



COPENHAGEN  
CONSENSUS  
CENTER

# THE DANISH HEALTH CARE SYSTEM: AN ANALYSIS OF STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

## THE CONSENSUS REPORT

Kjeld Møller Pedersen,  
University of Southern Denmark

Mickael Bech,  
University of Southern Denmark

Karsten Vrangbæk,  
AKF Danish Institute of Governmental Research

**The Danish Health Care System:**  
**An Analysis of Strengths, Weaknesses, Opportunities and Threats**

Kjeld Møller Pedersen, Mickael Bech, Karsten Vrangbæk

ISBN - 978-87-92795-00-7

## Table of Contents

<b>Table of Contents .....</b>	<b>2</b>
<b>Summary .....</b>	<b>6</b>
<b>A snapshot of the Danish health system .....</b>	<b>8</b>
<b>Framework.....</b>	<b>10</b>
<b>Overview of challenges (threats) and opportunities .....</b>	<b>12</b>
Challenges .....	12
Opportunities .....	12
<b>Overview of strengths and weaknesses .....</b>	<b>13</b>
Strengths .....	13
Weaknesses.....	13
Objectives of the Danish health system .....	14
Solutions.....	15
<b>Challenges.....</b>	<b>16</b>
Demographic development: Aging and stagnating number of occupationally active .....	16
The manpower situation: shortage .....	18
Fiscal sustainability: difficult to finance the health system of the future .....	18
<i>Expenditure development 1999-2008 .....</i>	<i>18</i>
<i>Determinants of growth in health expenditures .....</i>	<i>20</i>
<i>Prognosis for health care expenditures .....</i>	<i>21</i>
(In)equity issues .....	24
<i>Inequity in life style/risk factors .....</i>	<i>27</i>
<i>Inequity in access .....</i>	<i>29</i>
<b>High expectations.....</b>	<b>29</b>
<b>Globalization/Europeanization of health care markets &amp; health tourism.....</b>	<b>31</b>

Integration of private providers and financing with a universal and comprehensive public health care system and the creation of a level playing field for competition.....	31
<b>Opportunities.....</b>	<b>33</b>
Personalized medicine .....	34
New technologies.....	35
Expectations and competencies of the population participation and self care .....	35
<b>Strengths.....</b>	<b>36</b>
Patient rights .....	36
Choice and waiting time guarantees.....	36
<i>Choice of primary care</i> .....	36
<i>Choice of hospitals</i> .....	37
High patient satisfaction and trust.....	37
Easy access in primary care, incl. gatekeeper role .....	38
(Reasonable) expenditure control, including efficiency and reimbursement systems .....	38
Introduction of ‘packages’ for cancer and certain cardiac conditions and fast track issue .....	39
Work in progress on (coherent) patient pathways .....	40
Increased focus on palliative care/end of life care .....	40
Considerable investments in new hospitals.....	41
Strengthening of pre-hospital treatment/care .....	42
Quality assurance and monitoring .....	43
Well functioning multi-level democratic structures for integrated decision making and implementation.....	46
<b>Weaknesses .....</b>	<b>47</b>
Tensions within the democratic multilevel governance structure: Limited voter interest and unclear role for politicians at decentralized levels.....	47
Ambivalence towards strengthening of prevention and health promotion .....	48
Ambivalent attitude towards explicit political priority setting.....	49

Tight budgets and/or wrong allocation and activity based financing .....	50
Life expectancy and health status .....	51
Slow introduction of new treatments? .....	53
Lack of vision for new hospitals, i.e. 'hospitals of the future' and a vision for primary care .....	55
Too slow take up of the chronic care model? .....	56
Cooperation between municipalities – GPs – hospitals .....	59
Lack of focus on rehabilitation .....	59
Inequity .....	60
<b>Solutions .....</b>	<b>61</b>
What is an added life year worth? .....	62
Telemedicine: Large scale pilot projects for monitoring the chronically ill.....	63
<i>Proposal</i> .....	66
Methods for prioritization and proposal for an institute for priority setting analyses .....	67
Co-payment.....	70
Co-payment in Denmark and the Nordic countries .....	70
<i>Proposal</i> .....	71
Improve equity in health/use of health care.....	73
<i>Proposal</i> .....	74
Reducing the number of infections and adverse events.....	75
<i>Proposal</i> .....	75
Screening for diabetes and health check up in general practice.....	76
<i>Proposal</i> .....	76
Improved psychiatry.....	77
<i>Proposals</i> .....	77
End of life .....	78
<i>Proposal</i> .....	80



Diagnostic centers/fast track diagnosing and evaluation .....	80
Summary for solutions .....	82
<b>Endnotes .....</b>	<b>84</b>
<b>References .....</b>	<b>94</b>

## Summary

The organizing framework for this essay is an analysis of strengths and weaknesses of the Danish health system along with threats (challenges) and opportunities – a so-called *SWOT-analysis*. This is followed by 10 proposals (*'solutions'*) to the combined set of issues.

It is easy to come up with proposals that will increase the benefit scope and levels of health services provided *and* hence increase expenditures. However, *the whole point of the SWOT analysis is to identify areas worthy of attack* because they threaten the sustainability of the health system as we know it, run counter to the objectives of the system, e.g. equity, or are glaring weaknesses. Rational decisions about improvements must be based not only on a helicopter view of the health care system via the SWOT analysis, but improvements must be selected so that they have the biggest impact per monetary unit expended. Therefore, whenever possible and relevant it has been attempted to provide a very rough estimate of the cost-benefit ratio of particular solutions. Numerous references support both the SWOT-analysis and the solution section to underpin the factual basis of the report.

The *three major challenges* are interrelated: 1. Demography (aging, more chronically ill), 2. The manpower situation (a declining workforce), and 3. Fiscal sustainability in view of not only the demographic development but also the welfare effect of a steadily increasing income level: When gross domestic product, GDP, increases by one percent, health expenditures increase by 1.2 - 1.3%, hence gradually capturing a greater share of GDP. The fiscal challenge may threaten the tax financed health system. The question of mid- and long-term sustainability will require a strong political will to establish priorities within very narrow fiscal limits. Another considerable challenge is related to (in) equity in health outcome (mortality/life expectancy and morbidity). As regards inequity in health outcome it should be remembered that it is influenced by many other factors other than the health care system, for instance the work environment. - Yet another challenge relates to rising expectations about what can and should be provided by the health care system (free at the point of use).

On the *opportunity* side new treatments are at the core of attention, in particular opportunities that at one and the same time provide better treatment and do not increase costs (very much). Telemedicine is an example. The potential is considerable, but the cost-saving potential remains to be demonstrated convincingly. - The hospital investment plan provides an opportunity for rethinking the hospital of the future, logistics etc.

Patient rights, free choice, a high degree of patient satisfaction, the ambitious hospital investment plan, productivity gains, and quality monitoring are examples of *strengths* of the Danish health care system. On the *weakness side* ambivalence towards prevention and health promotion, possibly too slow introduction of new treatments, ambivalence towards explicit priority setting, low life expectancy, and a need for improved cooperation between hospitals, GPs, and the municipalities can be mentioned.

The 10 chosen *solutions* in the table below are chosen based on how well they taken together address the challenges and the weaknesses identified in the SWOT-analysis. As noted above very rough estimates of the cost-benefit ratio for most of the solutions have been included in the right hand

column. They are not based on detailed calculations – and in the case of solution 10 (diagnostic centers) it really is a guesstimate.

	<b>Solution</b>	<b>The solution addresses the following SWOT-elements and objectives</b>	<b>Cost-benefit ratio and/or costs per quality adjusted life years, QALY</b>
1.	Increased use of telemedicine: Project with brief-case for tele-monitoring/advising the chronically ill	Demographic challenge (the chronically ill), the fiscal challenge and population expectations	CBA ratio 1: 1 - 2
2.	Cost-effective preventive activities/health promotion: Health tests and health consultations ad modum Ebeltoft	Demographic challenge (the chronically ill) and the low life expectancy	CBA- ratio: 1: 26 (a net-benefit per participant of DKK 26,000)
3.	Hospital palliative care – hospice at end of life	Demographic challenge and the population's expectations	Cost-minimization analysis points to palliative care/hospice care
4.	Improve equity in health/use of health care	Inequity issues	Somewhat meaningless to develop a CBA-ratio
5.	National Institute for Priority Setting, NIPS, Methods for (explicit) priority setting	Fiscal challenge and legitimacy of the public health care system	CBA-ratio: at least 1:1 and most likely 1: >1
6.	Expensive medicine	Institution for priority setting	CBA-ratio: at least 1:1 and most likely 1: >1
7.	Reducing the number of infections and adverse events'	Fiscal challenge and quality of care	CBA-ratio: at least 1:17
8.	Co- payment	Fiscal challenge	CBA-ratio: 1:13
9.	Improved psychiatric treatment/care	Weakness, psychiatry has fallen behind	For depression the costs per QALY ranges from \$ 15-35,000 - which is 'good value'. No cost-benefit ratio has been estimated.
10.	Diagnostic centers/fast track diagnosing	Access and coherent patient pathways	<i>Guesstimate</i> CBA-ratio: 1:1 and likely 1:>1



## A snapshot of the Danish health system<sup>A</sup>

During a typical year almost all Danes use health care services<sup>1</sup>:

- in 2006 90% of the population used health services i.e. consulted a GP, was hospitalized, used hospital outpatient services etc.

Compared to most other public services, health care is used throughout life, not just some stage of life like schools or nursing homes. This in turn means that everybody is affected by how well the health system works. In opinion polls about high concern political topics health care always rates among the top five.

The services are provided by a health workforce of about<sup>2</sup> 102,000 full time equivalents – about 4% of the total work force.

*Public expenditure* for health care provided by hospitals, GPs, etc. and drugs in 2008 was<sup>2</sup>:

- Dkr. 18,100 per citizens (public expenditures) per year of which Dkr. 13,500 is used for hospital services per year
- The average Dane privately pays Dkr. 4,100 per year out of pocket (co-payment)
- Total health expenditures have increased annually by 2.8% in real terms for the past 10 years
- Internationally the Danish spending level and growth rate is low.

Patients express a high degree of *satisfaction* with hospital care. The 2009 survey of about 70,000 hospitalized patients and 160,000 outpatients showed<sup>3</sup>

- that 90% of hospitalized patients found the overall experience either very good or good
- that 95% of patients receiving ambulatory hospital care found the overall experience either very good or good.

Patient satisfaction with GPs is also high (Statens Institut for Folkesundhed, 2011):

- 89% were very or somewhat satisfied – satisfaction increasing with age

*Waiting time* for elective surgery for the most common 17 operations, e.g. hip and knee replacement, cataract, hernia, and kidney stone<sup>4</sup> is relatively low compared to other tax financed health systems:

- an experienced average time of 63 days (calculated January – August 2010)

The extended *free hospital choice* gives citizens the right to use privately run facilities free of charge if waiting time at public hospitals exceeds one month. From fourth quarter 2009 to third quarter 2010

---

<sup>A</sup> The 200+ references appear in two formats: the majority appear as superscripts, but a number appear in rounded brackets, e.g. (Jensen 2011). The former are found under 'Endnotes' while the latter are listed alphabetically under 'References'.

- about 123,000 used this choice

A possible side effect of hospitalization is *hospital acquired infections*, e.g. wound infections. In 2009-2010 close to one of every 10 hospitalized patients had a hospital acquired infection<sup>5</sup>

- a prevalence of between 8.2 – 10.1% for hospital acquired infections.

The reporting system for *adverse events/unintended consequences* in connection with hospital treatment in 2009 received

- about 25,000 reports from the regions – of which 1.3% were graded as very serious

*Life expectancy* is often interpreted as a success measure for a health system. Life expectancy is influenced by many other things than the consumption of health care services, for instance life style. This said, however:

- Life expectancy for Danish males and females is among the lowest among the European OECD countries.

It is difficult to pass judgment on how well a health system is working. In part because the underlying objectives on which to evaluate the system may differ across different parties, in part because there should be some basis for comparison, e.g. other countries or a clearly delimited base line, and independent observers.

In the 2008 OECD Survey of Denmark<sup>6</sup> a chapter of 57 pages was dedicated to an evaluation of the health system and important challenges. The summary was clear:

*“Over the past few years, the Danish health system has improved. Yet when looking ahead, further pressures should be expected from new costly medical technologies expanding the range of conditions that can be treated, as well as from continued demand for shorter waiting times and care that responds to individual needs. Managing healthcare spending may well be the largest fiscal challenge over the coming decades. Sustaining universal public health insurance financed by general taxation should be feasible, but it will require continued efforts to enhance efficiency via organizational adjustments, refined economic incentives and the adoption of cost-saving treatment practices. At the same time, promoting healthy nutrition and lifestyles should have higher priority, and the system as a whole should be more engaged in helping to prevent people with health problems ending up being excluded from the labour market.” (p. 123).*

The Ministry of Health in February 2010 published an in-house produced benchmarking of the Danish hospital system<sup>7</sup>. The comparison was made vis-à-vis seven European countries: Sweden, Norway, Finland, the UK, Germany, the Netherlands and France. It was concluded that

*“Generally, the benchmarking study shows that the Danish hospital sector performs well in most areas compared with the seven countries in the publication and with the average of the OECD countries. With respect to Denmark, it should be underlined that access to health care is good*

*with relatively short waiting times, and that Denmark has the lowest proportion of citizens who experience unmet needs for medical examination among the countries benchmarked. In the area of heart disease treatment the quality is high, whereas Denmark performs less well in the area of cancer treatment.” (p. 5)*

## Framework

The brief for this analysis says that the authors have to develop possible and realistic solutions to the problems and challenges that the Danish health care will face over the coming years. It has been indicated that about 10 ‘solutions’ should be developed. The proposals should not be narrow, e.g. only focusing on hospitals or general practice, but cover important dimensions of health care. However, in order to come up with timely and relevant solutions it is necessary to sketch some of the challenges the Danish health care system faces over the next couple of decades. To this end a SWOT analysis will be developed.

SWOT analyses are not new. For instance, a few years back a group of foreign scholars visited Denmark and undertook a SWOT-analysis of the Danish Health Care System as of 1998/1999<sup>8</sup>. A SWOT analysis is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities, and Threats for an organization – or in this case, the whole health care system. It involves specifying the objectives of the business unit/health care system and identifying internal and external factors that are favorable and unfavorable to achieving the system objectives, namely SWOT.

The four letters cover:

**Strengths:** are *internal* characteristics of the business or the system. Ideally it should be compared to other systems to gain an impression of the relative strength. However, this comparative aspect will only be touched upon marginally in the following. .

**Weaknesses:** are *internal* characteristics that need to be addressed.

**Opportunities:** *external* chances to make greater sales or profits in the environment.

**Threats:** *external* elements in the environment that could cause trouble for the business/health system.

Identification of SWOTs is essential because subsequent steps in the process of planning for achievement of the selected objective ideally should be derived from the SWOTs.

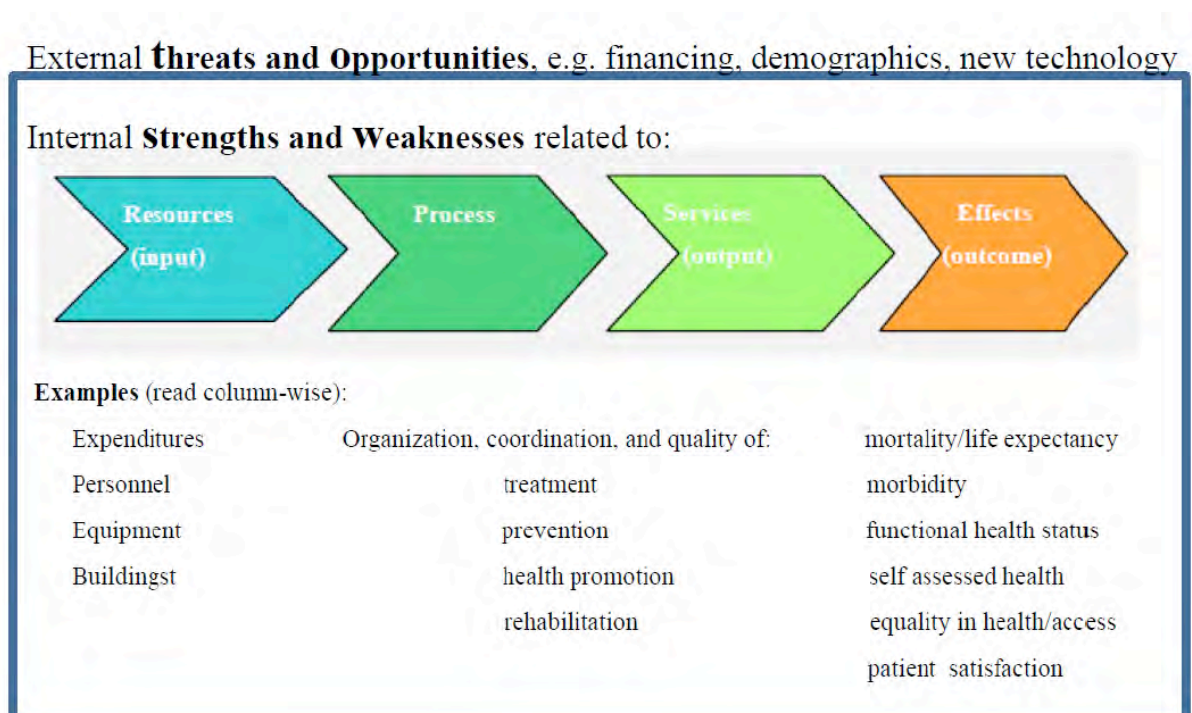
The figure below shows how the SWOT-analysis can be turned into (strategic) solutions by developing adequate and relevant responses to the four SWOT dimensions. It also clarifies in a logical manner which problems specific solutions are aimed at. In some cases a threat, e.g. a fiscal external threat may actually block other solutions. If the growth rate in health expenditures is constrained, it to a considerable extent limits some types of solutions, namely those that require an expansion of the overall health budget.

**Table 1: Combined SWOT analysis and proposed solutions (1 ...N means items/topics)**

		Internal characteristics	
		Strengths (S) 1 ...N	Weaknesses (W) 1 ...N
External characteristics	Opportunities (O) 1 ...N	(SO) Solutions 1 ...N	(WO) Solutions 1 ...N
	Threats (T) 1 ...N	(ST) Solutions 1 ...N	(WT) Solutions 1 ...N

Of course it is only a framework. In some cases we will deviate from it, for instance because some solutions both further develop positions of strength and alleviate weaknesses or that some threats or opportunities may be internal and not external.

The SWOT analysis takes place within the (figurative) framework of the figure below:



In the space allocated for the present analysis only some of the areas shown in Figure 1 will be touched upon.

## **Overview of challenges (threats) and opportunities**

### ***Challenges***

- a) demographic development (elderly, more chronically ill)
- b) life style induced illnesses in the welfare society and equity issues
- c) fiscal challenges; in part due to the demographic challenge. –The overarching issue is the long-term sustainability of a tax funded health system
- d) manpower shortage and the challenge of educating and recruiting staff with the right mix of knowledge and skills in all parts of the system
- e) inequity in access, utilization of service, and in health outcome
- f) high expectations in the population and sustaining legitimacy and trust of the public in the health system in the long run
- g) globalization/Europeanization of health care markets & health tourism
- h) how to integrate private providers and financing within a universal and comprehensive public health care system and how to create a level playing field for competition.

