2.80e-08	7.74e-10
ldm	-.3165028	.1183823	-2.67	0.008	-.5505222	-.0824835
_cons	-.7349894	.5424253	-1.36	0.178	-1.807262	.3372827

. ovtest

Ramsey RESET test using powers of the fitted values of kos

Ho: model has no omitted variables  
 F(3, 139) = 5.45  
 Prob > F = 0.0014

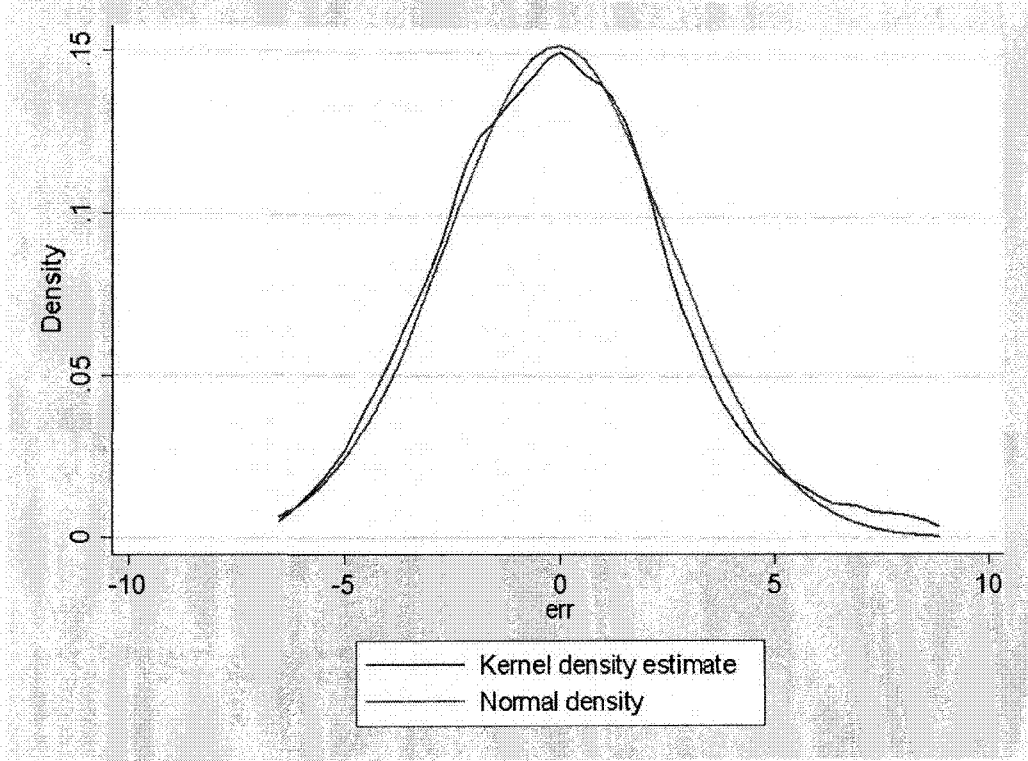
. linktest

(sum of wgt is 1.6293e+02)

Source	SS	df	MS	Number of obs =
Model	1496.27327	2	748.136637	161
Residual	1019.67727	158	6.45365361	F( 2, 158) = 115.92
Total	2515.95055	160	15.7246909	Prob > F = 0.0000
				R-squared = 0.5947
				Adj R-squared = 0.5896
				Root MSE = 2.5404

kos	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	.4519632	.1742483	2.59	0.010	.1078068	.7961196
_hatsq	.0571012	.0167427	3.41	0.001	.0240328	.0901696
_cons	.7659334	.3999876	1.91	0.057	-.0240788	1.555946

Kernel density function of residuals



# Improvement in relationships with family/friends due to services (IMPREL)

Regression with robust standard errors

Number of obs = 183  
 F( 9, 173) = 8.75  
 Prob > F = 0.0000  
 R-squared = 0.2382  
 Root MSE = 2.6874

imprel	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
pgc	-.099544	.051683	-1.93	0.056	-.2015543	.0024664
wcancer	-1.951026	.8820937	-2.21	0.028	-3.692077	-.209975
wdepr	-1.449114	.7477069	-1.94	0.054	-2.924917	.0266881
wpic	1.992992	.4736568	4.21	0.000	1.058102	2.927882
hc2_crit	.0000723	.0000288	2.51	0.013	.0000154	.0001292
rec_fh	.0693455	.02268	3.06	0.003	.0245804	.1141107
nvc_long	.0264543	.0055765	4.74	0.000	.0154477	.037461
dc_alon	-1.798065	.7591752	-2.37	0.019	-3.296504	-.2996271
dm_wcost	.0029255	.0016953	1.73	0.086	-.0004206	.0062717
_cons	7.175129	.6276842	11.43	0.000	5.936224	8.414034

. ovtest

Ramsey RESET test using powers of the fitted values of imprel

Ho: model has no omitted variables

F(3, 170) = 5.82  
 Prob > F = 0.0008

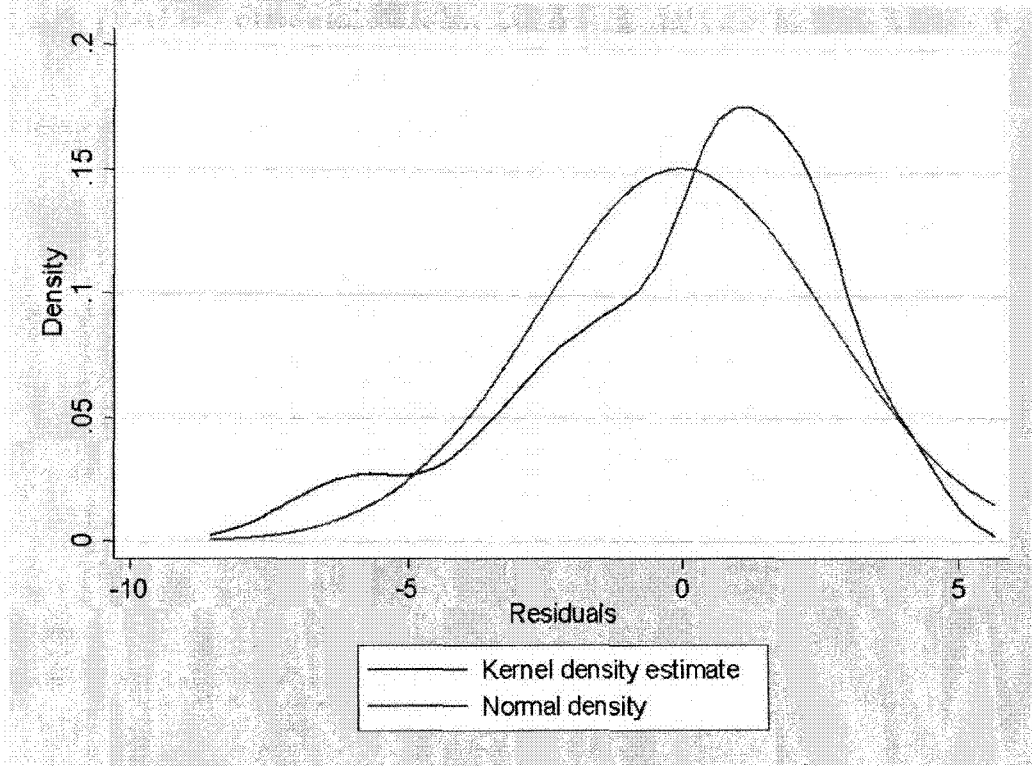
. linktest

(sum of wgt is 1.8115e+02)

Source	SS	df	MS	Number of obs = 183
Model	466.283842	2	233.141921	F( 2, 180) = 35.75
Residual	1173.90997	180	6.52172204	Prob > F = 0.0000
Total	1640.19381	182	9.01205389	R-squared = 0.2843
				Adj R-squared = 0.2763
				Root MSE = 2.5538

imprel	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	3.672075	.7957219	4.61	0.000	2.101932	5.242218
_hatsq	-.1897437	.0557544	-3.40	0.001	-.2997601	-.0797274
_cons	-8.953936	2.812173	-3.18	0.002	-14.503	-3.404871