### ***Opportunities***

- i) new treatments, e.g. personalized medicine. .
- j) new technology, e.g. telemedicine, digital infrastructure (EPR, patient management, quality assessment) or transition to (more) ambulatory care
- k) expectations and competencies of the population participation and self care
- l) redesign of work processes in the whole health system (in part due to the fiscal pressure, but also due to new hospital facilities). Fast track procedures, patient pathways
- m) ‘hospital of the future’ – new hospital facilities and organizations along with ‘primary care of the future’.
- n) Interaction with private sector (business and NGO) for development of new organizational forms, medical practices and technologies

## **Overview of strengths and weaknesses**

Strengths and weaknesses is a sliding scale and classification of particular phenomena depends on the 'cut-off' point on this scale. Furthermore, strengths and weaknesses are relative concepts and therefore require some kind of base of comparison. Here the objectives of the Danish health care system are used.

### ***Strengths***

- a) quality assurance system (almost) in place, including 'unintended consequences'
- b) (apparently) good treatment quality (NIP) (but limited evidence for relative performance compared to other countries)
- c) patient rights
- d) high patient satisfaction
- e) easy access in primary care
- f) free hospital choice – and low waiting time
- g) (reasonable) expenditure control
- h) introduction of 'packages' for cancer and certain cardiac conditions
- i) work in progress on (coherent) patient pathways
- j) increased focus on palliative care/end of life care
- k) considerable investments in new hospitals
- l) strengthening of pre-hospital treatment/care
- m) balance of public-private (provides an opportunity to discuss 'privatization')
- n) reasonably well functioning multi-level democratic structures for integrated decision making and implementation
- o) a very effective general practice sector and a reasonable well organized primary care sector in general

### ***Weaknesses***

- a) low life expectancy
- b) (too) slow introduction of new treatments
- c) ambivalence towards strengthening of prevention/health promotion
- d) ambivalent attitude towards explicit priority setting

- e) too slow introduction of the chronic care model
- f) lack of vision for new hospitals, i.e. 'hospitals of the future', and primary care of the future
- g) too tight budgets (?).
- h) has psychiatry inadvertently been left a bit behind? (fairly low growth rate compared to somatic hospital care)
- i) cooperation between municipalities – GPs – hospitals
- j) lack of focus on rehabilitation
- k) cooperation with/integration of private delivery organizations and the creation of a level playing field for competition
- l) relatively poor results in some areas (e.g. breast and colorectal cancer)
- m) introduction of ABF and other new incentives tend to weaken expenditure control
- n) tensions within the democratic multilevel governance structure: Limited voter interest and unclear role for politicians at decentralized levels.
- o) Some geographical differences in access to health care
- p) Misc. inequity issues

### ***Objectives of the Danish health system***

As mentioned earlier the SWOT-elements should be evaluated in the light of the objectives of the health care system. The Health Act of 2007 consolidated a number of existing acts and was passed by the Folketinget (the Danish Parliament) and hence can be considered as the officially stated objectives of Danish health care.

In the Health Act of 2007 the first two articles set out the objectives of the Danish health care system. At the general level the overall objective is to improve population health and at the individual level to prevent and treat illness and alleviate suffering and functional restrictions. Article 2 is more specific:

- easy and equal access to health care,
- treatment of high quality
- coherent and linked services
- free choice of health care provider
- easy access to information
- a transparent health care system

- short waiting time for treatment.

### ***Solutions***

Solutions should be developed so that they address relevant SWOT-elements and furthermore should contribute to fulfillment of the system objectives above, cf. the table above with the strategic content of the SWOT.

	<b>Solution</b>	<b>The solution addresses the following SWOT-elements and objectives</b>
1.	Increased use of telemedicine	Demographic challenge (the chronically ill), the fiscal challenge and the population's expectations
2.	Cost-effective preventive activities/health promotion/health promotion in the work place	Demographic challenge (the chronically ill) and the low life expectancy
3.	Hospital palliative care – hospice at end of life	Demographic challenge and the population's expectations
4.	Improve equity in health/use of health care	Inequity issues
5.	Methods for (explicit) priority setting	Fiscal challenge and legitimacy of the public health care system
6.	Expensive medicine	Institution for priority setting
7.	Reducing the number of infections and adverse events'	Fiscal challenge and quality of care
8.	Co-payment	Fiscal challenge
9.	Improved psychiatric treatment/care	Weakness, psychiatry has fallen behind
10.	Diagnostic centers/fast track diagnosing	Access and coherent patient pathways



## Challenges

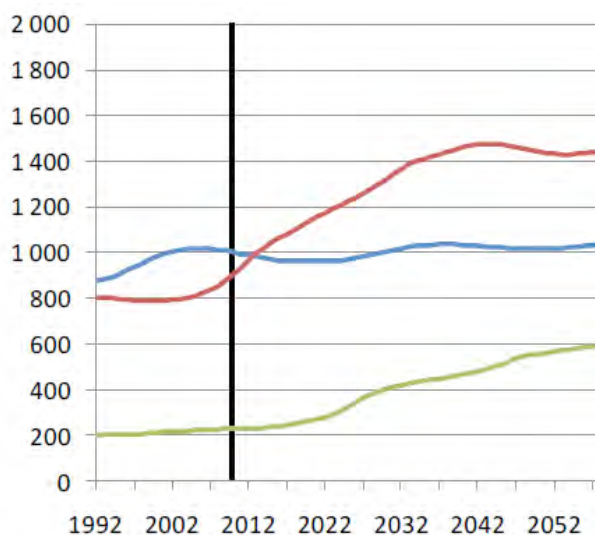
The biggest challenge facing the Danish health system is the demographic development. It has been recognized for the past 10-15 years, but really first came into focus in the new millennium<sup>9, 10</sup>. If overlooked, observers will not understand the dilemmas and the need for change facing the health system over the next 1 – 2 decades. As such it concerns the whole society, but here we limit ourselves to the ramifications for health care:

- Expenditure consequences of an increasing number of elderly and increased life expectancy
- Manpower situation
- Financing: eroding tax base for income taxation which is the main source of financing for the health system

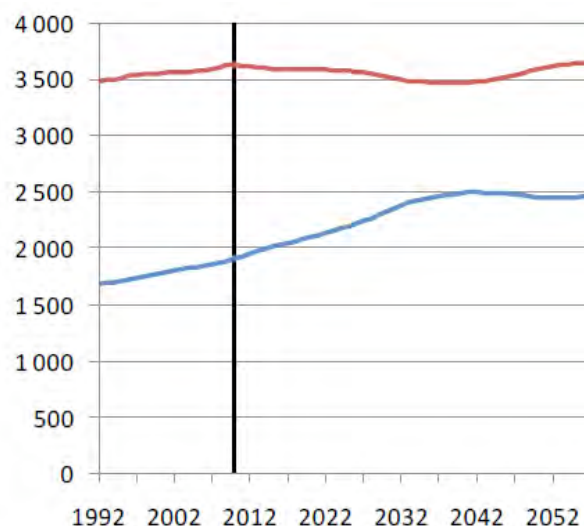
### ***Demographic development: Aging and stagnating number of occupationally active***

There is truth to the saying that in the long run we are all dead. However, in order to build a sustainable health system we have to take stock of important future developments. The demographic development probably is the most important, and even if we look 30-40 years into the future we cannot hope for reversals of the predicted trends. It may appear abstract to look just 20-30 years into the future, but current woes in the health system will worsen if no corrective action is taken.

**Figure 1: Development 1992-2060 for three age groups: 0-14 (blue), 80+ (green) and +65 (red)**



**Figure 2: Development 1992-2060 for the occupationally active (15-64, red line at the top) and occupationally inactive (0-14, 65+)**



Source: DREAM model (Hansen, 2010)

Figure 1 illustrates the development for three age groups from 1992 and until 2060. Over the next 30 years the number of persons 65 years of age and above will increase in absolute terms by approx. 400,000 persons.

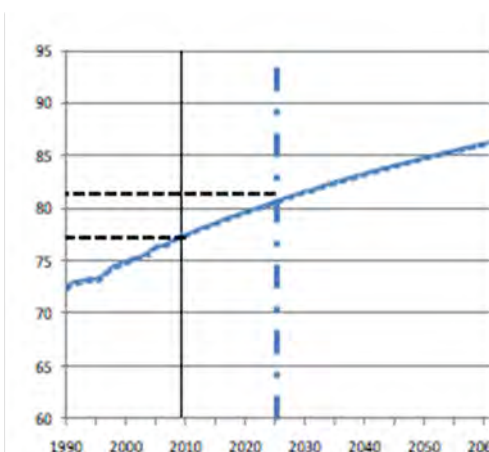
If we look at the 80+ year group in isolation, this group will increase by approx. 200,000 over the same period. The Danish population is in truth aging. For health and social services this in general terms implies an increasing need for treatment, nursing, and support. The group with chronic diseases will increase because the incidence of a number of diseases increases with age, i.e. diabetes, cardiovascular diseases, rheumatic diseases etc. Many will have several diseases, so called co-morbidities. The health system will have to develop coping strategies now and in the course of few years.

At the same time, however, the occupationally active group, traditionally defined as the age group 15-64) is slightly declining, Figure 2. Hence, with a stagnating or decreasing work force the health system at the same faces an increasing need for manpower. There are also economic ramifications of this.

The demographic support fraction defined as the number of occupationally inactive (0-14, 64+) divided by the number of occupationally active (15-65) is a key figure. In a welfare system largely based on 'pay-as you go' where this year's taxes pay for this year's expenses, e.g. health care, old age pensions, and nursing homes, the development in this fraction is of great economic importance. This is due to the simple fact that the main contributors to tax income are the occupationally active.

Measured this way, today we have a situation where two occupationally active persons 'support' one occupationally inactive person, a fraction of 0.50. However, around 2040 there will likely be four occupationally active to support three occupationally inactive, a fraction of close to 0.75.

Life expectancy will increase steadily in the coming years. The latest available projections are presented in Figure 3 and 4 for males and females respectively.



**Figure 3: Life expectancy, males**



**Figure 4: Life expectancy, females**

Source: DREAM Model(Hansen, 2010)

The importance of life expectancy is that the longer people live, the longer they – or some of them – need health and social care.

### ***The manpower situation: shortage***

With a stagnating work force there will be a general shortage situation in the labor market – despite current unemployment – and hence intense competition for existing and future manpower. Looked at from a narrow health system perspective the shortage situation can be outlined as follows:

By 2015 the shortage will be about 12-14% of the current workforce and around 2020 the shortage will have grown to 15-16%. For 2015 the expected shortage in absolute numbers will be<sup>12, 13</sup>:

- nursing assistants, about 5,700
- nurses, about 5,600
- physicians, about 2,600

This is calculated based on unchanged demand, and only three key groups have been mentioned. There will most likely be shortages in other areas. Hence, the number is likely to be higher. For nursing assistants and nurses it should be recalled that there is competition from nursing homes and home nursing, where a shortage akin to the one described will most likely also become visible.

This situation will most likely set in motion a number of activities: 1. Making health care an attractive work place, in part to retain, in part to recruit, 2. probably wage pressure, 3. internally at hospitals it is likely to increase the focus in two areas: redesigning work flow and ‘task shifting’, i.e. that nursing assistants take over some nursing tasks, nurses take over some physician tasks in order to make sure that core competencies are put to effective use – because it is easier in the short to medium term to recruit and train nursing assistants and nurses compared to physician specialists, 4. as concerns general practice innovative organizational models will/must be developed.

### ***Fiscal sustainability: difficult to finance the health system of the future***

Like with manpower the question of short-, mid-term and long-term financing of the health system is rooted in the demographic development. There are two sources that together will create a fiscal challenge of considerable size: Aging combined with increased life expectancy and the stagnating work force and in consequence hereof, a (partial) erosion of the taxable income base. On top of this the current crisis and EU rules concerning ‘allowable’ deficit of public finances, namely a maximum of 3% of GDP (gross domestic product), roughly the value of the productive output, will strain the fiscal sustainability.

### **Expenditure development 1999-2008**

The following key numbers capture the expenditure development over the past 10 years<sup>14</sup>:

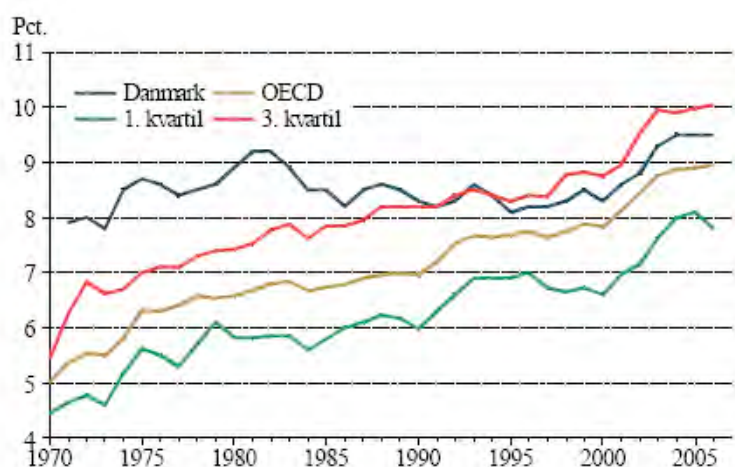
- overall annual growth rate per year 1999-2008 in real terms (corrected for inflation): 2.8%
- the annual growth rate for hospital expenditures per year 1999-2008: 3,3%
- the growth rate for psychiatry has been very low, a total of about 5% from 2000 to 2008<sup>12</sup>.

- the annual growth rate for primary care (GPs, practicing physician specialists, physiotherapists etc.) per year 1999-2008: 4.1%
- the annual growth rate of drugs expenditure per year: 5.1%

In other words, steady and continual growth – despite the impression one gets from the news that ‘savings’ have been the order of the day. Whether the growth rates have been sufficient, however defined, is another matter to be discussed later.

Internationally the growth rate is among the lowest if compared to countries we often compare ourselves to. It is a common procedure for international comparisons to look at expenditures as percentage of GDP (gross domestic product). Figure 5 and 6 together paint a picture of Denmark being a ‘fairly low spender’ (figure 5) and a ‘low growth rate’ country (figure 6).

**Figure 5: Health expenditures as percentage of GDP 1970-2007<sup>14</sup>**

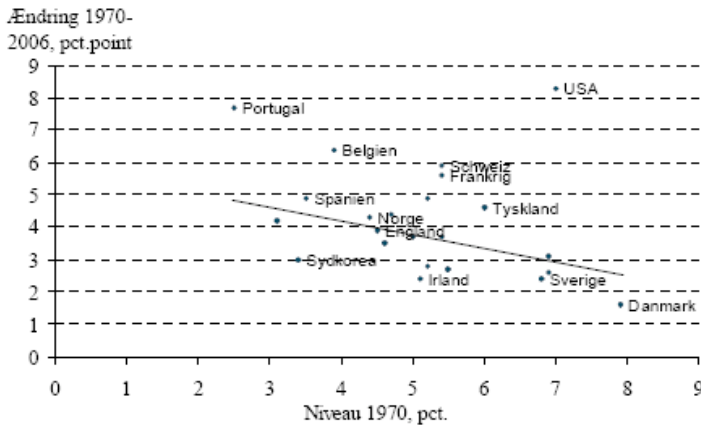


*Notes: 1. Kvartil is the expenditure in the ¼ lowest spending countries in OECD whereas 3. Kvartil is the ¼ highest spending countries on health care as a percentage of GDP*

From being well above the OECD average Denmark today is only slightly above. Basically this means that the Danish growth rate has been slower than in many other OECD countries, Figure 6.

There are several contradictory interpretations of these numbers. On the one hand, that cost containment has been successful in Denmark. On the other hand an alternative interpretation is that the health system has been underfunded – at least compared to other countries. Both extremes are probably biased towards fitting in with certain interests. Before passing judgment, several questions must be clarified, and after that it will still be difficult to pass judgment: Types and scope of treatments offered; how efficiently the health system operates (how many services like bed days, hospitalization, GP consultations are provided per million Dkr.), and what are the administrative costs of running the system. It is difficult to answer these questions, and until then it is probably best to take the information in Figure 5 and 6 as interesting ‘facts’ without going into too much interpretation.

**Figure 6: Growth in the GDP-percentage going to health expenditures compared to 1970-level<sup>14</sup>**



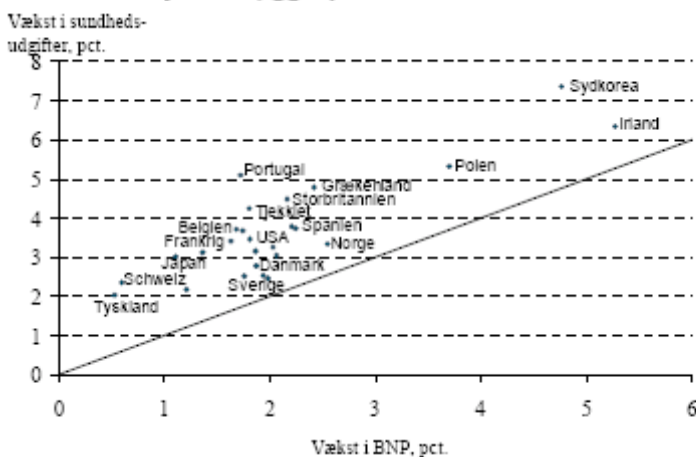
### Determinants of growth in health expenditures

What determines growth in health care expenditures? A very general, but somewhat superficial explanation, is to note not only that health expenditures grow when GDP grows, but that in developed countries the growth rate of health expenditures exceeds that of GDP. Figure 7 shows this clearly. No country is below the 45-degree line, showing an over proportional growth rate for health care expenditures.

Economists express this phenomenon in the following way: When GDP grows by 1%, health expenditures grow by more than 1%. Over the past 15 years this 'additional growth', as we call it later, has been 0.3%, i.e. health expenditures grow by 1.3% when GDP grow by 1%.

One way of characterizing this would be to call it 'welfare effect', in that it is not as such driven by for instance demographic development but by increasing income levels. The reasoning goes as follows: As we get richer, we want to spend more on health care. However, as an explanation this is not very satisfactory. Some premises should be introduced, for instance that over time the possibilities for new treatments are increasing rapidly, i.e. treatment availability, along with an apparently increasing political willingness to pay in tax finance systems. However, few analyses are available that show this in detail.

**Figure 7: Annual real growth rate per capita in health expenditures and GDP, 1970-2006<sup>14</sup>**



In view of how tax finance funding of health care in Denmark and other countries, namely tax financed, one should stress that this development is a 'willed' development in the sense that it has been politically approved. However, it does not mean that there is total political control over the development. Often the development is considered 'inevitable', i.e. it seems impossible to say no to introduce a new and proven treatment that at the same time increases costs. To contain costs involves priority setting and also a view to the overall macro economy, i.e. what is the 'fiscal health' of the nation.

### Prognosis for health care expenditures

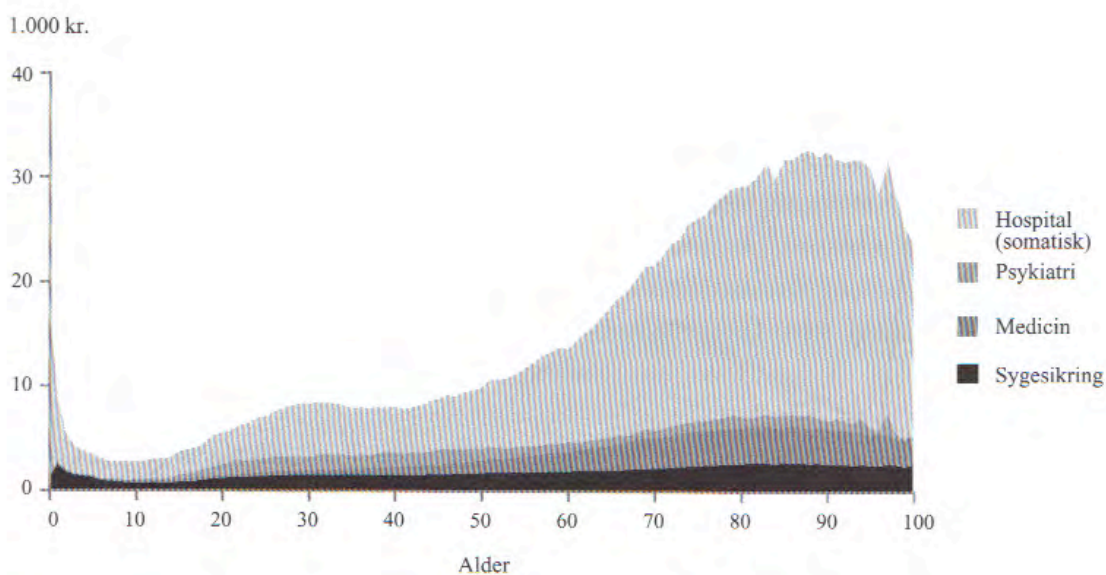
Turning to the future, future growth in health expenditures can be divided into a demographic component (overall aging of the population, longer life expectancy, and possibly changed morbidity pattern) and a non-demographic component (increasing welfare, new treatments, and development in productivity... the 'added growth' component mentioned above).

The point of departure for the demographic component is the average public health expenditures per person. This is shown in figure 7. Average annual expenditures vary considerably across the life cycle. From around the age of 60 there is a strong increase. The 'top' around the age of 30 is mainly due to women giving birth to children.

Based on a number of assumptions, for instance 'healthy aging' to be discussed later, the future development in **public** health expenditures, i.e. private expenditures that amount to around 16-17% of total expenditures are not included), are shown in figure 8, indexed at the 2008 level.

Several scenarios are shown from the most conservative (no increase in life expectancy over the period) to an added 'additional growth' (welfare effects) due to increased wealth up to 0.6% per year.

**Figure 7: Average public expenditures per person, year 2000<sup>15</sup>**

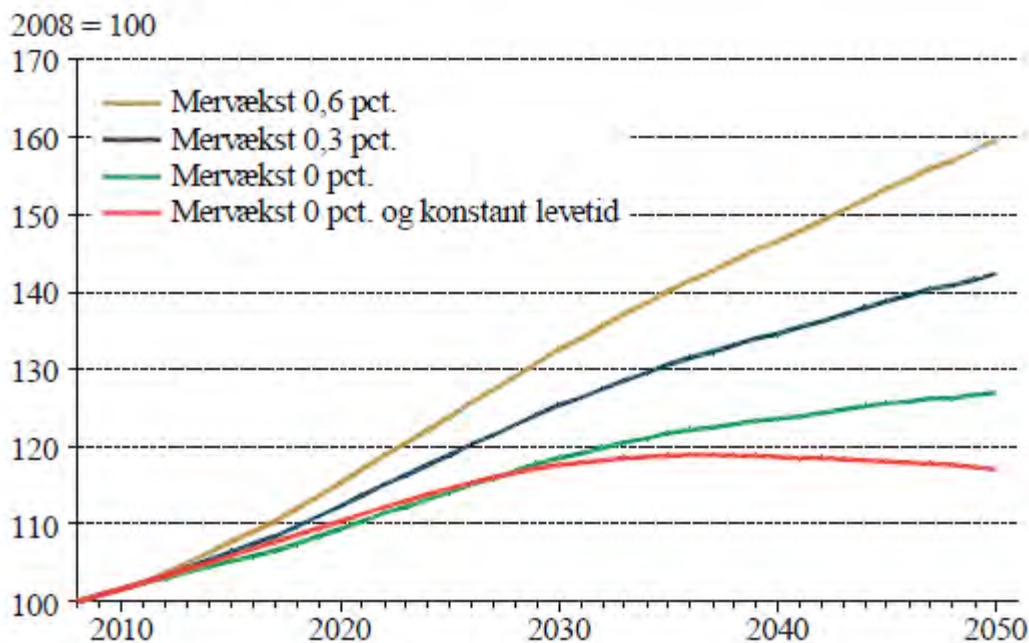




In the analyses 'Additional growth' is defined as non-demographic growth over and above productivity growth in the economy (i.e. over growth in GDP), where the scenario with 0.3% additional growth is an average of the experience over the past 15 years as mentioned earlier.

Within the next two decades publicly financed health expenditures will increase with between an (unlikely) 20% and a more likely 35% in real terms. To this should be added an increase in social expenditures of app. 13% under the assumption of 0.3% additional growth.

**Figure 8: Prognosis for development in future health expenditures, indexed at 1000 in 2008.**

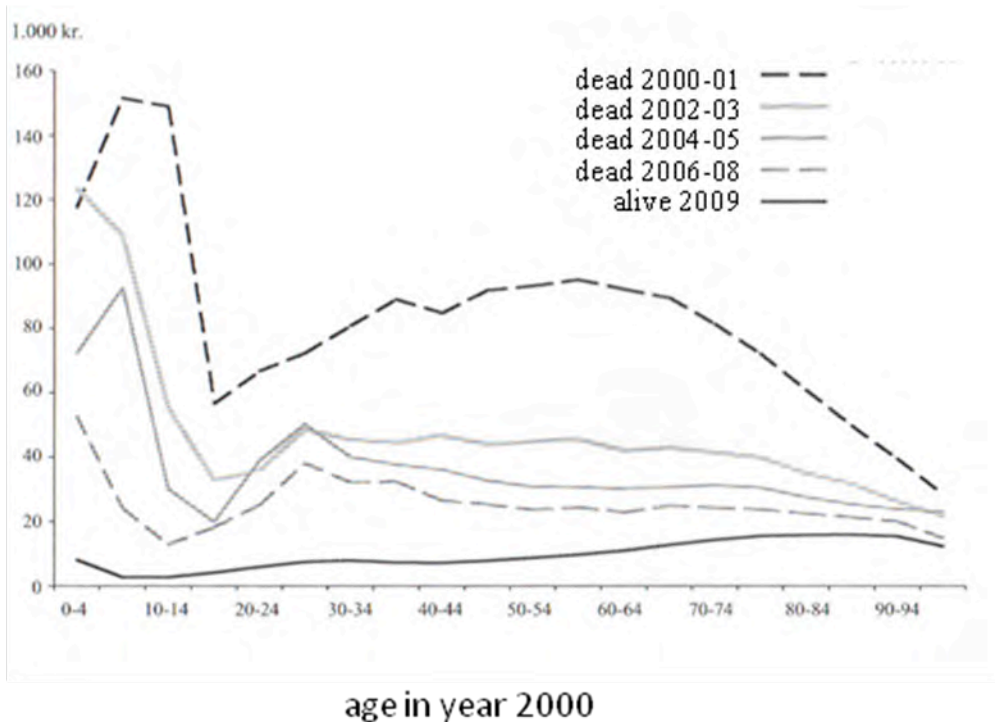


The Economic Council notes that the uncertainty of the prognosis is considerable. However, the greatest uncertainty is about the 'additional growth', not the demographic component. 'Additional growth' depends among other things on political priority setting and the will to carry out priority setting. In addition the assumptions about 'additional growth' are crucial when looking at fiscal sustainability discussed below.

Another uncertainty is about 'health aging' that is softening the economic consequences of the demographic changes considerably. The demographically determined health expenditures depend on aging and proximity to death (reflecting what is termed terminal costs of dying). When life expectancy increases, the terminal costs are postponed, i.e. occur by definition later in life, and the increases in health expenditure that follow from longer life expectancy are not as large as the increase in the number of elderly persons would suggest. This phenomenon is referred to as "healthy ageing"<sup>15</sup>. Arnbjerg and Bjørner, whose calculations underlie the above, found that based on the empirical estimates for the period 2000-2007, see figure 9, that healthy aging is expected to reduce the impact of increased life expectancy on real health expenditures by 50 percent compared to a situation without healthy ageing. The Economic Councils gives the example of an 85 year old woman in year 2050. Compared to an 85 year old women in 2006 her 2050 counterpart will have health expenditures that are 13% lower (simply because she dies later due to increased life expectancy and hence at the age of 85 is 'healthier' and use fewer health services than her

2006 counterpart). It is obvious that to the extent the assumptions about health aging do not hold up, then the expenditure growth will be (considerably?) higher that indicated above.

**Figure 9: Average health expenditures in 2000 for persons with different time distance to death<sup>11</sup>**



The growth rates depicted in figure 8, apart from the lowest curve, mean that health expenditures will grow faster than the economy (growth in GDP). The question is what this means for fiscal sustainability. Fiscal sustainability is basically the medium and long run balance of overall public finance must balance, i.e. that income and expenditure should 'equal' each other (in the long run). Hansen and Pedersen<sup>11</sup> finds that fiscal sustainability is robust with respect to growth in health care expenditures due to future increases in life expectancy. This is a consequence of healthy ageing and the indexation of the statutory retirement age to life expectancy that follows from the 2006-welfare reform. Fiscal sustainability remains very sensitive to non-demographic factors: An increase in non-demographic ('additional growth') expenditure growth of 0.3 pct. in excess of the productivity growth increases the fiscal sustainability problem by 2.1 pct. of GDP. Doubling the expenditure growth relative to productivity growth to 0.6 pct. increases the fiscal sustainability problem by 4.8 pct. of GDP. These numbers should also be seen in the light of EU fiscal rules of a max. deficit of 3% of GDP. This means that health care alone could threaten this objective.

The Economic Council has higher numbers than Hansen and Pedersen. With 'additional growth' of 0.3% per year the council concludes that this will lead to a sustainability problem of 3.0% of GDP, equivalent to 54 billion Dkr. measured in 2009 Dkr, and with 'additional growth' of 0.6 this increases to 5.7% of GDP which is equivalent to 102 billion Dkr. in 2009 DKr.

Hansen and Pedersen – and along with them the Economic Council - conclude that the current growth in non-demographic ('additional growth') health care expenditures of 0,3% cannot be maintained/sustained



for a prolonged period without challenging the public financing of health care expenditures in Denmark. On the other hand it is difficult to see how the population and with them politician will stop 'changing' income increases into, among other things, more health care. Later in the paper we will look at priority setting

The Economic Council notes that in essence there are only three possible (and combinations thereof) ways of financing the future health expenditures if 'additional growth' more or less is a fact of life:

- public expenditures in other areas than health have to grow at a lower rate than economic growth in the economy, i.e. allow health expenditures to grow faster than GDP, for instance at least 0.3% as for the past 15 years.
  - in essence, however, this is already taking place (recall the growth rates mentioned earlier).
- tax revenues have to grow faster the growth rate of the economy, i.e. increase the tax burden
- user payment/increased co-payment.

The Economic Council (p. 226 ff) illustrates the consequences for the tax rate if the 'deficit' is to be finance entirely through taxes. An annual increase of the low tax rate of about ¼% (the tax rate applied to the base income) is needed to finance the 'additional growth' of 0.3% in health care expenditures. However, this will only reduce the sustainability problem from 3% of GDP to 1.7% because there is a concomitant need to finance elderly care in the social sector.

The Economic Council also proposed an earmarked health tax ('health contribution') as a means to make visible health care costs and as a possible means of disciplining cost expansion – and last, but not least to ensure that cost increases are financed here-and now and not by increasing government debt. Increases in the health contribution should match overall increases (demographic and welfare effect) in the health expenditures. However, a number of issues in relation to ear-marked taxation were not discussed in detail.

### ***(In)equity issues***

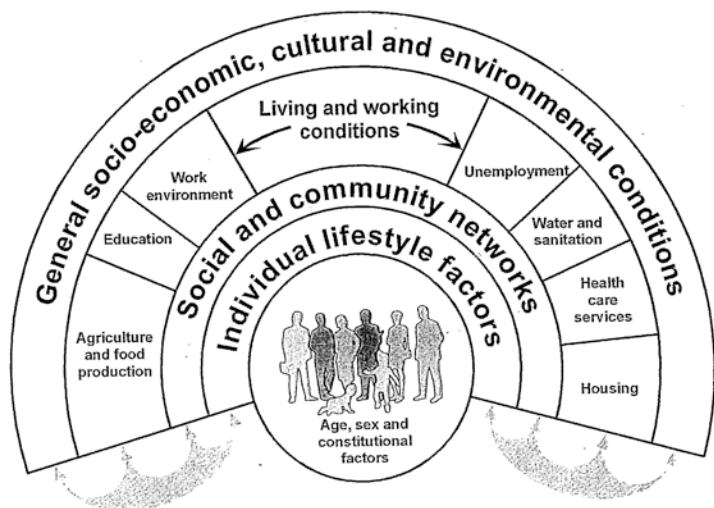
Equity issues are of great concern in the Danish health system. Not only does the Health Act state that Danes have equal access, but in very general terms the rationale for the Danish health system is equity in the several senses of the word. In particular, 'equal access independent of economic means' is an important part of the justification for the tax financed health system where use of hospitals and GP services are free at the point of use. Equity is an important goal in official documents like the national strategy for prevention and health promotion, where the current version carries the title: Healthy throughout life<sup>16</sup>.

Equity in health has to be distinguished from equity in access to health care, and equity in the distribution and utilization of health care resources, basically covering three stages: 1. access, 2. use and 3. outcome. There are two main issues: 1. How to measure and document the degree of inequity and 2. how to reduce inequity. The latter will be addressed in more detail in the section on solutions.

Much of the debate is framed in terms of equity in health and in many cases implying that the health care system is the main determinant of (in)equity in health. However, the classic diagram illustrating that the mechanisms are far more complicated still stands, figure 10. The important point in figure 10 is that shows

that in terms of policy changes much change need to take place outside the health care system traditionally defined, e.g. work environment or structural changes, e.g. taxation of tobacco or alcohol.

**Figure 10: A conceptual model of the main determinants of health<sup>17</sup>**



Morbidity varies – not only according to age and gender, which is natural – but also according to schooling and education which gives rise to equity concerns. The latter variation is termed ‘social gradient. This is illustrated in figure 11 for (self reported) diabetes and long term illness with severe functional restrictions. Age and gender differences have eliminated so that educational difference are clearly seen.

**Figure 11: Illustration of social gradient for diabetes and long standing illness**

illustration of social gradient: Percentage with diabetes according to years of education. Age and sex standardized

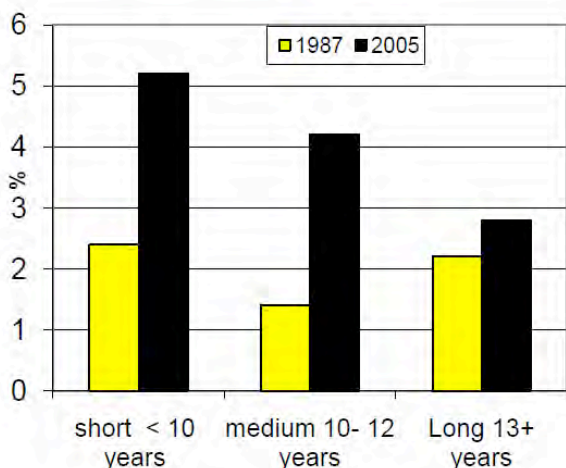
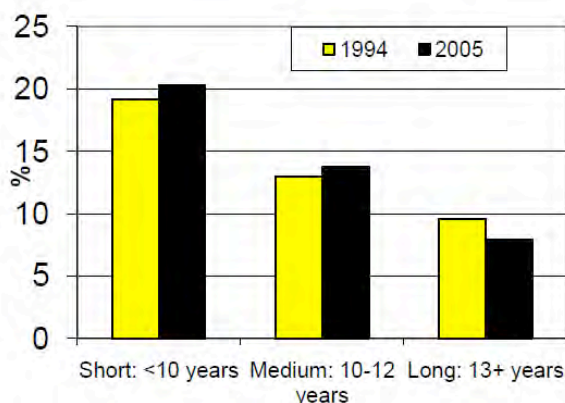


illustration of social gradient: % with very restricting long term illness according to years of education. Age and sex standardized.



The trend is clear and unambiguous:

- the less education the higher the percentage with diabetes or long standing illness.
  - this picture holds in many other areas

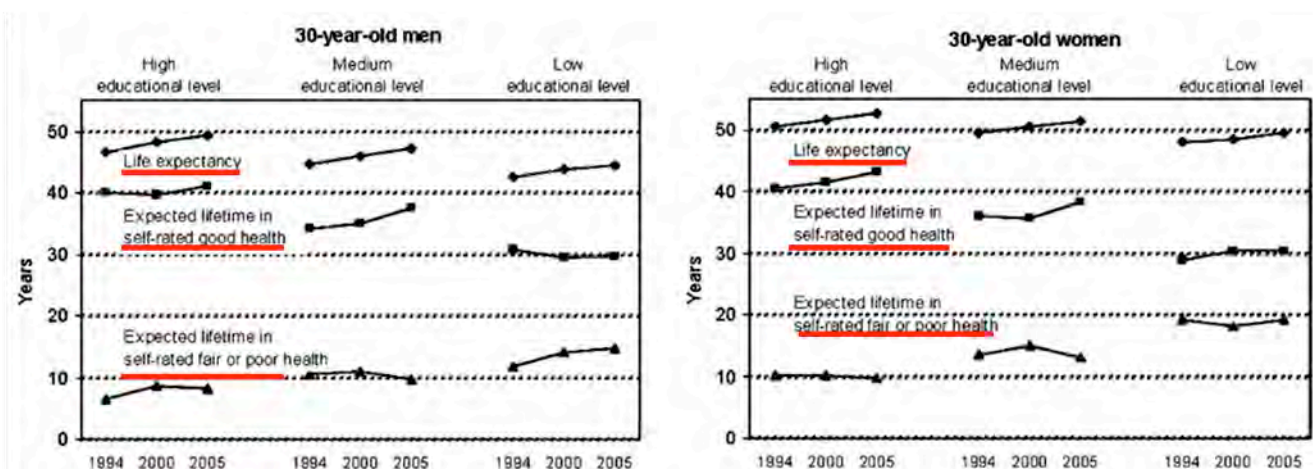
The next question is whether inequity increases over time, i.e. over the period of 18 and 11 years respectively in figure 11 for diabetes and long term illness? For diabetes it is visually clear: there has been an over-proportional growth among persons with a short education compared to those with a long education. The numbers carry it out: In 1987 2.2% of persons with 13+years of education reported diabetes compared to 2.4 % for those with less than 10 years of education. In 2005 this was dramatically different: 2.8 % compared to 5.8%:

- for several illnesses there seems to be increasing inequity.