Kernel density function of residuals



## Satisfaction with chances to meet people and socialise (SATSOC)

Regression with robust standard errors

Number of obs = 211  
 F( 9, 201) = 14.03  
 Prob > F = 0.0000  
 R-squared = 0.3060  
 Root MSE = .91748

satmeet	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
pgc	-.0922343	.0141686	-6.51	0.000	-.1201724	-.0642962
upercent	-.2204702	.0617436	-3.57	0.000	-.3422185	-.098722
vexed	-.7131185	.3662469	-1.95	0.053	-1.435298	.0090605
infhwk	.0359009	.0128129	2.80	0.006	.0106359	.0611659
dc_kats	-.9809957	.4859173	-2.02	0.045	-1.939145	-.0228462
dc_cpnb	-.1790688	.0587254	-3.05	0.003	-.2948658	-.0632719
ldc	.0907378	.0385682	2.35	0.020	.0146875	.1667881
hc2_long	.0000565	.0000151	3.74	0.000	.0000267	.0000863
nvc_katm	.0088148	.0022619	3.90	0.000	.0043547	.0132749
_cons	5.447618	.2487388	21.90	0.000	4.957146	5.938091

. ovtest

Ramsey RESET test using powers of the fitted values of satmeet

Ho: model has no omitted variables

F(3, 198) = 1.01  
 Prob > F = 0.3874

. \*\*hettest

. linktest

(sum of wgt is 2.0883e+02)

Source	SS	df	MS	Number of obs =	211
Model	76.1418136	2	38.0709068	F( 2, 208) =	47.23
Residual	167.660866	208	.806061857	Prob > F =	0.0000
				R-squared =	0.3123
				Adj R-squared =	0.3057
				Root MSE =	.89781
Total	243.80268	210	1.16096514		

satmeet	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	2.234055	.9001576	2.48	0.014	.4594527	4.008656
_hatsq	-.1621281	.1174702	-1.38	0.169	-.3937128	.0694567
_cons	-2.290944	1.707734	-1.34	0.181	-5.65763	1.075742

# Worker perception of impact (WKSAT)

Regression with robust standard errors

Number of obs = 319  
 F( 21, 297) = 35.32  
 Prob > F = 0.0000  
 R-squared = 0.2930  
 Root MSE = .75894

wksat	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
wcstress	-.2102825	.1049972	-2.00	0.046	-.4169153	-.0036497
clove	.4056165	.109722	3.70	0.000	.1896855	.6215475
employ	-.3404699	.1328695	-2.56	0.011	-.6019549	-.0789849
cantmeal	-.2031811	.1070478	-1.90	0.059	-.4138494	.0074871
cantbed	-.3639715	.1334643	-2.73	0.007	-.626627	-.101316
shortint	-.4661203	.2346668	-1.99	0.048	-.9279406	-.0042999
vexed	-.330427	.1738646	-1.90	0.058	-.6725896	.0117356
wcancer	-.3463762	.1222554	-2.83	0.005	-.5869728	-.1057796
whealth	.0648317	.0265889	2.44	0.015	.0125052	.1171583
pallcare	-1.459591	.1747464	-8.35	0.000	-1.803489	-1.115693
dc_katm	-.6244141	.1202205	-5.19	0.000	-.8610061	-.3878222
dcc_chaf	.0144755	.0034731	4.17	0.000	.0076405	.0213105
dc_reli	-.5184329	.1812495	-2.86	0.005	-.8751289	-.1617368
ldc_ualo	.090028	.0309312	2.91	0.004	.029156	.1509
hc_wcost	.0030522	.0008275	3.69	0.000	.0014238	.0046807
re_hrsk	-.3357222	.2098347	-1.60	0.111	-.7486735	.077229
re_walo	-.3930524	.150142	-2.62	0.009	-.6885294	-.0975755
rec_katm	.006293	.002782	2.26	0.024	.000818	.011768
rec_cemp	.0048112	.0026126	1.84	0.067	-.0003303	.0099527
drc_wash	.0001851	.0000348	5.33	0.000	.0001167	.0002535
hmc_hrel	.0004528	.0001868	2.42	0.016	.0000851	.0008204
_cons	2.671594	.136969	19.51	0.000	2.402041	2.941147

. ovtest

Ramsey RESET test using powers of the fitted values of wksat  
 Ho: model has no omitted variables  
 F(3, 294) = 2.03  
 Prob > F = 0.1097

. \*\* hetttest

. linktest

(sum of wgt is 3.1932e+02)