Brønnum-Hansen<sup>18</sup> recently reported on the development in health outcome measures such as life expectancy and self reported health status in Denmark, figure 12. The results document that social inequality in health expectancy has widened since the mid-1990s. There is a striking consistency in differences between people with a low and a high educational level, whatever indicator was chosen. The health expectancy of people with a medium educational level was consistently in between that of people with a low and a high level. No systematic change in the proportion of expected lifetime in good health was seen. In particular, the life years gained during the period 1994–2005 were in general not exclusively years in good health.

In a society with a long standing concern for equity a development like the one documented in figures 11 and 12 is a considerable challenge. However, the mechanisms behind this development are not easily changed, see figure 10. and the work by Jacob Nielsen Arendt<sup>19</sup> Arendt distinguishes between down-and upstream elements. Down stream in terms of figure 10 means focusing on individual behavior, while up-stream are structural mechanisms in society like educational structure.

**Figure 12: Illustration of inequity<sup>20</sup> for 30 year old men and women (in terms of remaining expected life years): life expectancy and self assessed health status**



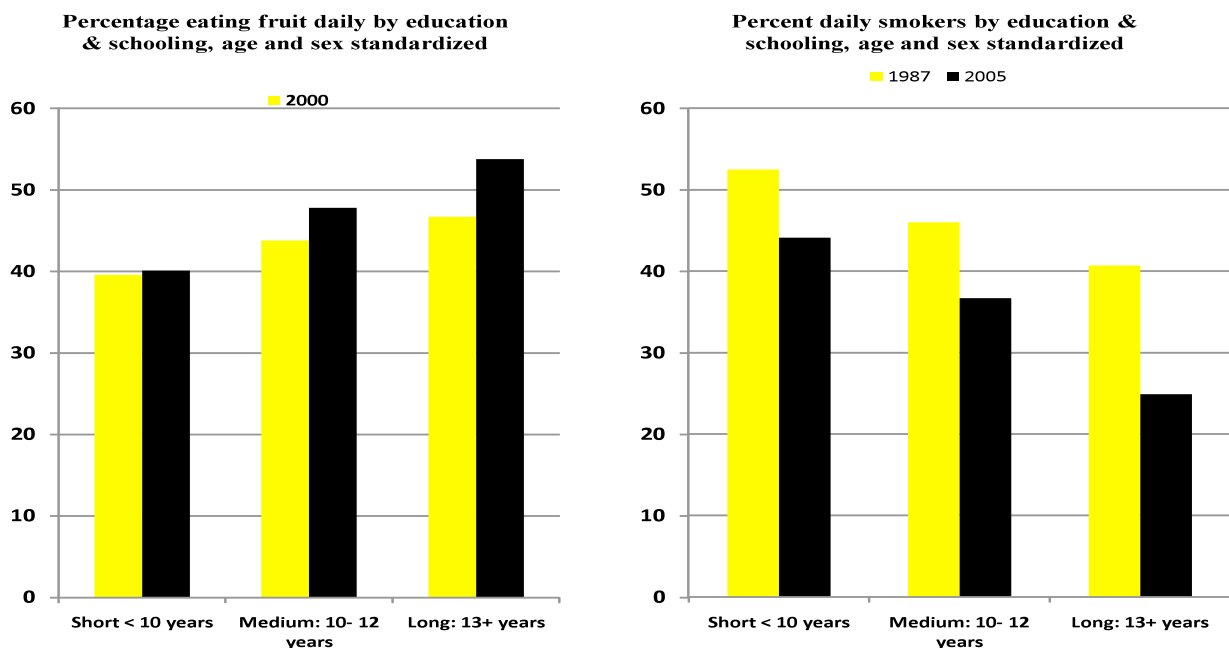
If the underlying causes are education, does it then help to work with individual health behavior. He also asks: Should inequity be reduced at any price? It is a lot easier to point out and document a negative development in equity than providing an effective cure.

### Inequity in life style/risk factors

Much illness depends on life style and health behavior, e.g. smoking, exercise, and/or nutritional habits. There is a strong and persistent social gradient in life style. Hence, there undoubtedly is a relationship between the social gradient in life style and (the social gradient) in illnesses related to particular life styles/health behavior – and then in turn feeding into and becoming part of the explanation for inequity in health outcome. However, the exact relationship is far more complicated than indicated here, but there must be a relationship.

Figure 13 shows clearly that those with the lowest education and schooling also are those with health habits that are not conducive to good health ('unhealthy life style').

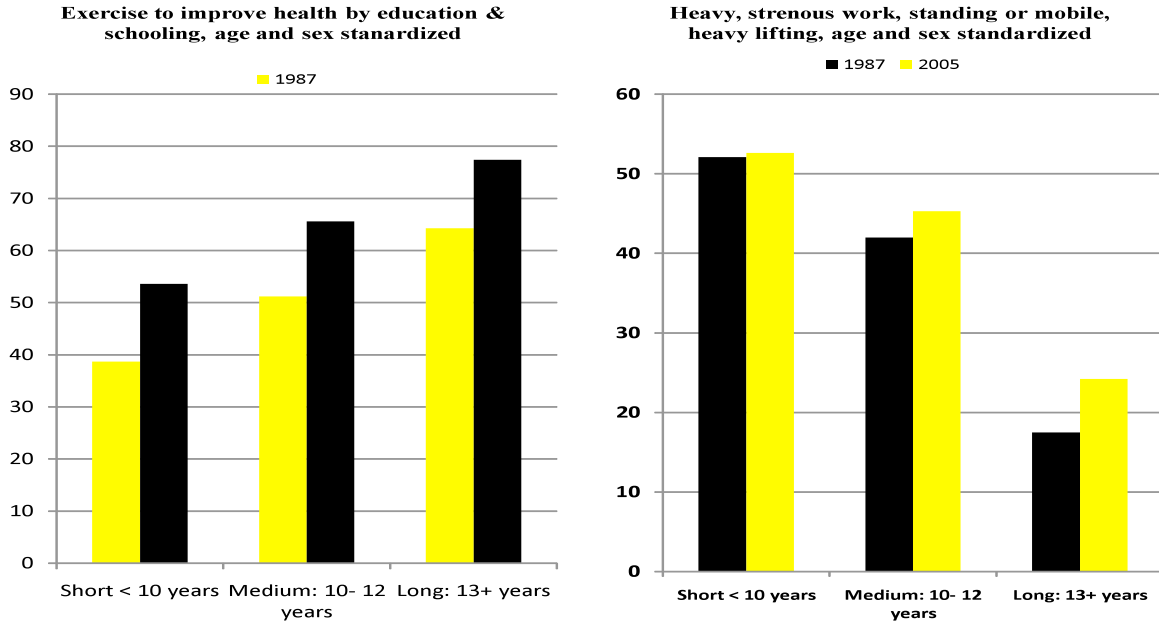
**Figure 13: Social gradients in two life style/health habit areas<sup>20</sup>**



The same pattern is seen in figure 14, where it is extended to include working life. Heavy physical work is something that is far more prevalent among persons with the fewest years of education and schooling.

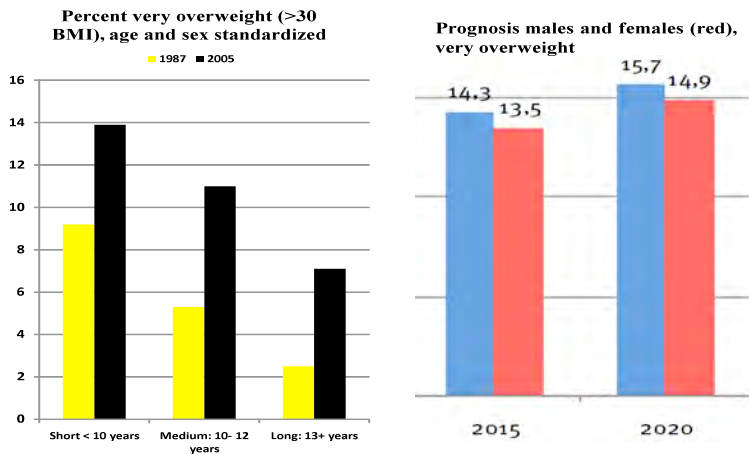
The pattern seen in the two previous figures is found in many other areas and is well documented<sup>21</sup>.

**Figure 14: The social gradient in exercise and work life**



It is very difficult to look into the future as regards development in health habits and some of the consequences in the wake of (un)healthy behavior/habits. A brave attempt has been made by Juel and Davidsen at The National Institute of Public Health<sup>22</sup>. Past development – for instance from 1987 to 2005 is analyzed, e.g. the left part of figure 15, and then put into a population prognosis as used above, resulting in a prognosis, the right part of figure 15. Such prognoses are inherently difficult to make, but with a short time horizon they still make indicate a likely development. Such developments – and the consequences for the morbidity panorama, e.g. diabetes – were not included in the prognosis above for development in health expenditures.

**Figure 15: Development in overweight and a prognosis for 2020**



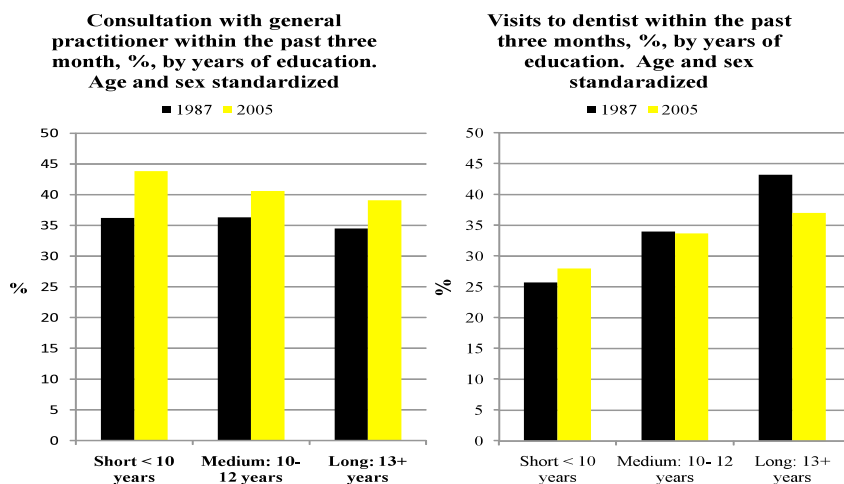
## Inequity in access

“Equal access” meaning access according to medical need and not, for instance income, is a key objective of Danish health care. This issue is illustrated in figure 15A for visits to GP and dentist within the past three months. The important difference between the two providers is that access to GP is free, while there is considerable co-payment for dental visits – hence with co-payment as a possible barrier to access – a clear picture emerges.

For GP visits a slightly ‘reverse’ social gradient is seen with percent wise more persons with short education seeing a GP in the stated time period than persons with a long education. In view of the social gradient in morbidity it is not surprising albeit the reverse picture might have been stronger. On the other hand, for visits to the dentists the well known social gradient is seen. The real underlying reason is hardly education per se but rather an underlying difference in income according to education.

Prescription medicine is also characterized by quite a bit of co-payment. When looking at ‘regular use of medicine’ using same the technique as in figure 15A, there is a clear ‘reverse’ social gradient : For the group with +13 years of education 34% said they were regular user compared to 48% for the group with less than 10 years of education. It is not necessarily a contradiction compared to use of dentist, but should caution about too quick conclusions about co-payment. One observation is relevant, however: Most of the regular medicine users undoubtedly use prescription medicine – and hence have received advice from a physician. The same type of advice is not available for the need for dental treatment.

**Figure 15A: Access to GP and dentist.**



## High expectations

Expectations from the population in general and patients in particular challenge the public health care system in many ways<sup>23</sup>. Patients expect to receive high quality treatment, responsiveness to personal needs, to be informed and to be involved in decision making – and on top that they expect free services as the implicit ‘payment’ for their taxes. In addition patients act more and more like consumers<sup>24, 25</sup> and consider health care on par with (some) consumer goods. Expectations are formed in many ways:

Knowledge about availability of treatment, experience with service levels and attitude of providers in other walks of life.

The public health care system, however, so far also seems to have been successful, at least in terms of high patient satisfaction<sup>26</sup>. Despite these good results, there is a growing public debate about the responsiveness of the public health care system to patients' individual needs for being involved, being informed and having individualized their contact with the health care system. Recent results of patient satisfaction in general practice seem to indicate that a significant share of especially young people are not satisfied with their treatment and also experience that doctors act paternalistically and are not responsive to patients' need for information and involvement<sup>27</sup>. This may signal the coming of a generation with other expectations and demands.

The population in general expects to have easy access to a highly specialized and high quality health care system providing 'best practice' treatment. The rising expectations to the health care system, together with the fiscal constraints discussed above will be a major challenge. Potentially, the high expectations to meet best quality of care and easy access may challenge the financial sustainability and the legitimacy of the public health care system in the population, in particular if the outcome of this is an increased number of voluntary health insurance giving access to private health care facilities, e.g. private hospitals. Private financing and private hospitals need not be a negative phenomenon, but to avoid fragmentation the nature and rules for cooperation between public and private hospitals need to be specified.

The regions have been rather successful in closing down a number of smaller hospitals in Denmark despite local protests. However, it is questionable whether the population's expectations can be met with a decreasing number of hospitals and especially a reduced number of acute facilities in the future. Furthermore, the cost of new treatments will not only challenge the fiscal sustainability but also challenge the population's trust to the public health care system when not all new treatment may be affordable within the public health care budget. The legitimacy of the present public health care system with universal coverage and easy access may be questioned with an ever present (and increasing) need for prioritization and competing private options.

A difference between the political willingness to pay and the private willingness to pay with the latter being bigger than the former but with no 'outlet' through the public sector budget due to fiscal constraints will most likely lead to an increase in private health insurance.

In the health insurance literature it is common to distinguish between complementary, supplementary or duplicate health insurance in relation to the tax-financed system<sup>28,29</sup>: 1. Complementary voluntary private health insurance covers co-payments for treatments that are only partly covered by the tax-financed health care system. 2. Supplementary voluntary private health insurance covers treatments that are excluded from the tax-financed health care system. 3. Duplicate voluntary private health insurance covers diagnostics and elective surgery at private hospitals and for instance physiotherapy or office visits to medical specialists – services that are also provided by the tax-financed public health care system.

The increase in private health insurance will most likely occur in the area of duplicate voluntary insurance for elective treatment. In view of the expected size of insurance premiums it is rather difficult to imagine that an insurance market for acute private health care will emerge.



## **Globalization/Europeanization of health care markets & health tourism**

An important external factor with growing influence on the Danish health system is the ongoing and gradual integration within the EU and global markets for health services, work force and capital. The implementation of the EU “Internal Market” implies that health personnel, health services and capital for health service investments can move freely across national borders within the Union. The actual development of EU-wide markets is a gradual process where particularly the EU court system and the Commission is pushing the boundaries for the internal market into the field of health care, while many member states, and thus the Council of Ministers want to maintain the organization of health care as a national prerogative according to the Treaty (the principle of subsidiarity). The ongoing tension between the two positions creates a rather undetermined path for the future where EU court decisions in reality become the drivers for a more integrated market<sup>30, 31</sup>.

Why is free movement of patients a challenge? First, because nation states may lose their ability to determine national service levels and thus will have less room to establish national priorities – and hence also less control over national costs than previously. Second, because of the economic challenge of having to pay for treatment abroad, while at the same time being obligated to provide service and service infrastructure nationally. There are also unresolved issues of quality control across national borders and legal obligations in case of malpractice or accidents. The actual number of patients traveling abroad is still very limited, but can be expected to increase in the future. – The Danish regions had agreements with 6 private treatment facilities abroad in 2009.

Why is free movement of capital and services a challenge? There is a risk that major international capital funds or hospital chains move into the Danish market as has already been witnessed by for instance the acquisition of ‘Danish Private Hospitals’ by the capital fund Aleris which is a subsidiary of the huge fund EQT. This can be seen as an advantage, as it creates a capacity buffer. Yet, it also creates issues of planning and coordination across the public and private sectors, as well as competition for personnel, which for instance may drive up wages.

The issue of internationalization of health care extends beyond the EU area. There is a growing international market for treatments for instance in plastic surgery and for serious illnesses such as cancer – giving rise to so-called ‘health tourism’(medical tourism). Although this can be beneficial to the individual there are also significant risks and uncertainties related to the quality of treatment abroad, and the obligation in case of malpractice or accidents. However, from a Danish perspective very few of the health tourists are Danes. On the other hand: The increased transparency about treatments available abroad – and maybe not easily accessible in Denmark – may fuel more health tourism than seen today.

### ***Integration of private providers and financing with a universal and comprehensive public health care system and the creation of a level playing field for competition.***

The Danish health system was designed and has developed as a public integrated structure where planning, expenditure control and delivery was largely integrated in a multi-level public governance structure with the regional level as a key player. Primary care providers like GPs, practicing specialists, physiotherapists



etc. have historically been self-employed but strongly integrated into the public system, and almost exclusively financed by public funds.

Starting 1989, but accelerating after the turn of the millennium an increasing number of small private hospitals providing mainly elective surgery have entered the market. The growth was fueled by the tax exempt status for employer paid health insurance giving access to treatment in the private sector, and the government's waiting time guarantee. Initially (from July 2002 to October 2007) it was a two month guarantee and after October 2007 it was reduced to one month. The guarantee means that after waiting two/one month for treatment at public hospitals, patients acquire the right to treatment in the private sector financed out of the public health budget.

The private hospital sector is small but attracts considerable attention in the public debate. Unfortunately there is a tendency to confuse private hospitals with beds for overnight patients and single practitioners within certain specialties, e.g. eye, ear, nose, throat. There are about 20 private (for profit) hospitals. Private hospitals in particular provide elective orthopedic surgery (hip-knee-replacement etc.). Private hospitals on average have 9-10 beds (as of July 1, 2010) and most have 5-10 beds. The total bed capacity in the private hospital sector is 500<sup>32</sup>. This should be compared to about 16,000 somatic beds in public hospitals of which 6,000 beds are beds within the surgical specialties<sup>33</sup>.

The manpower situation for private hospitals is as follows<sup>32</sup>

- 500 FTE nurses, equal to about 850 persons, of which about 20% hold a position at a public hospital. There are about 33,000 FTE nurses at public hospitals.
- About 200 full-time employed physicians and a number of part time employed physicians so that the total number of physicians is around 800 of which 70% also hold a job at a public hospital. This number of physicians should be compared to a total of 13,000 physicians at public hospitals.

The turnover of private hospitals in 2009 was 2.2 billion Dkr. of which about 1.2 billion Dkr. was payment for 'guarantee' patients paid for by the public sector. The rest came from health insurance and patients who pay themselves.

The market for health insurance in 2009 was as follows

- 900,000 holders of employer paid health insurance, and about 1.1 million covered (spouses often are covered). This market has basically emerged since mid 2002.
- 1.8 million members of 'denmark' of which about 25% carry surgery benefits

The introduction of private financing/health insurance and private providers, in particular private hospitals, as competitors to public hospitals raises a number of issues. First, private financing through voluntary health insurance for elective treatment paid by the employer and tax exempt for the employee challenges the basic principle of social equity, as it tends to favor people in certain private industries, and is almost totally absent in the public sector. Second, private providers create issues of coordination as they are not part of the ordinary hierarchical chain of command, and often not well integrated in terms of information sharing systems. Third, the ambition of creating competition between public and private providers involves

a number of issues in regards to setting a level playing field. Public providers are obliged to provide acute care and the whole spectrum of treatment, be it acute or elective. Public hospitals cannot decide to close down unprofitable services. The private sector on the other hand can select their activity areas and do not have extended obligations to maintain acute care or long-term care services. Public hospitals have obligations in terms of research and education, which private actors do not. These general factors contribute to a higher cost structure in the public sector, and thus uneven competition terms. The current configuration of the payment system to hospitals with a combination of activity based funding and a global budget implies that public hospitals are only rewarded for extra activity up to a certain point. Beyond this threshold level, they have no incentive to increase activity. Private hospitals on the other hand do not have similar constraints. Extra activity means extra income for this group of providers.

## Opportunities

Interaction with private sector (business and NGO) for development of new organizational forms, medical practices and technologies.

In the previous section we have described a number of challenges in regards to the interaction between the public and the private sector in health care. However, it is evident that interaction with the private sector can also be seen as an opportunity in several ways. First, the private providers can represent a convenient buffer to supplement the public sector in situations of extra pressures. Having a private sector alleviates the public from investment costs, and reduces the risk of overinvesting in public resources that may become redundant. Second, the existence of a private sector and the creation of an exit option for citizens can provide personal utility as well as pressure on the public sector to improve service and quality. The mechanism for service-quality improvement is complex and depends on the financing system. Yet there is reason to believe that the mere existence of an alternative option and the inherent contestability of public services when providing an exit option can sharpen the attention to service-quality dimensions<sup>34</sup>. Third, the private sector may provide opportunities for learning and organizational development. Private actors work under different conditions than public ones, and may thus have different incentives to develop new organizational solutions. The public sector may take advantage of this by selectively copying private sector practices. Finally, there may be benefits in establishing cooperation with private firms for developing and testing new pharmaceuticals and medical devices. The private sector has expertise and live settings for development of products, while the private sector has knowledge of market conditions and capital to fund development. Development and research can benefit both.

A specific type of public-private interaction involves voluntary organizations or NGOs. There are several examples of this already. Patient organizations provide expertise and knowledge of the conditions for specific patient groups. Larger patient organizations also fund research and provide facilities for their members to supplement the public service supply. Not for profit organizations deliver care services to elderly and long term care patients. A more recent phenomenon at the individual level is the use of private volunteers as helpers in hospital settings. So far, their role has mostly been to support and help out with practical issues, but it is not unlikely their role can be extended in the future in both the hospital sector and in long term care.

## ***Personalized medicine***

A number of advances in e.g. the field of human genetics and molecular medicine have made it possible to develop new treatment and prevention strategies. The quest is opened towards individualized (personalized or targeted) medicine with huge interests in biomarkers, and pharmaco-genetics. Personalized medicine is a concept where patient care become individualized based on distinctive characteristics with health care services tailored to individual variation in risk and treatment response. Individualized medicine involves that predicted treatment responses to treatment will be based on the individual's genetic makeup. Individuals will be classified beyond their basic diagnosis according to disease susceptibility or expected responsiveness to treatment enabling targeted interventions potentially providing better efficiency of existing treatments and fewer or less severe side-effects. Medicine will be given more effectively and new treatment strategies in general can be investigated reducing cost or making treatment programs more cost-effective. However, personalized medicine requires more specialized and more intensive diagnostic procedures and may induce costs for genetic counseling and new types of medical care<sup>35</sup>. Also, there remains a considerable need for research before promising technologies have provided evidence to be implemented in common practice<sup>36</sup>. Advances in stratified therapeutic and diagnostic tests involve development of new therapeutic approaches with use of innovative compounds usually increasing costs (and improving quality) of treatment. It is unsure how costly and cost-effective the development personalized medicine is but it will surely be one of the challenges in the future health care system in terms of cost, cost-effectiveness, need for prioritization and demand for specialized resources. Another challenge will be the potential future developments within cell therapy, treatments with stem cells and new drugs facilitating new treatments putting even more pressure on the funding of the public health care system.

Diagnostics is the key to personalized medicine<sup>37,38</sup>, a tailored approach to treatment based on the molecular analysis of genes, proteins, and metabolites. Yet although this approach has generated much excitement, few personalized-medicine tests have achieved high levels of clinical adoption. We are already seeing that new departments of molecular medicine are being added to the ever increasing number of specialties. For instance, the university hospital in Skejby in March 2009 opened a molecular medical department<sup>39</sup> providing, among other things diagnostic molecular tests. Similarly, it is possible to obtain a university degree in molecular medicine, e.g. at the University of Aarhus<sup>40</sup>. Mass spectrometry is an analytical technique that is used for determining the elemental composition of for instance molecules and for elucidating the chemical structures of molecules. Hence, access to such techniques is an important prerequisite. In other words: the future is already here and new treatment possibilities are ready to take off.

In a recent article<sup>37</sup> it was noted that there are three main obstacles to the advancement of personalized medicine: scientific challenges (a poor understanding of molecular mechanisms or a lack of molecular markers associated with some diseases, for example), economic challenges (poorly aligned incentives), and operational issues. Although scientific difficulties remain, the economic challenges and operational questions now seem to be the biggest hurdle.

Davis et al<sup>37</sup> notes that investors and analysts have suggested that personalized medicine can dramatically reduce health care costs. Yet most payers have been slow to invest in personalized medicine. Leaders in payer organizations say that several factors could explain this reluctance. First, it is hard to identify which

tests truly save costs. Second, the belief that it is difficult to track much earlier-stage and experimental testing leads to fears that although individual tests may not be very expensive, the overall eventual costs could be unjustifiably high. A third concern is the difficulty of enforcing standard protocols to ensure that physicians follow through with appropriate patient care based on test results. Fourth, test information could be misused— particularly in the early stages of investigation and development—which could harm patients. Finally, there is no longitudinal accounting, which would enable payers to capture long-term cost savings from near-term testing.

### ***New technologies***

The reduced number of hospital bed experience in all western countries has been enabled by better planning of treatments and lately by new treatment technologies facilitating less invasive treatment where patients can be discharged earlier or treated in outpatient settings. The last two decades have also offered new developments of telemedicine and new IT infrastructures assisting more efficient treatment patterns. With an aging population with fewer people in the working force more a greater share of the population with need of treatment these new technologies, where only a few of the existing technologies are implemented at the moment, may be one of the future contributions to sustaining an efficient and sustainable public health care sector. These assisting technologies may address different type of issues. 1) One type of technology is related directly to treatment of patients such as telemedicine with direct or indirect communication between patient and health care professionals which may reduce cost or increase quality of care efficiently addressing not only the longer distances to hospitals but also the populations' rising expectations for responsiveness. Another type of technology is for instance robot assisted surgery(Barbash, 2010; Lotan, 2004;Patel, 2009). 2) Another type of technology facilitate efficient use of existing resources by more efficient communication or more efficient use of capacity across different geographical sits.3) Finally new IT technologies may facilitate more efficient use of information for present treatment but also for treatment planning and communication. Since this area will be described as one of our solutions we will not comment this further here except for the observation, that there appears to be significant potential as only a limited number of existing technologies have been implemented so far.

New technologies can be of three types from an economic perspective: a. Do they substitute existing treatments, i.e. better (and less costly?), b) are they complementary to existing treatment enhancing the clinical and/or economic value, and c) new in the sense that they have not been available earlier. There is no doubt that the future will hold examples of all three, but most likely with focus on c) with likely cost-expansion of health care expenditures. However, in view of the idea of the present SWOT-analysis, it would be desirable that opportunities can also be seen as part of the solution to the challenges listed. This means that from this perspective the interesting new technologies should be substitutes, point a in the list.

### ***Expectations and competencies of the population participation and self care***

In line with the technological development, the populations' competencies, willingness and expectations to be involved in treatment have increased. For an increasing number of chronic patients treatments are to a high degree dependent on patients' self-care and active participation in not only treatment but in actively changing life style. The willingness and expectation to participate actively have resulted in many new treatment and preventive strategies involving individual coaching, group training, self care technologies for

monitoring etc. which empower patients with competencies and self-care to a degree where they do not consider themselves as 'patients' <sup>41</sup>.

Having emphasized the many good developments in these areas there is still need for providing evidence for many of these treatment strategies as well as a need for development of strategies which work efficiently for lower social groups which seem not to be efficiently targeted with the present initiatives.

## **Strengths**

### ***Patient rights***

A number of initiatives have been introduced to strengthen patient rights in the health system<sup>42</sup>. The National Board of Health is in charge of securing the patients' dignity, integrity and right of self-determination<sup>43</sup>. In 1992, a law was passed on patient rights, which obliges doctors to inform patients of their condition, treatment options, and the risk of complications. It also prohibits doctors from initiating, or proceeding with, any given treatment that is against the will of the patient (unless mandated by law). In addition, the patient has the right not to receive information. This law was extended in 1998, regulating the basic and general principles of the individual patient's right of self-determination and public security related to the health system and regarding medical examination, treatment and care. Issues covered are the patient's right to continuous information, which is adapted according to age and the disease(s), given throughout examinations and treatment and communicated with respect to the patient. Furthermore, the rules also determine doctors' rights to share information with third parties, to give patients right of access to documents, to hold case records and to have total professional confidentiality<sup>44</sup>.

The general aims of the patient rights regulation are to help ensure that the patient's dignity, integrity and self-determination are respected; and to support the trust relationships between the patient, the health system and the various personnel involved. The act also contains rules on information about consent and life testimonials, and information regarding patient cases and professional confidentiality, along with access to health information<sup>45</sup>.

The choice and waiting time guarantees are patient rights of a different kind.

### ***Choice and waiting time guarantees***

#### **Choice of primary care**

Since 1973 residents over the age of 16 have been able to choose between two coverage options known as Group 1 and Group 2. The default is Group 1 and approximately 99% of the Danish population were in this group in 2004<sup>46</sup>. Group 1 members have free access to general preventive, diagnostic and curative services. Patients may consult emergency wards, dentists, chiropractors, ear, nose and throat specialists or ophthalmologists without prior referral, but their GP must refer them for access to all other medical specialties, physiotherapy and hospital treatments. Consultation with a GP or specialist is free of charge, while dental care, podiatry, psychology consultations, chiropractics and physiotherapy are subsidized. Patients seeking care from specialists other than ear, nose and throat specialists or ophthalmologists, and without a GP referral, are liable to pay the full fee. An individual may change GPs for a nominal fee at any time.

In Group 2, individuals are free to consult any GP and any specialist without referral. The region will subsidize the expenses up to the cost of the corresponding treatment for a patient in Group 1. The same rules apply to treatment by podiatrists, psychologists, dentists, chiropractors and physiotherapists. Hospital treatments are free. Only a minority of the population (1%) chooses this group, probably due to the level of general satisfaction with the referral system.

### **Choice of hospitals**

A legislative reform in 1993 gave patients the freedom to choose to be treated at any hospital in the country as long as treatment takes place at the same level of specialization. This is in accordance with the fundamental principle that health services should be provided at the most appropriate level of specialization (i.e. less specialized cases should not be referred to more highly specialized units). This legislative reform was a key step towards allowing patients more influence over their care and treatment. However, according to a national study, which assessed the impact of the reform, patients prefer treatment close to their place of residence, which contradicts the original intention of the reform<sup>47</sup>.

In 2002, a new piece of legislation regarding waiting time guarantees was implemented. Patients who are not offered treatment at public hospitals within two months of referral are free to choose treatment at private hospitals or clinics anywhere in the country and at hospitals abroad. In 2007, this guarantee was changed to one month as of 1 October. The non-public treatment expenses are paid by the patient's region. As a precondition for the use of the extended free choice, the chosen non-public hospital or clinic has to have an agreement with the region<sup>46</sup>.

Average "experienced" waiting times for planned hospital operations have fallen from 90 to 57 days in the period 2001-2005 and has been relatively stable at this level since then, although with a slight increase in 2008 and 2009. The measure of "experienced" waiting time is after the diagnosis is determined and without patient induced waiting time<sup>2</sup>.

Waiting times for life threatening diseases such as cancer are considerably lower as they are in essence treated as acute conditions, and also subject to specific "care packages" defining the maximum waiting time for all parts of the treatment.

87% of the patients admitted to hospital for planned procedures in 2006 were aware of their right to choose hospital. – 46% indicated in a survey in 2006 that they had actively chosen the hospital on which they were treated (this includes choice of local hospitals)<sup>2</sup>.

Around 60.000 patients were treated according to the waiting time guarantee in 2009. The total number of planned operations in 2009 was 660.000<sup>2</sup>.

### ***High patient satisfaction and trust***

Patient satisfaction is generally high and has remained on a high level, and is also high compared to other public sectors. Around 90% are satisfied with their inpatient stay or outpatient visit<sup>26</sup>. Around 20% of the population has contact with hospital throughout a year and the high level of satisfaction for public hospital therefore provides great legitimacy to the public hospitals in the public debate. However, the public debate also contains the individual case with critical and erroneous handling of treatment or communication. In addition the number of patient complaints handled by the national Patients' Board of Complaints' has

increased from e.g. 3,312 new cases in 2005 to 4,235 new cases in 2009<sup>48</sup>. This increasing number of complaints cannot unambiguously be interpreted while the increasing rate may illustrate not only changes in expectations to treatment, treatment outcomes and communication; changes in general trust to the health care system; changes in population's attitudes to authorities and changes in actual delivered quality. The number of patient complaints is, however, still considered to be on a low level compared to the overall number of contacts.

### ***Easy access in primary care, incl. gatekeeper role***

One of the major strengths emphasized in a SWOT analysis by an international team in 1999 was the easy access to general practice<sup>49-51</sup>. The efficient mix of fee-for-service and capitation reimbursement, the well-organized patient-list system and the gate keeping by GPs were emphasized to provide not only easy and quick access to primary care services but also to contribute to keeping treatment on the lowest effective cost level. The current GP system has experienced very few and only evolutionary changes in the last four decades and has only recently been challenged with minor changes due to lack of GPs in some areas of Denmark. The number of consultations has increased with around 2% yearly (adjusted for population size and demographics) over a long period and this has increased the expenditure for GPs. The expenditure for GPs as a relative share of total health care expenditure has remained relatively stable.

The latest 2011 contract with GPs opens up for regions to set up their own clinics with publicly employed GPs to cope with the shortage of GPs in outlying areas. So far GPs exclusively have worked as private entrepreneurs with a public contract. This may signal a change in the institutional organization of this sector but the changes will only have marginal influence in the short-run on the general organization of GPs while the private entrepreneurial system still is considered to be a very cost efficient system compared to other institutional organizations of mode of provision. Also, the same contract opened up for the self-employed GPs to establish branch facilities, typically in outlying areas, and to staff them with 'employee-GPs', i.e. changing the rule that GPs should be self-employed. This change may counteract the possibility for public run GP surgeries.

### ***(Reasonable) expenditure control, including efficiency and reimbursement systems***

There is a strong and unrelenting pressure on the cost of health care systems all over the world. Rising income levels and ever improving or new methods of treatment are the main explanations, but not up till now demography. By international standards the growth rate for health expenditures in Denmark, however, is low. Figure 6 and 7 carry this out clearly. This raises several questions: Has the annual increase been too low – on average 2.8% for the past 10 years? What are the likely explanations of the tight expenditure control?

As to the first question it is impossible to answer yes or no. The answer depends not only on the perspective, i.e. pressure groups, politicians, the average user etc., but also on assessment of whether new and improved treatments have been made available not too long after international availability. Overall there is no reason to believe that Denmark has been far behind in the introduction of new treatments, although exceptions can be found. See also 'weaknesses' where the question of too tight budgets is also discussed.



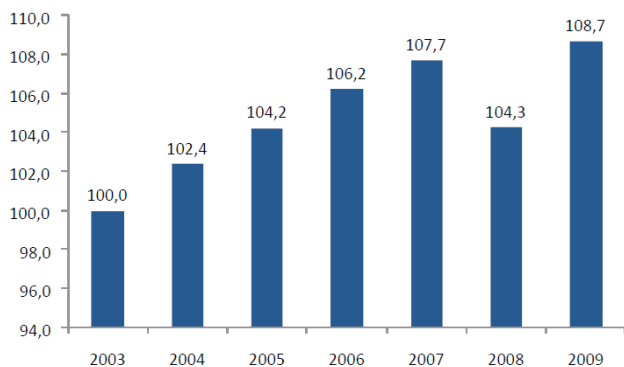
Taken together three main explanations of the low growth rate can be given:

- budget caps negotiated annually between the government and the regional authorities
- productivity increases
- reasonably well functioning reimbursement systems.

In tax financed systems the development of health expenditure to a considerable extent is tied to the macroeconomic development. This is reflected in annual budget negotiations between government and the regions about the economic frames/budget caps for the upcoming. Basically government will enter the negotiations with an eye to overall economy and the level and growth rate of public expenditures in general. From the perspective of economists this is a strength even though the growth rate has exceeded that of the economy for many years. In addition it is to a considerable extent a binding budget constraint in the sense that budget overruns typically have to be picked up the following year.

In the annual budget negotiations annual productivity increases are also established: Usually two percent per year, meaning that in this way more room is created for an increased activity level in addition to the real increase of resources available.

The capped sectoral budget, a ‘hard’ budget constraint, and productivity requirement has led to a reasonable good productivity record for the hospitals, figure 16.



**Figure 16: Cumulative productivity growth 2003-209 for hospitals(strike in 2008) <sup>52</sup>**

### ***Introduction of ‘packages’ for cancer and certain cardiac conditions and fast track issue***

The fast track approach for hospital care for cancer patients and certain groups of patients with cardiovascular diseases has improved patient satisfaction and quality of treatment, because the fast track approach is based on minimizing delay between services and care is tightly coordinated<sup>53</sup>.

In both cases the fast track approach was introduced because it was fairly common knowledge that for both groups of patient waiting time might be harmful to health (disease progress). It is noteworthy that the change was brought about by a law making it a patient right, although one provincial hospital (Vejle Sygehus) had pioneered the approach, but take up at other hospitals was slow.



At the core of the fast track thinking is logistic thinking, including booking across departmental boundaries to ensure coordination. Professionally it requires a description of which services should be provided and the time sequence of these services.

In March 2010 a rider was added to the fast track, namely that patients now have the right to have a 'pathway coordinator', i.e. a person who coordinates care for the patient

As mentioned this approach is an improvement from the patient perspective and also supported by scientific evidence. Other areas could take advantage of the same thinking.

### ***Work in progress on (coherent) patient pathways***

Much treatment and rehabilitation constitute a chain of services offered by different providers and authorities. Typically there is a triangle: Hospital – general practice – municipality - occasionally called the Bermuda Triangle to indicate poorly coordinated care. In the 2009 survey of patient experience almost 20% of the patients found that their GP has been too badly informed by the hospital and for the cooperation hospital – municipality 17% found that cooperation had been very bad or bad<sup>54</sup>. Unfortunately there is no information on how municipalities and GPs cooperated with the hospital.

The 2007 health care reform (amalgamation of the counties into 5 regions and more municipal involvement in health care) also introduced the so-called 'health agreements' where hospitals - - GPs and municipalities agree on for instance standards for discharge from hospitals, on procedures for hospital admission etc. All of this has the potential for better coordination of patient pathways when treatment by mentioned provider is involved in the patient pathway.