Source	SS	df	MS	Number of obs =	319
Model	71.2505738	2	35.6252869	F( 2, 316) =	65.95
Residual	170.708746	316	.54021755	Prob > F =	0.0000
Total	241.95932	318	.760878364	R-squared =	0.2945
				Adj R-squared =	0.2900
				Root MSE =	.73499

wksat	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	1.453793	.5633148	2.58	0.010	.3454713	2.562114
_hatsq	-.0805024	.0987243	-0.82	0.415	-.2747425	.1137376
_cons	-.6216015	.8024702	-0.77	0.439	-2.200461	.9572582

**Appendix Table 6.1 Area rankings of outcome goals at the time of reforms**

Outcome goal	All LAs		Local authorities																							
	AR s.d.	AR	0	1	2	3	4	5	6	7	8	9	AR s.d.	AR	AR s.d.	AR	AR s.d.	AR	AR s.d.	AR	AR s.d.	AR	AR s.d.	AR	AR s.d.	
Access to services to users who had previously done without either any help or appropriate help	4.0	1.7	3.5	1.6	3.4	1.7	4.1	1.7	3.8	2.2	3.7	1.3	2.8	1.2	4.6	1.0	4.3	1.5	4.3	2.2	5.1	1.6				
Empowerment, choice and control over their own lives for users	2.5	1.5	2.6	1.5	2.7	1.6	2.0	1.3	2.2	1.3	2.6	1.5	2.6	1.0	2.4	1.5	2.3	1.9	3.5	1.7	2.7	1.6				
Chance for more users to stay at home rather than enter care home	1.9	1.2	3.0	1.4	2.1	1.6	2.3	1.7	2.4	1.7	1.3	0.5	1.5	0.7	1.5	0.8	2.1	1.0	1.4	0.7	1.4	0.7				
Chance to regain as much independence as possible through rehab. and skill-enhancing services	4.1	1.6	1.9	1.0	3.6	1.5	4.0	1.6	4.3	1.3	4.7	1.5	4.5	1.4	4.4	1.1	4.0	1.8	4.3	1.6	4.7	1.7				
Support for family carers to enable them to have respite	3.5	1.1	4.5	1.1	3.8	1.0	3.5	1.1	3.6	1.0	3.4	1.1	4.0	1.3	2.8	0.8	3.3	1.1	3.2	1.0	3.1	1.0				
Raising charges in order to generate income so that services can be extended to those who need subsidised care	6.1	1.2	6.5	0.8	6.1	1.5	5.6	1.0	6.5	0.9	5.8	1.1	6.6	0.7	6.8	0.4	6.0	1.3	5.7	1.4	5.9	1.6				
Emphasising welfare gains for users irrespective of cost to the local authority	6.1	1.1	6.0	1.3	6.3	0.7	6.7	0.6	5.7	1.6	6.6	0.5	6.3	0.7	5.7	1.3	6.1	1.0	5.7	1.4	5.7	1.0				
Number of staff interviewed	131		8		13		13		10		11		14		19		11		17							

AR= average rating; s.d.= standard deviation.

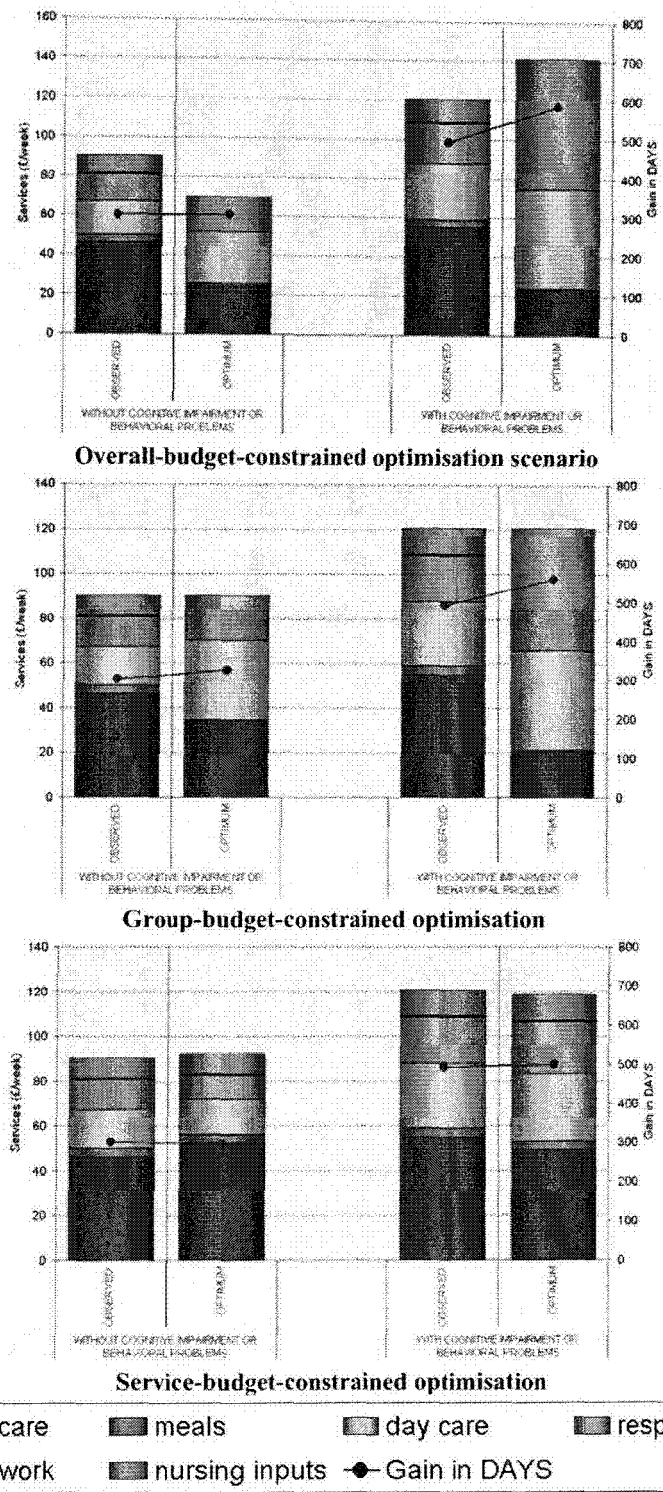


**Appendix Table 6.2 Area rankings of means to achieve goals at the time of reforms**

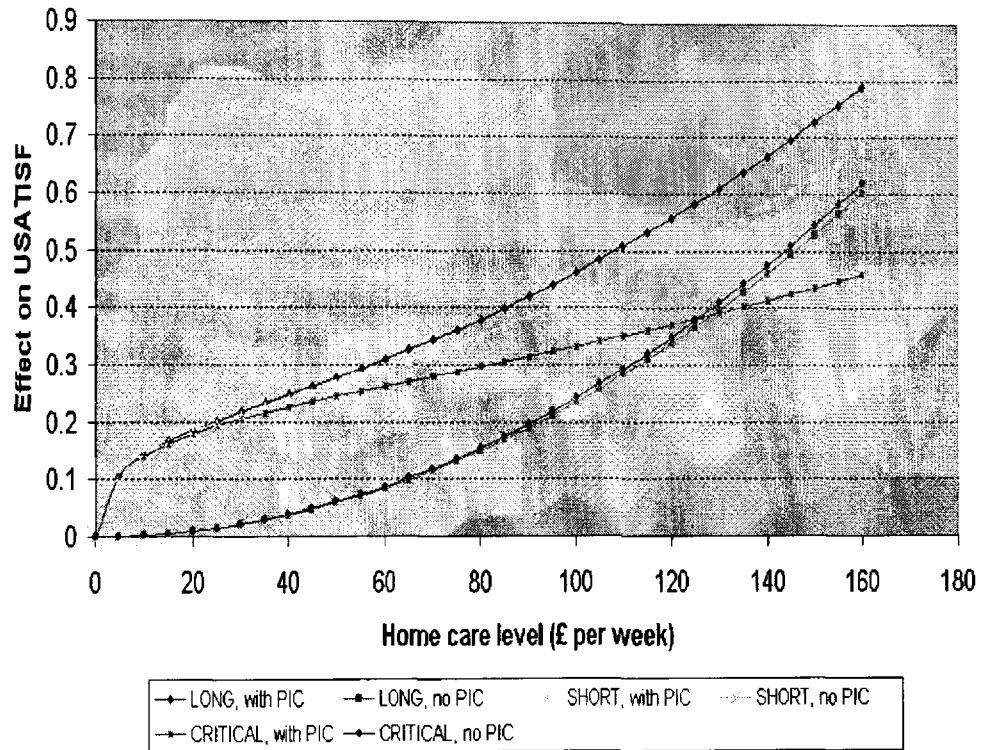
Means	Overall		Local authorities																			
	A.R	s.d.	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
Assessments which are needs led rather than service-led	1.80	1.72	1.88	1.46	1.53	1.60	1.92	1.93	1.77	1.69	1.64	1.50	2.36	2.53	1.08	.28	2.26	2.10	1.00	.00	2.12	1.76
Support for family carers to enable them to continue their caring	4.45	2.10	5.50	2.00	4.53	2.07	4.92	4.92	4.85	1.95	4.27	2.33	4.29	1.98	3.69	1.75	4.26	2.40	4.27	2.28	4.35	2.03
A chance for front-line staff to use their resourcefulness to find, develop and use cost-effective options from different sources	4.92	2.10	4.25	2.12	3.93	1.87	4.38	2.43	5.69	1.89	3.64	1.57	4.93	2.27	6.77	.83	5.05	2.17	5.73	1.79	4.65	2.12
The encouragement of preventive and outcome related approaches among front-line workers as opposed to crisis intervention	6.10	1.61	6.63	1.06	5.47	1.88	6.69	1.11	6.15	1.57	6.09	2.07	6.14	1.46	5.46	1.85	6.16	1.71	6.00	1.79	6.35	1.32
The provision of a mainstream domiciliary care by independent providers	6.26	1.47	6.13	1.64	7.00	.00	6.15	1.57	5.31	2.14	6.55	1.21	6.36	1.28	7.00	.00	6.68	.75	5.73	1.79	5.53	1.97
The targeting of charges on those most able to make a contribution	6.78	.71	6.63	1.06	7.00	.00	6.46	1.20	7.00	.00	7.00	.00	6.86	.53	7.00	.00	6.84	.50	6.09	1.38	6.76	.56
Successful joint working with local hospitals in respect of appropriate, safe and timely discharge back home	4.96	1.89	6.13	1.46	5.73	1.67	4.23	1.74	4.38	1.94	4.27	2.20	5.43	1.99	4.92	1.61	4.53	2.01	4.36	1.75	5.65	1.80