Coordination gradually become better and the use of health agreements and 'pathway coordinators' may be the way forward in area where the past 25 years have seen various initiatives – most without great effect.

### ***Increased focus on palliative care/end of life care***

The terminal stages of life are attracting increasing attention as witnessed by palliative teams and hospices. The first hospice was established in 1992 at Skt. Lucas Stiftelsen. As of October 2010 there were 17 hospices with a total of 196 beds<sup>55</sup>. Today hospice is covered by the free choice of hospital and it is free to the patient provided that referral criteria are fulfilled. In 2009 the price per bed day at a hospice was around Dkr. 4,500 (Danske Diakonhjem).

WHO defines palliative care as an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual. Palliative care:

- provides relief from pain and other distressing symptoms;
- affirms life and regards dying as a normal process;
- intends neither to hasten or postpone death;

- integrates the psychological and spiritual aspects of patient care;
- offers a support system to help patients live as actively as possible until death;
- offers a support system to help the family cope during the patients illness and in their own bereavement;
- uses a team approach to address the needs of patients and their families, including bereavement counseling, if indicated;
- will enhance quality of life, and may also positively influence the course of illness;
- is applicable early in the course of illness, in conjunction with other therapies that are intended to prolong life, such as chemotherapy or radiation therapy, and includes those investigations needed to better understand and manage distressing clinical complications.

Palliative care is especially directed at patients with cancer, although the principles are applicable for other diseases. At present there are 16 palliative teams and two hospital-based palliative units.

The idea of palliative teams and hospices can be boiled down to the title of a recent article by the acknowledged writer Dr. Atul Gawande: 'Letting go. What should medicine do when it can't save lives'<sup>56</sup>. In a recent report it was noted that few nations, including rich ones with cutting-edge health care systems, incorporate palliative care strategies into their overall health care policy—despite the fact that in many of these countries, increasing longevity and ageing populations mean demand for end-of-life care is likely to rise sharply<sup>57</sup>.

Although much has happened the past 10 years a recent analysis of what many would find an offending term, the quality of death index (essentially, what has been called palliative care above) placed Denmark on 22<sup>nd</sup> place<sup>57</sup>.

One of dilemmas is where terminal care best takes place: in the home supported by a palliative team; in a nursing home; in a hospice or in a special hospital department. The report from the Economists Intelligence unit<sup>57</sup> also notes that few nations, including rich ones with cutting-edge health care systems, incorporate palliative care strategies into their overall health care policy—despite the fact that in many of these countries, increasing longevity and ageing populations mean demand for end-of-life care is likely to rise sharply. In view of the Danish demographic development and the social, health costs during the final years of life and the somewhat unclear location of the responsibility for providing palliative care a national strategy is needed.

### ***Considerable investments in new hospitals***

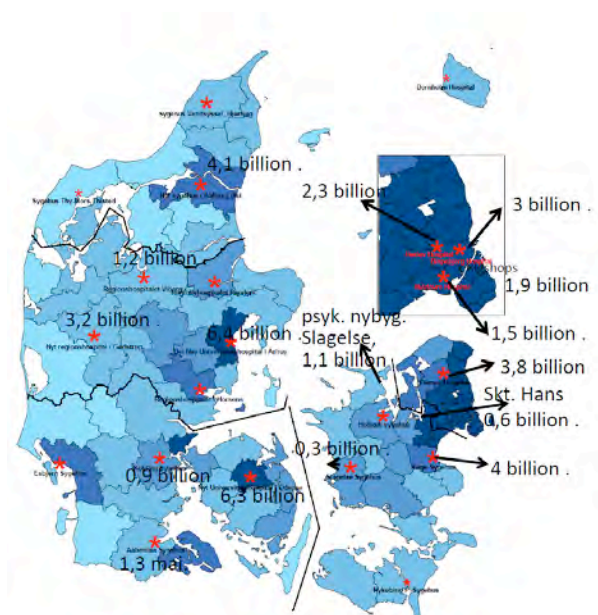
The government in 2007 announced that 25 billion Dkr. had been reserved for building of new hospitals and renovation of existing facilities. This is the largest investment program ever for hospitals. In addition to the 25 billion came an estimated 15 billion from the regions from sales of often centrally located properties. Thus a total of 40 billion Dkr. will be invested over the coming decade.

The background for this massive infusion of money was the reorganization January 1, 2007 leading to the amalgamation of the 14 counties into 5 regions. The counties and now the regions had/have the main responsibility for running the health service. The reorganization naturally led to regional reorganizations of the hospitals. This in turn was necessitated by a brand new model for emergency care from the National Board of Health. In the future fewer hospitals should have 24/7/366 emergency admission; A reduction from around 40 hospitals with emergency admission in 2007 to 21 in the course of 5-10 years.

Figure 17 shows how the investment funds have been distributed across 16 hospital projects. Basically three new university hospitals will be built (replacing existing ones) and two new mid-size hospitals will also be built, and in two other existing hospital facilities will be extended so that they essentially are 'new'.

There is no doubt that this will strengthen the Danish hospital system. There are clear demands for improved productivity due to better physical facilities, but this can only be achieved by critically looking at work routines, patient pathways and patient logistics in general. Hence, many interesting opportunities open up with the massive investment program. The challenge for hospital management and clinical management is to take full advantage of this unique chance for reorganizing a hospital.

**Figure 17: Investments in new or renovated hospitals. Red marks indicate hospital with emergency admission**



### ***Strengthening of pre-hospital treatment/care***

In the wake of the hospital restructuring several hospitals will close – and more importantly –with the centralization of emergency admissions the average distance to an emergency hospital has increased considerably. This in turn has led to a strengthening of the pre-hospital service.

Over few years the system has been overhauled and reorganized. No longer – and not really for several years – does an ambulance just signify patient transport. Treatment starts in the ambulance – either by a paramedic, a nurse or a physician – and the ambulance is linked to the designated emergency hospital so

that the hospital is advised about the condition of the incoming patient or the ambulance staff can dialogue with hospital staff.

'Rendezvous models have been developed as alternative to ambulances staffed with physicians, i.e. an ambulance with a patient is met by a mobile unit staffed with a paramedic or physician.

Service levels have been established, e.g. max. 15 minutes for an ambulance to respond to an emergency call. This is monitored closely by all regions.

A new set-up for dispatching ambulance and mobile units has also been developed. There has been considerable attention to developing models of pre-hospital service to outlying areas, including a helicopter set-up.

An issue not yet resolved well is the cooperation with 24/7 services provided by GPs (out-of-hours service, from 4. p.m. to 8.a.m on weekends and 24 hours on week-ends and holidays). This is a system organized by the GPs themselves, but the co-operation between this system and the largely hospital bases system outlined above need to be improve.

### ***Quality assurance and monitoring***

Over the past two decades quality issues in health care has come to the fore. The background was a negative one, namely that it was realized that many patients died or had their hospitalization prolonged because of low treatment quality (wrong, insufficient or not state of the art treatment). To witness: In Denmark it was estimated that 1,500 – 2,000 persons died due to adverse events, that medication errors not only causes untimely deaths but also prolonged hospital stay with up to 7 days on the average, and that 8-10% of hospitalized patients acquire an infection.<sup>58</sup> Today Denmark is in the forefront regarding quality assurance and monitoring – but not necessarily in terms of actually measurable quality of treatment.

A national program has been established. The Danish Healthcare Quality Program, DDKM, is a method to generate persistent quality development across the entire health care sector in Denmark. The Danish Healthcare Quality Program, DDKM, provides for standards of good quality – and of methods to measure and control this quality. As such, DDKM does not guarantee a high level of quality, but enables providers of health care to monitor and (partially) control their quality level.

The objectives of the Danish Healthcare Quality Program are<sup>59</sup>:

- To avoid errors causing loss of lives, quality of life and resources
- To ensure that knowledge achieved via research and experience is utilized in all branches of the health care sector
- To document work performed
- To achieve the same high quality across geographical boundaries and sectors
- To generate coherence in citizens' pathways across sectors – e.g. in the transition from hospital to local health care



- To render quality within the health care sector more visible
- To avoid that all institutions must invent their own quality assurance system
- To strive towards excellence – all the time

The Danish Healthcare Quality Program is based on the quality method known as *accreditation*. The basic principle of accreditation is to determine a minimum level of good quality within a number of areas, which are followed up for their level of compliance. The faults and omissions discovered in the process are used as an empirical basis to improve quality. All private and public Danish hospitals must be accredited – and the first ones have successfully passed the accreditation process.

There has been debate about the value of accreditation, in part because the (economic and clinical) benefits are hard to document, in part because it involves quite a bit of paper work (“bureaucracy”)<sup>60, 61</sup>. A rough estimate of the costs of implementing the DDKM is between 0.7 – 1 billion DKr. - equal to less than 1.5% of total hospital expenditures<sup>62</sup>. The benefits – to be documented systematically – will come from the savings due to better quality of care.

The Danish National Indicator Project, NIP, will be integrated into DDKM, as will the annual surveys of patient experienced quality<sup>3</sup> so that much of significant ongoing quality initiatives will gradually become an integrated part of DDKM.

The Danish National Indicator Project, NIP,<sup>63, 64</sup> was established in 2000 as a nationwide multidisciplinary quality improvement project. From 2000 to 2002, disease-specific clinical indicators and standards were developed for six diseases (stroke, hip fracture, schizophrenia, acute gastrointestinal surgery, heart failure, and lung cancer). Today diabetes, depression, birth and chronic obstructive pulmonary disease (COPD) have been added. The NIP model will become an integrated part of the Danish Healthcare Quality Program, DDKM.

Indicators and standards, see figure below, have been developed and implemented in all clinical units and departments in Denmark treating patients with these diseases, and participation is mandatory. All clinical units and departments receive their results every month. National and regional audit processes are organized to explain the results and to prepare implementation of improvements. All results are published via [www.sundhed.dk](http://www.sundhed.dk) in order to inform the public, and to give patients and relatives the opportunity to make informed choices.

A noteworthy feature of the system is seen in the right hand column of the figure. All the indicators (of good care/treatment) are based on graded scientific evidence. The picture for stroke is not unusual, i.e. not everything that is done – and ought to be done – is firmly based on scientific evidence. It is not an argument against doing it but cautions us toward the lack of solid evidence and where more research is needed.

Reporting from NIP takes place in a framework like the one shown in figure 17A with information from the previous reporting periods to be able to track changes. Table 2 has been pulled together from the 2009 report on stroke<sup>65, 66</sup>, including new indicators compared to figure 17A. The system is continually being refined and improved. Table 2 has included as an illustration only. The original sources should be consulted

for full explanation of the indicators. 'Standard' is the professional judgment of how many patients ideally should receive the service in question (in some areas it is a subset of stroke patients).

**Figure 17A: The framework for the national indicator project, NIP**

**Table 1** Clinical indicators for stroke

Indicator concept	Indicator	Type	Standard	Time	Evidence <sup>1</sup>
Organization of treatment	Proportion of patients treated/rehabilitated in stroke units	Process	≥90%	<48 hours after admission	A
Secondary prophylactic treatment	Proportion of patients treated with platelet inhibitors	Process	≥95%	<48 hours after admission	A
	Proportion of patients treated with anticoagulants	Process	≥60%	<14 days	A
Diagnostics	Proportion of patients who undergo a CT/MRI scan	Process	≥90%	<48 hours after admission	B
Assessment by a physiotherapist	Proportion of patients assessed by a physiotherapist	Process	≥90%	<48 hours after admission	D
Assessment by an occupational therapist	Proportion of patients assessed by an occupational therapist	Process	≥90%	<48 hours after admission	D
Assessment of nutritional status	Proportion of patients who have their nutritional status evaluated	Process	≥90%	<48 hours after admission	D
Mortality	30 days and 3, 6, and 12 months mortality	Outcome	30 days mortality <20%	30 days and 3, 6, and 12 months after stroke	C

CT/MRI, computed tomography/magnetic resonance imaging.

<sup>1</sup>The letters A, B, C and D in this column refer to the level of evidence for an indicator. 'A' represents the highest level of evidence, since evidence is obtained by meta-analysis of random controlled trials. 'B' evidence is obtained from controlled studies without randomization or from quasi-experimental studies. 'C' evidence is obtained from other epidemiological studies, such as case control studies. 'D' evidence refers to evidence based on different expert opinions.

Source: Mainz et al.<sup>63</sup>

**Table 2: Quality reporting for stroke, 2009 and 2007**<sup>65, 66</sup>

Indicator	Standard	Fulfilled (2009)	2009	2007
Stroke unit (within 48 hours)	95%	yes	91	85
Antiplatelet therapy within 48 hours	95%	no	88	87
Oral anticoagulant therapy	95%	no	73	77
CT/MRI scan at day of hospitalization	80%	no	71	62
Assessment by Physiotherapist within 48 hours	90%	no	75	70
Assessment by occupational therapist within 48 hours	90%	no	72	66
Nutritional risk evaluation	90%	no	69	66
Water swallowing test at day of hospitalization	90%	no	61	55
Ultrasound/CT-angiography, neck artery, within four days	90%	no	52	35
Mortality within 30 days	15%	yes	11	11
All-or-none			25	21 (in 2008)

Note: the number of patients included varies by indicator. A total of 11,421 was available, i.e. a substantial number of patients. - 11,281 was used for the first indicator while the subset of relevant patients of indicator number 2 was 7,441 etc. All-or-none' refers to patients who received the first 9 services.



The good news is that overall there are improvements from 2007 to 2009. At a more negative level only two standards out of 10 are fulfilled. Now, in sensational journalism, this would be presented as 'scandalous'. But before too hasty conclusions one should for instance consider the evidence level, the circumstances that occasionally makes it difficult if not impossible to carry out the procedures etc. Not in order to 'apologize' but in order to understand.

The next question is: What is the effect of compliance (full or partial) with the standards? At a general level the answer is better patient treatment and care. At a more detailed and relevant level one would want to know: Does it save/increase use of resources? It is often claimed that good/ better quality costs more – but is it so simple? Secondly, does mortality decrease, and if not mortality does the physical and mental functioning increase if all 9 points in table 2 are fulfilled. At present all of this it is not well explored, but for stroke there are at least two articles address it. Svendsen et al<sup>67</sup> looked at the relationship between degree of fulfillment of standards and length of stay, LOS.. They concluded that the median LOS was 13 days. Meeting each quality of care criteria was associated with shorter LOS. The size of the reduction was between 13-33 %. The association between meeting more quality of care criteria and LOS followed a dose-response effect, that is, patients who fulfilled between 75% and 100% of the quality of care criteria were hospitalized about one-half as long as patients who fulfilled between 0% and 24% of the criteria. Palnum et al<sup>68</sup> looked at quality of care and short-term mortality for stroke patients. Their findings can be summarized so that: elderly stroke patients in Denmark receive a lower quality of care than do younger stroke patients, however, the age-related differences are modest for most examined quality-of-care criteria and do not appear to explain the higher mortality among older patients

With this extended stroke example we have attempted to show how quality is monitored, results and improvement, and consequences in terms of length of stay and mortality. There is no doubt that Denmark is in front. There has been some criticism about 'bureaucracy' surrounding quality monitoring. It is true that collecting the data does consume resources. However, in view of the benefits to patients and the hospitals there is no doubt that in cost-benefit terms it is money well invested. However, it is important with more research of the type mentioned in the preceding paragraph.

### ***Well functioning multi-level democratic structures for integrated decision making and implementation***

All public health systems need a steering structure for allocation of resources, implementation of policy initiatives and control of accountability. The Danish system is organized as a multilevel governance structure with state, regions and municipalities. The regions play a crucial role in organizing and delivering specialized curative health care services, while the municipalities are in charge of most public health, rehabilitation and long term care services. The state sets the formal framework legislation and finances health care. In addition to legislative measures there is a long tradition for interaction between the levels through annual negotiations and agreements on budgetary matters. The budgetary agreements define the overall expenditure levels, and specify more specific initiatives and targets. There are regular follow up meetings on implementation progress and results in-between agreements. The process of entering agreements has served relatively well as a mechanism for coordinating central financing and regional/municipal activity levels. The agreements also serve as a platform for consensus-building on new organizational priorities in the sector. The formal negotiation structure is supplemented by a general

tradition for involving decentralized authorities in committees and councils for reorganization and development of guidelines and recommendations for the sector. Some observers argue that the state has taken on a stronger hand in such negotiation processes over the past decades, yet it still appears that the various negotiation arenas and processes between the state and regional/municipal actors represent a reasonably well functioning mechanism for co-development and coordination of policy initiatives.

The following examples of policy implementations illustrate the relatively well-functioning multilevel decision structures: 1) the implementation of a comprehensive “The Danish Healthcare Quality Program, see above. The model amalgamated several decentralized initiatives into a comprehensive national model based on a combination of accreditation and national quality databases. The annual budget negotiations were important arenas for the decision process on the “Danish Model for Quality Assessment”<sup>69</sup>, 2) the extensive transformation from in-hospital care to outpatient services, which has led to significant reductions in bed time, and cost. The transformation has been implemented by the regions, but supported by national level policy, 3) the implementation of a new hospital infrastructure. In a comparative light the Danish health sector has shown a greater ability to make structural adjustments than several of the neighboring. The changes have taken place after dialogue between the national and regional authorities, albeit with a relatively strong hand from the state level.

The Structural reform of 2007 also introduced new institutional structures for coordination between regions and municipalities. The regions are now required to enter agreements with the municipalities within the region on interaction in regards to health care – called Health Agreements. The agreements include mandatory elements on admission to and discharge from hospitals, information sharing, coordination of rehabilitation etc. The agreements are currently being evaluated by the National Board of Health but are generally considered important tools for coordination in spite of conflicting incentives at the two levels<sup>70</sup>.

## Weaknesses

### ***Tensions within the democratic multilevel governance structure: Limited voter interest and unclear role for politicians at decentralized levels.***

In a previous section we characterized the multilevel governance structure for Danish health care as reasonably well functioning. The arguments were that the system historically has been relatively good at adapting to new contingencies in order to meet multiple goals of cost containment, quality improvement and innovation. Yet, this picture should be modified with the observation that there seems to have been growing tensions within the system over the past decade. These tensions between decentralized autonomy and central control culminated in the structural reform of 2007. The reform created five new regions instead of the previous counties, and at the same time stripped the regions of their right to finance their activities through taxation. The regions thus became fully dependent on the national level, and municipal co-financing for their activities.

The subsequent process of creating new hospital structures has also revealed a stronger willingness from the central level to dictate decisions at the decentralized level. Regionally developed plans were in several



cases rejected by the national authorities that tended to place a higher emphasis on an expert committee appointed by the state.

Such de facto reduction in autonomy at the regional level is likely to affect the support for decentralized democratic governance negatively and to make it more difficult to recruit new members to the regional assemblies<sup>71</sup>. Moreover, such ongoing tensions are likely to negatively affect the broader legitimacy of the public governance structure. This may in turn lead to further reforms, and perhaps also accelerate the tendency to demand supplementary or alternative private solutions with the potentially negative effects on equality and integrated planning described in the above.