Successful joint working with local community health services in respect of assessment and service provision	5.43	1.86	5.25	1.49	4.73	2.09	6.15	1.41	4.54	1.81	5.09	1.64	6.21	1.53	5.46	1.61	5.42	1.87	5.45	2.07	5.82	2.35
Value for money and improvement the use of expenditure over time	6.13	1.57	6.25	1.75	6.33	1.59	5.69	1.60	5.54	2.22	6.09	1.64	6.50	1.29	5.77	2.01	6.47	1.02	6.27	1.19	6.18	1.51
Controlling growing expenditure as demand for community care builds up	6.13	1.60	6.38	.74	6.47	1.41	6.54	.78	5.38	2.26	6.73	.65	6.93	.27	6.08	1.44	5.26	2.28	6.55	.82	5.65	2.03
An investment in fundamental reform, as opposed to pragmatic changes, to existing skills, policies and structures	6.73	.89	6.38	1.77	6.60	1.12	6.62	.77	6.69	1.11	6.73	.65	6.64	1.08	7.00	.00	6.63	1.01	7.00	.00	6.94	.24
Generating routine data to inform service commissioners and providers	6.66	.95	6.13	1.46	6.47	1.06	6.77	.83	6.54	1.66	6.82	.60	6.64	.93	6.77	.60	6.58	1.02	6.91	.30	6.82	.53
Ensuring that services are flexible and diverse so that singly or in combination they can to meet most individual needs	4.88	2.00	3.13	2.10	4.33	1.50	4.77	2.13	5.92	1.71	6.00	1.55	5.64	1.91	4.15	1.99	4.79	2.02	4.91	1.97	4.76	2.17
Separating service commissioning from provision at the case level	6.28	1.44	7.00	.00	6.87	.35	5.77	2.09	6.77	.83	5.91	1.81	6.57	.85	6.08	1.80	6.21	1.36	6.64	1.21	5.41	1.80
Number of cases	134		8		15		13		13		11		14		13		19		11		17	

AR= average rating; s.d.= standard deviation.

**Appendix Figure 7.1 Input mix efficiency for length of stay in the community (DAYS) by cognitive impairment**



**Appendix Figure 7.2 Combined home care effect on USATISF for six case types in optimisation analysis**



**Declaration regarding joint authorship**