### ***Ambivalence towards strengthening of prevention and health promotion***

The structural reform in 2007 changed the responsibility for prevention, treatment and rehabilitation between municipalities and regions<sup>72</sup>. One of the areas being restructured was prevention and health promotion where the municipalities were given responsibility for and some supporting economic incentive to promote primary, secondary and tertiary preventive initiatives. Essentially the municipalities have sole responsibility for primary prevention (life style – and, in the parlance of the Act termed ‘citizen oriented prevention’). There is a shared responsibility for tertiary prevention, e.g. typically the chronically ill. (in the terminology of the Act termed ‘patient oriented prevention’)

At the same time municipal co-financing was introduced. Basically municipalities pay a certain amount every time one of their citizens uses regional health care services. Thus, in this way the law makers hoped to give the municipalities an incentive to look for municipal alternatives to certain regional health care services, e.g. prevent repeated hospitalizations by strengthening home aid, home nursing, or patient schools for chronically ill.

Most municipalities have introduced some prevention programs and carried out surveys, so-called health profiles, to build their prevention and health promotion strategy on; however, there is still considerable ambivalence towards strengthening preventive programs and the optimal level of preventive initiatives. The ambivalence has many explanations such as lack of evidence, lack of funding in the municipalities, lack of infrastructure, lack of knowledge or competences in the municipalities and lack of economic incentive to promote prevention.

A number of reports have tried to point out cost-effective preventive initiatives<sup>73</sup> but there is still a considerable and probably in-optimal variation between the municipalities. There exists no complete or comprehensive overview of the preventive programs in the municipalities (Due 2008; Hansen 2008; Hansen 2010; Kommunernes Landsforening 2008; Sundhedsministeriet, 2008), but we believe that there is a considerable (but not necessarily optimal) amount already allocated but the use of efficient preventive programs is at an in-optimal low level, to a certain extent documented by the Commission on Prevention<sup>74</sup>. With the current fiscal situation (as well as the situation in the near future) for the municipalities it is hard to believe that the preventive effort will increase but one can hope that the existing funding will be used more economically rational on efficient preventive programs.

One of the considerable obstacles in obtaining the optimal level and mix of preventive programs is the conflicting economic incentives facing the municipalities responsible for prevention and regions responsible for providing health care services. The 2007 structural reform have addressed this conflicting and tried to

align the incentives by making municipalities partly responsible for funding of the health care system depending on actual utilization by the citizens of the municipality. The idea was that municipal co-funding would provide municipalities with an incentive to try to develop alternatives to regional health care for certain patient groups, for instance patients with chronic diseases like COPD. However, most consider these economic incentives either to be too low in the relevant treatment areas, or too general, as they include areas where the municipalities in reality have very little or no possibilities for substitution, e.g. pregnancies or broken legs<sup>75-78</sup>.

### ***Ambivalent attitude towards explicit political priority setting***

The need for prioritization in the health care system is acknowledged by national as well as regional politicians, the population and by health care professionals. Despite this general recognition of the no formal infrastructure in the Danish health care sector or authorities facilitates more explicit prioritization. Some of the national authorities, e.g. the National Board of Health and The Reimbursement Committee in The Danish Medicines Agency, do take decision prioritizing reimbursement and implementation of the new treatments but the prioritization is neither explicit nor transparent. In the vision of The Danish Medicines Agency it is stated that “we will focus on the health and welfare of both people and animals with due consideration to affordable and economic treatments” but critics would claim that little emphasis is paid to cost-effectiveness, and where economic considerations are taken into consideration it is only in terms of the impact on total expenditure rather than cost-effectiveness.

As indicated a number of national Danish institutions contribute directly or indirectly to priority setting by ex-or implicitly doing priority setting or by providing information for priority setting. The following are examples and not an exhaustive list while regional authorities also have various institutions contributing to priority setting.

- National board of health – National Committee for the Evaluation of Cancer Drugs (UVKL) This committee is an advisory assembly whose purpose is to advise the regions on the use of cancer drugs on a national level. In their mandate it is stated that Health Technology Assessment (HTA) or mini-HTA is an appropriate framework for providing a systematic assessment. It is stated that UVKL discusses cancer drugs on the basis of submitted mini-HTAs from the professional associations, often with an economic evaluation (cost-effectiveness analysis) as part of the assessment. There has been a number of HTA completed for this purpose but at present no or very few mini-HTAs are being made.
- The Reimbursement Committee in The Danish Medicines Agency decide which prescription drugs can be subsidized on a general basis (general reimbursement), and when a patient can be granted individual reimbursement for specific drugs. The reimbursement is the deduction from the price charged at the pharmacy. Decision on reimbursement indirect operates as priority setting where cost and cost-effectiveness, however, only is one of parameters being taken into account. There is no formal requirement for including cost-effectiveness analysis in the decisions.
- The Nordic Cochrane Centre (NCC) is an independent research and information centre that is part of The Cochrane Collaboration. The NCC provides systematic reviews of the clinical effects of health

care. These reviews contribute to priority setting by helping to only implement health care services which have proven to be effective. The center is part of the Cochrane Collaboration.

- Institute for Rational Pharmacotherapy (IRF). The aim of the IRF is to promote the most rational use of current and future medicinal products with respect to both pharmacological and economical aspects. This aim is directed towards both primary and hospital care. IRF contribute to priority setting by e.g. providing reviews of new medical products, by preparing pharmacotherapeutic guidelines for selected areas in co-operation with the relevant scientific societies, by initiating projects and scientific investigations in areas of major pharmacotherapeutic and economical concern.
- The national Mini-HTA database collects mini-HTAs or hospital-based HTAs. This is intended to facilitate priority setting at the hospital level. The mini-HTA has proven to be a useful framework which has some applicability to hospital level priority setting but there are still some issues about the quality of the mini-HTA reports <sup>79</sup>
- The Unit for Health Technology Assessment and Evaluation within the National Board of Health has until recently provided comprehensive national HTAs on selected topics.

The debate on explicit prioritization is raised time to time in the public debate and among health care professionals, but no infrastructure or agreements have been reached like in other countries, like e.g. NICE in UK. Politicians and public authorities have been reluctant to keep prioritization in closed environments with little or no transparency to the public. The relative favorable increase in the public funding for health care, compared to other public welfare areas, have still called for prioritization but the coming years with an expected lower growth in health care expenditure necessitate a more transparent and explicit framework for prioritization in the health care sector.

### ***Tight budgets and/or wrong allocation and activity based financing***

Reimbursement of hospitals was changed in 2002 going from global budgeting to become partly dependent on activity using a DRG system <sup>80-82</sup>. The overall budget control of hospital expenditure, which is the responsibility of the regions, has changed with the introduction of activity-based funding (ABF) of hospitals. ABF have had clear pros by promoting more overview and comparative measures of hospital production as well as influencing health professionals' mindset to become increasingly aware of costs and cost minimization initiatives. Some periods with ABF have, however, also demonstrated some of the cons in terms of lower budget safety and changes in the abilities to allocate hospital funding.

The introduction of ABF together with the introduction of patients extended free of provider has challenged the regions' abilities to control overall budgets. The region face the dilemma that they have incentivize their hospitals to respond to demand while the extended free choice enables patients to choose hospital in another region or a private hospital if treatment guaranties cannot be fulfilled by the public hospital. On the other hand regions have to safeguard the overall budget, which means that they should not incentivize activity too strongly. Regions have many possibilities of safeguarding the overall budget for their public hospitals but the mechanisms by which they do so has changed considerably since the days of global budgets.

Despite many mechanisms for budget safeguarding regions' ability to allocate budgets has been severely challenged because of the extended free choice with 1 month waiting time guaranty for all patients independent of type of disease, severity of the disease or type of treatment. Due to this waiting time guaranty regions face the competition from private providers (private hospitals and clinics) who are able to provide the treatment within the waiting time guaranty. Regions have therefore very little capability of reducing allocation of funding to some disease areas or treatment types, and this has resulted in in-optimal high funding and in-optimal low waiting time for some minor sever diseases.

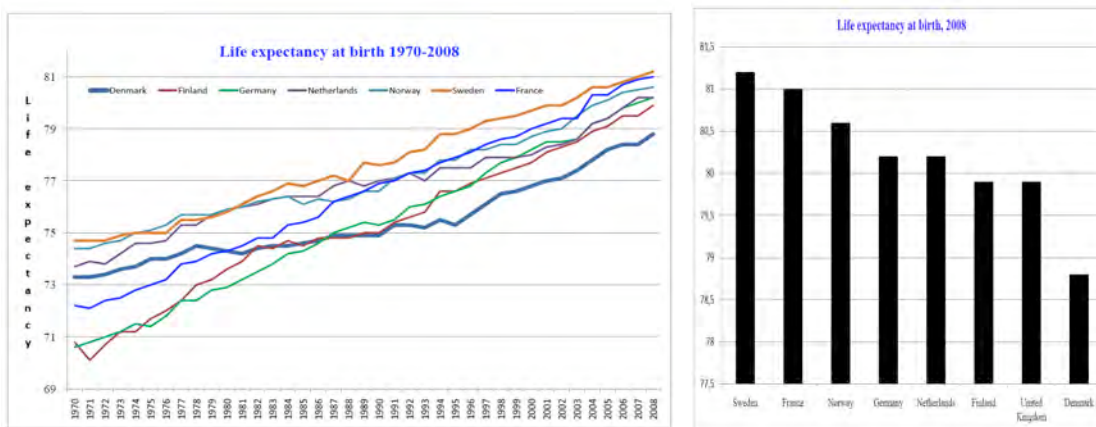
### ***Life expectancy and health status***

It would be ideal if a measure of success in terms of 'health' for the health care system existed. However, this is not the case. Instead a number of imperfect and conventional measures exist. Among them is life expectancy at birth, i.e. how many years can a new born child expect to live given existing mortality rates at different ages. Measured by this metric the Danish system does not fare well, cf. Figure 18.

Denmark was in the middle by 1970 – but life expectancy almost stagnated 17 years (1978-1995) – and after this life expectancy started to growth again. But the consequence of the stagnation was to put at the bottom place, as clearly seen in the right hand side of figure 18. The stagnation is puzzling and has been analyzed intensively<sup>83, 84</sup>. It is striking that Sweden consistently has been at the top. In a recent article Denmark and Sweden was compared with a view to the causes of this different pattern. Juel concludes that life style is main culprit:

*“Life expectancy in Sweden is now almost three years longer than in Denmark. A very substantial part of the Danish excess mortality and low life expectancy compared to Sweden can be attributed to high mortality related to alcohol and tobacco consumption. Overall, alcohol and smoking account for almost the entire difference between Danish and Swedish men and for 75 per cent of the difference between Danish and Swedish women”<sup>85</sup>*

**Figure 18: Development in life expectancy at birth 1970-2008, and situation in 2008**



This conclusion is basically the same as emerged from the analyses in the mid 90ies. Many interest groups have tried to tie the lackluster development in life expectancy to health care spending and have often referred to the rather low Danish health care spending level, cf. above. While it cannot be ruled out entirely

it is not very likely that this is the main cause<sup>86</sup>. Several things point in this direction. Firstly, life expectancy is influenced by many other things than health care services, e.g. work environment and life style. Secondly, much health care is not directly aimed at prolonging life, but rather to alleviated functional limitations, e.g. hip-and knee replacement, cataract surgery. Thirdly, life expectancy is not a very sensitive indicator in the sense that only rather dramatic interventions will change life expectancy radically – therefore casting doubt on the use of life expectancy as a good indicator of success.

**Figure 19: Declining excess mortality for diabetic patient 1997-2008.**

Overdødelighed blandt personer med diabetes for perioden 1997-2008 (korrigeret for alder)

År	Kvinder	Mænd	Alle
1997	1,83	1,96	1,90
1998	1,79	1,90	1,85
1999	1,75	1,98	1,86
2000	1,77	1,92	1,84
2001	1,70	1,82	1,76
2002	1,64	1,88	1,75
2003	1,68	1,83	1,75
2004	1,60	1,80	1,70
2005	1,62	1,77	1,69
2006	1,60	1,71	1,65
2007	1,54	1,70	1,62
2008	1,51	1,64	1,57

Kilde: Det nationale diabetesregister

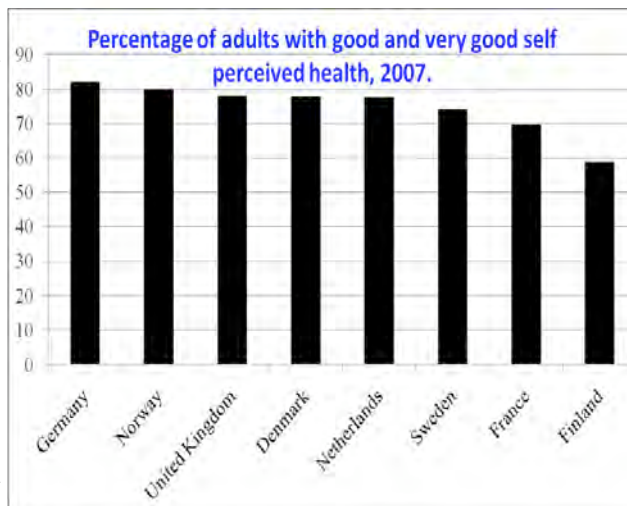
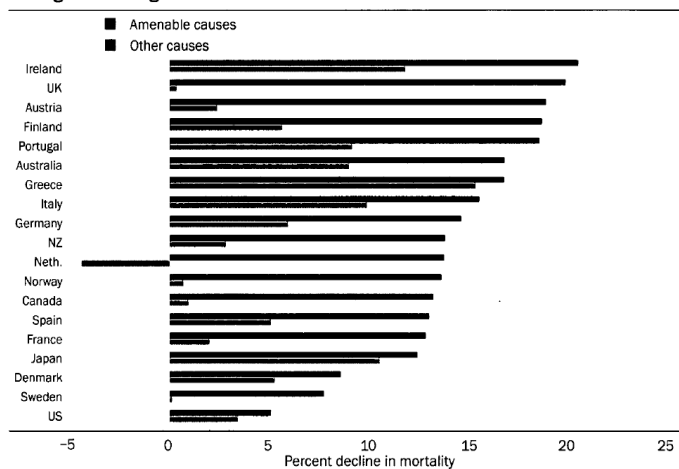
The last point can be illustrated by looking at diabetes, figure 19. Improvements in diabetes care has led to a decline in mortality (the over proportional mortality that characterizes persons with diabetes). The improvements in diabetes care have been so successful that they undoubtedly have contributed to the improved decline in the excess mortality (compared to the population norm) survival. However, the point here is that such an obvious success story is not really detectable and/or identifiable in overall life expectancy.

Two supplementary measures are of interest: Self perceived health and mortality from amenable causes, figure 20.

A fundamental issue relates to how to attribute population health outcomes to health care, the basic weakness of life expectancy is exactly the lack of a high degree of attribution. One approach uses mortality data, which are readily available at a population level in many countries, and is based on the concept of ‘amenable mortality’ referring to deaths from certain causes that should not occur in the presence of timely and effective health care<sup>87, 88</sup>. It is in no way a perfect measure because one can always debate exactly what and what extent something is amenable to health care. From figure 19 it is seen that Denmark does not fare too well measured this way – but neither does Sweden. For self perceived health we do better.

**Figure 20: How is Denmark doing in terms of amenable mortality and self perceived health**

**Percentage Decline In Mortality From Amenable Causes And Other Causes Of Death Among Females Ages 0–74 In Nineteen Countries From 1997–98 To 2002–03**



### ***Slow introduction of new treatments?***

In many areas Denmark have not been on the forefront of implementing new technologies and treatments<sup>89,90</sup>. The slow adoption of new technologies and drugs may be due to the before mentioned successful cost containment but this is not the only reason. The awareness and capability to implement new technologies is another reason as in general what determines diffusion of new treatments where economics is only part of the explanatory variables.

Do authorities drag their feet in introducing new treatments – or put differently and more dramatic: Are patients “denied” access to new treatments, in particular drugs? This is a recurrent claim – in particular from the pharmaceutical industry. An example of such a claim and the reasoning behind can be found in one of many statements from LIF<sup>91</sup>. The heading went: ‘Danes do not get the newest cancer drugs’. Referring to a recent report<sup>92</sup> it was noted that cancer survival in Denmark is low. And

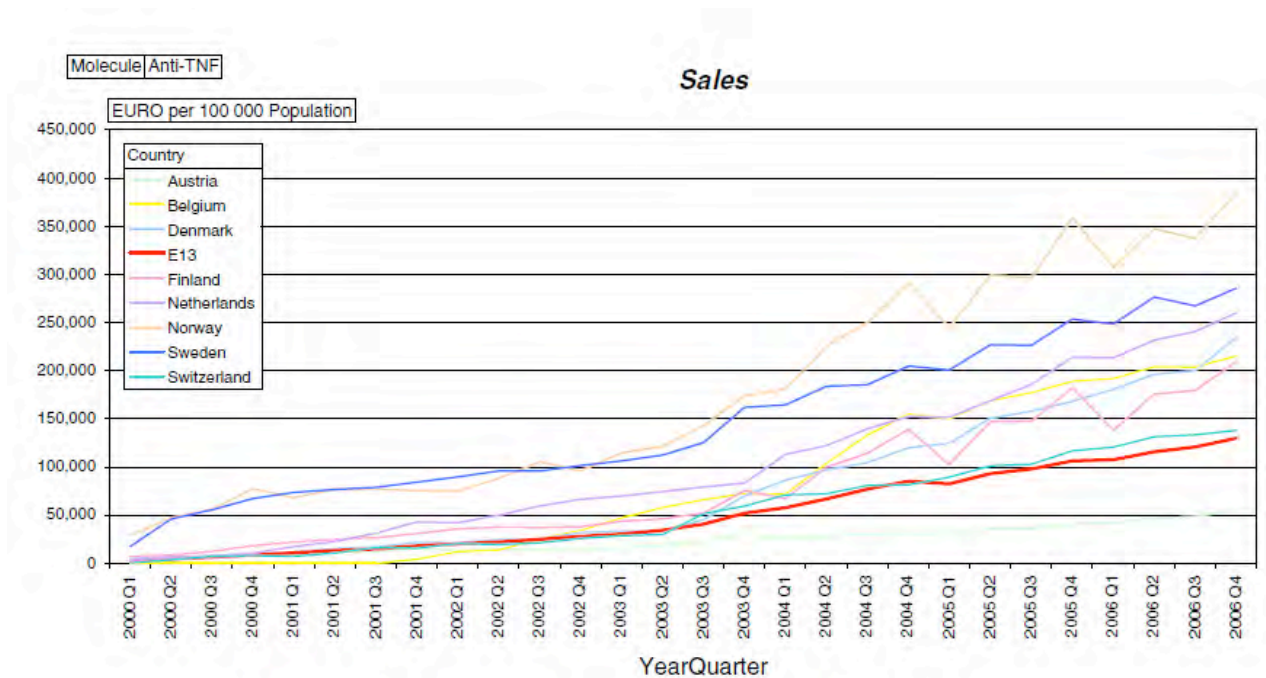
*“One of the reasons for these non-impressive results is that Denmark only slowly takes up these new and more effective drugs. The report show how fast eight new drugs against cancer were marketed in different European countries and here Denmark systematically has been slower than Sweden and Norway. Thus, there are more examples of drugs having been used for two years in neighboring countries before Danes were allowed to benefit from them”*

There are at least three relevant issues. First, is it true that access to drugs is slower in Denmark? Secondly, if an affirmative answer: Does it matter (what benefits are foregone) and thirdly: What are the reason?

As regards the first question figures 21 and 22 provide examples of research underpinning claims about slow introduction. Figure 21 shows that the level of sales of these biological drugs for rheumatism have been rather low, while figure 22 shows that the timing of market approval in Denmark is not far behind most other countries in the table. As regards figure 22 there is supplementary information in the source showing development in sales. Marketing authorization is one thing, actual use is another.



Figure 21: Sales of 'biological' drugs for treatment of rheumatism<sup>93</sup>



The second and third questions above are best addressed together. There is no question that these new drugs have an effect on the targeted illness – that is why they have tested thoroughly in randomized trials. However, the question is how much better than existing treatment they are?

Often improvements are 'marginal', i.e. not really a breakthrough with dramatic clinical improvements. And if this improvement comes at a high price – which is often the case with new (biological) drugs – then it is fair to ask whether it should be introduced. This leads directly to the question of priority setting. In Denmark we have recently seen the establishment of the Council for Expensive Hospital dispensed drugs (basically some of the above mentioned), RADS, where the two interlinked issues of effect and costs undoubtedly will be discussed.

Whether one unquestionably should consider 'delayed' introduction of new treatments as a negative thing is debatably, but it should be discussed seriously to ensure an evaluation of whether it is real problem, not only perceived by the pharmaceutical industry. It should be noted that apart from cancer it is hard to find examples outside the realm of pharmaceuticals. For cancer 'experimental treatment' (drugs, radiation, and surgery) has been discussed for several years because it was believed that Danish oncologists were too conservative and somewhat unwilling to provide 'new and/or experimental' treatments (that patients had heard were available abroad). In 2003 the system with access to experimental cancer treatment was put in place with advisory board. The arrangement was aimed at patients with life threatening cancer or similar manifestations where treatment possibilities in Denmark were exhausted. The board advises on patient cases where the attending hospital physician has applied on behalf of the patient. The number of cases is limited. In 2009 a total of 341 patients had applied<sup>94</sup>. Increasingly patients are not send abroad but instead are enrolled in trials at Danish hospitals.

Figure 22: National launch dates for 8 cancer drugs<sup>92</sup>

	Capecitabine	Gemcitabine	Imatinib	Irinotecan	Oxaliplatin	Rituximab	Trastuzumab	Vinorelbine
Europe	Jun 1998	Apr 1995	Jul 2001	Sep 1995	Jul 1996	Dec 1997	Nov 1998	Jun 1989
Austria	Sep 2000	Jun 1995	Dec 2001	Sep 1997	Jun 1998	Jul 1998	Oct 2000	Jun 1992
Belgium	Sep 2001	Jan 1997	Oct 2002	Jun 1999	Oct 2001	Jul 2000	Apr 2001	Jul 1999
Czech Republic	Feb 2001	Apr 1996	Apr 2002	Nov 1997	Feb 2001	Oct 1999	Mar 2001	Oct 1993
Denmark	Sep 2001	Mar 1997	Dec 2001	Dec 1998	NA	Dec 1998	Dec 2000	Jun 1998
Finland	Mar 2001	Sep 1995	Nov 2001	Apr 1997	NA	Jul 1998	Oct 2000	Nov 1996
France	Nov 1998	Jul 1996	Apr 2003	Sep 1995	Jul 1996	Jun 1998	Sep 2000	Jun 1989
Germany	Mar 2001	May 1996	Nov 2001	Sep 1998	Sep 1999	Jul 1998	Oct 2000	Feb 1996
Greece	Dec 1999	Jan 1997	May 2002	Feb 1998	NA	May 1999	May 2000	May 1997
Hungary	Jan 2002	Jan 1997	Dec 2001	Jul 1999	NA	Apr 2000	Jul 2001	Jan 1998
Ireland	Mar 2001	Apr 1996	Jan 2002	Sep 1998	NA	Aug 1998	Dec 2000	NA
Italy	Oct 2001	Jul 1996	Jan 2002	Nov 1997	Jun 2000	Mar 1999	Feb 2001	Mar 1992
Netherlands	Jun 2001	Jun 1995	Nov 2001	Sep 1998	Aug 1999	Jul 1998	Sep 2000	NA
Norway	Oct 1998	Mar 1997	Aug 2001	Aug 1998	NA	Feb 1998	Nov 1998	Oct 1998
Poland	Dec 2000	Mar 1997	Jan 2002	Jan 1999	Sep 2003	Dec 2000	Mar 2002	Oct 1994
Spain	Feb 2001	Nov 1995	Apr 2002	Jun 1997	Apr 2000	Sep 1998	Nov 2000	Apr 1993
Sweden	Feb 2001	Apr 1995	Nov 2001	Jun 1998	Sep 1999	Jun 1998	Oct 2000	Oct 1996
Switzerland	Jun 1998	Jun 1997	Jul 2001	Sep 1998	Sep 1999	Dec 1997	Aug 1999	Mar 1996
UK	Feb 2001	Dec 1995	Nov 2001	Mar 1997	Sep 1999	Jun 1998	Sep 2000	Jun 1997

Table 4.2. National launch dates for and capecitabine, gemcitabine, imatinib, irinotecan, oxaliplatin, rituximab, trastuzumab and vinorelbine: NA = not launched or not available.

The reverse side of ‘too slow to introduce new treatments’ is to ask whether there are areas where we have fallen behind. In two areas Denmark probably fell behind in the 1990ies: Heart (surgery) and cancer treatment. In the new millennium this has been rectified by ‘Cancer Plan I – III’, the latest from November 2010<sup>95-100</sup>. Many observers would agree that the catch-up effort has been successful even though it is not yet visible in terms of (markedly) improved survival rates. For heart surgery the catch up started already in 1993 with the ‘heart plan’. In 2005 the National Board of Health published a status report and noted that we on par with most other countries<sup>101, 102</sup>.

### ***Lack of vision for new hospitals, i.e. ‘hospitals of the future’ and a vision for primary care***

As noted in the section on strengths the Danish State and the Regions are currently investing more than 40 billion Dkr in a new hospital infrastructure. The changes are made to accommodate the new regional structure and following overall principles of pursuing benefits of scale and specialization by concentrating activities on fewer and larger hospital facilities. Yet, it can be argued that beyond these general and somewhat vaguely defined principles with relatively weak evidence for the benefits, at least in economic terms<sup>71</sup>, there is a lack of coherent long term vision for the development of “hospitals of the future”, and for coordinating such hospital facilities with a modernized “primary care of the future”. It is obviously difficult to foresee in detail what the future needs and opportunities will be, yet it is equally obvious that there are a number of dimensions where current development trends are likely to make an even larger impact in the future, and where a coherent strategy for integrating all of these elements in a flexible solution has potential to improve the future performance of the health system significantly. However, it



appears that there is a limited will or capacity in the system to build such a coherent long term vision for hospitals and primary care of the future.

Some of the development trend that should be considered include: 1) the rapid development of IT and telecommunication technology, which are already today having a large impact on medical practice. This development is likely to continue in the future with opportunities for digitalizing many areas of the current practice. An important aspect here is the development of digital imaging technology for diagnostics. This creates new opportunities for sharing information across treatment levels, and thus for coordinating fast track diagnosis and treatment paths. 2) The development of customized medicine based on gene mapping, will alter the way we think about medication and treatment regimes, and will require new and more individualized information and treatment structures. 3) The development of nano-technologies for operations is likely to continue leading to much less invasive types of surgery than today, and thus a continued development towards shorter hospital stays, which in turn requires more comprehensive and coordinated efforts in the primary care sector. 4) the demographic transition towards more elderly will in itself require a reconfiguration of the focus in both the hospital and primary care sectors, and not least a much stronger emphasis on creating coherent pathways across the sector boundaries for the many elderly patients, which often have multiple conditions and complex care needs. 5) At the same time we can expect other parts of the future patient population to have many mental and economic resources that can be utilized for self-management and active involvement in co-production of treatment. This requires innovative ways of interaction between health care personnel and patients of the future.

In more general terms we see a need for developing a health sector with a much stronger focus on innovation and continuous integration of the most recent research in to practice. In this sense “the hospital of the future” is much more a concept of organizational processes and knowledge management than of physical infrastructure. Similarly we need to develop a concept of the “primary care of the future” which accommodates the growing need for integration of services and the growing number of elderly and patients with long term care needs. It is also of vital importance that the “primary care of the future” develops a stronger focus on effective prevention and health promotion in order to prevent diseases, and to detect conditions at an early stage.

### ***Too slow take up of the chronic care model?***

The National Board of Health relatively early took leadership in developing a chronic care model – in part in view of the demographic development discussed above, in part because the prevalence of chronic illnesses was increasing independently of the demographic development due to life style changes. In a number of reports a ‘chronic care’ model described below was developed<sup>103-110</sup>. It is a definite strength that the chronic care model is being promoted vigorously by the National Board of Health, including establishment of a steering group for chronic care with representatives from municipalities, regions, and government, but unfortunately not with a GP representative. A dynamic project on chronic care has also been established by the National Board of Health. A weakness is that the uptake of the model seems rather slow and much depends on the (good) will of the parties involved in the operational details: Municipalities, GPs and the Regions. GPs are formally a regionally financed entity, but run by self-employed GPs on contract with the region. There has been much talk and understanding but not a corresponding level of *coordinated* action whereas many examples of *independent* municipal and regional projects are seen. Central government has approved 0.6 billion Dkr. that has been allocated to projects that run 2010-2012. However, one may

question the number of project. Looking at the list of projects<sup>110</sup> it is clear that an attempt has been made to consider 'everybody' – probably resulting in too many and too small projects with no guarantee that good project results will become part of the annual budget once project money run out.

It is also a strength (and a weakness) that chronic care is an integral part of the compulsory health agreements<sup>111</sup> between regions/GPs and the municipalities, but it has been hard to obtain commitment to concerted action.

The National Board of Health describes the background for the initiative as follows:

*“Due to the emergence of increasingly efficient and costly treatment options, an ageing population and the ensuing increase in the number of people affected by chronic diseases and problems recognized in the care of chronic conditions it is necessary to identify the options for better care in connection with chronic conditions, p.4<sup>107</sup>*

Chronic diseases can be defined by one or more of the following characteristics: they are permanent, leave residual disability, are caused by non-reversible pathological alteration, require special training of the patient for rehabilitation, or may be expected to require a long period of supervision, observation or care. This definition includes both somatic and mental disorders.

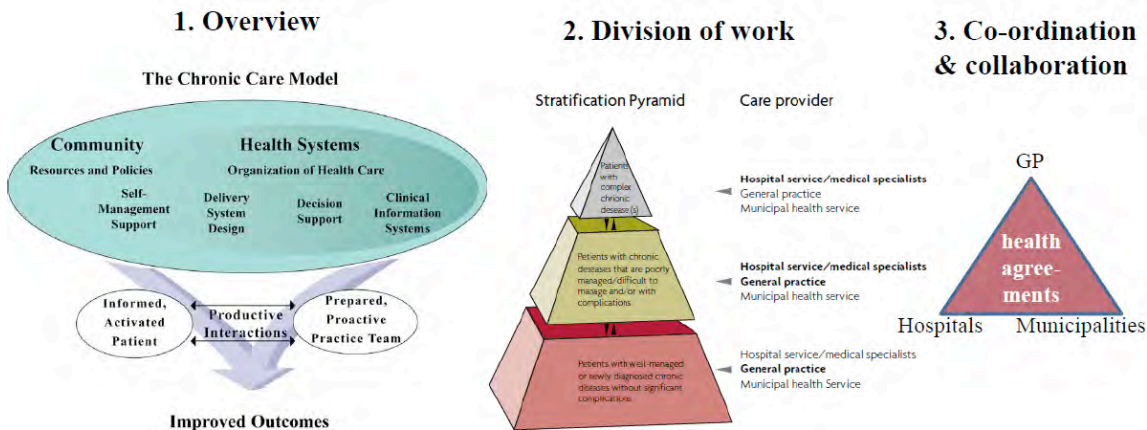
The list of specific chronic diseases usually encompasses:

- diabetes
- asthma and allergy
- cancer
- chronic obstructive pulmonary disease (COPD /KOL)
- cardiovascular disease
- osteoporosis
- muscular-skeletal diseases, typical rheumatism
- psychiatric diseases

The chronic care model was basically developed in the US<sup>112</sup>. The basic ideas and issues are captured in figure 23. Starting from the left we have what is formally the 'chronic care' model. An essential element is the collaboration between the health system and the community (in Denmark among other things the municipalities and NGOs). Another important element is self care. The National Board of Health has been strong in stressing this element<sup>103, 109, 113,106</sup>. An important element of self care is monitoring – where telemedicine may become an important tool. The National Board of Health states that: “The patients' self-monitoring of the disease should be enhanced and technologies for self-monitoring should be evaluated and the quality of the monitoring should be assured”, p. 7<sup>110</sup>.

The stratification model in the middle of Figure 23 stresses both the division of work and the importance of primary care. It is of course an idealized model but on the other hand it also shows how important it is to discuss and implement ways of ensuring that patients as much as possible are treated at the local level. The work with patient pathways for chronic patients is an important way to realize this<sup>108</sup>.

**Figure 23: A snapshot of the chronic care model**



To the right in the figure is collaboration triangle in Danish health care. The chronic care model is a generic model –albeit implicit mirroring an American setting. The model needs to fit a Danish setting and in particular to capture the three main parties. Much is done formally through the health agreements, but more importantly is the day to day collaboration. One particular challenge is to decide on who is to lead. The recommendation is clear: “...the general practitioner is the project leader through the entire course of the chronic disease and that the contents of the function are incorporated into the description of the course.” The question is whether this is accepted by the other parties and whether general practice and will take on this task.

In view of the previous recommendation it should be noted that general practice already is heavily involved with chronic patient, figure 24. Almost 50% of face-to-face encounters are with chronic patients.

The totality of the chronic care has not been subjected to rigorous evaluation, only parts, e.g. the self-care component, (Lorig 1999). Hence, one must be careful not to make too sweeping generalizations or claims. The chronic care model can be looked at from several perspectives:

- as a way of providing care in the primary care sector and avoiding ‘clogging’ in-and outpatient care. In this respect the model is worth looking at – in particular if outcomes are equal or better than for hospital care
- producing better outcomes. A recent summary of studies seem to provide some support for this, (Coleman 2009)
- does it create net savings or at least provide cost-effective care compared to for instance mainly hospital care. One should probably not expect net-savings. (Peikes 2006; Peikes 2009; Russel 2009). At best it is cost neutral.

**Figure 24: Chronic diseases and general practice**<sup>114</sup>

	n	Audit		Estimated no. of consultations	
		%		annually	per week/GP
	<b>21.464</b>	<b>100%</b>		<b>14.834.097</b>	<b>79</b>
The eight chronic diseases	11.506	53,6%		7.951.075	42
Other reasons than chronic	9.958	46,4%		6.883.022	37
<b>The 8 chronic diseases:</b>					
Cardio-vascular.....	4.028	18,8%		2.670.137	14
Musculus – skeletal.....	2.915	13,6%		2.017.437	11
Psychiatric problems.....	1.803	8,4%		1.246.064	7
Type 2 diabetes.....	969	4,5%		667.534	4
Cancer .....	786	3,7%		548.882	3
COPD/KOL.....	496	2,3%		341.184	2
Asthma and allergy .....	400	1,9%		281.848	2
Osteoporosis.....	109	0,5%		74.170	<1

### ***Cooperation between municipalities – GPs – hospitals***

Well functioning cooperation between municipalities, general practice and hospitals is essential not only for patient evaluation of health care but also for treatment outcome. Despite the fact that it has been discussed for at least 25 years there is still place for improvement<sup>115</sup> even though much work is being done, for instance in connection with the health agreements. In the first 1985-white paper on the issue coordination of chronically ill patients was discussed – and some of the recommendations still are not implemented.

In two areas it is crucial that the triangle-cooperation functions: Training/rehabilitation and chronic care – where the latter in part overlaps with care for the elderly. The health agreements also play a pivotal role in this connection. The problem with the health agreements are that they on the one hand are compulsory but on the other hand non-committing, i.e. without the consent of the parties it is impossible to do anything, for instance to follow intersectoral guidelines from the National Board of Health for treatment of the chronically ill. In addition the economic incentives to cooperate are not in place. A so-called municipal co-financing for regional health care is in place but is not targeted and in many cases considered very ineffective.

### ***Lack of focus on rehabilitation***

It is increasingly being realized that rehabilitation is an integral part of treatment or the final part of a course of treatment. It is also realized that rehabilitation is more than ‘training’, e.g. traditional physiotherapy. Rehabilitation covers physical, mental and social needs and therefore often consists of a multidisciplinary package of services.

A recurrent theme for cancer<sup>116, 117</sup>, heart, and rheumatism patients and groups with misc. chronic diseases is that they receive too little or no rehabilitation<sup>118</sup>. Rehabilitation is also an integrated part of the chronic care model. There is reasonable evidence for the effect of rehabilitation<sup>119-122</sup>.

According to the Health Act patients have a right to a training plan when they are discharged from a hospital and it is found medically relevant<sup>123</sup>. Apart from specialized training, training according to the plan must be provided by the municipalities that decide on both the type and extent of training. There are at least three problems with this organization: a) as a rule it is only training, not rehabilitation that is offered, b) economic incentives are largely absent or too small, and c) some municipalities are too small (population wise, and therefore in terms of patients) to offer training differentiated according to illness/problem.

Overall the lack of rehabilitation seems to be a weakness of the Danish health system, although cancer plan III shows some promise. There much likely is a need not only to have a look at the Health Act and substitute rehabilitation for training. Furthermore there may be a need to look at economic incentives.

### ***Inequity***

Inequity issues were discussed under the heading of 'challenges' in part because most of them in a sense are outside the control of health care system, e.g. work environment or life style, with access to services being an exception. Nevertheless, most likely many consider both inequity in health and inequity in morbidity as a weakness of the health system. If not, it is at least an issue of considerable societal concern.

Inequity in geographical access to health care has only been touched on indirectly above. The centralization of hospitals and the shortage of GPs mean that people in outlying areas are increasingly forced to travel further to reach health services. It is well known that distance to provider influences utilization level: the longer the distance, the less use.

## Solutions

It is easy to come up with proposals that will increase the benefit scope and levels of health services *and* increase expenditures. However, *the whole point of the SWOT analysis has been to identify areas worthy of attack* because they threaten the sustainability of the health system as we know it, run counter to the objectives of the system, e.g. equity, or are glaring weaknesses. If we are to make rational decisions about improvements it must be based not only on a helicopter view of the health care system via the SWOT analysis but improvements must be selected so that they have the biggest impact per monetary unit expended and should have a realistic chance of being implementable in the Danish health care sector.

The SWOT analysis can be used to briefly to compare with the objectives for Danish health care set out in Health Act:

Objective according to the Health Act	Comment
Easy and equal access to health care	Basically fulfilled – even though equal access independent of economic means always will be a sore point as long as there is co-payment. However, a world without co-payment would require an additional 20 billion DKK. of tax money
Treatment of high quality	Seems to be fulfilled to a reasonable degree – but difficult to documents.
Coherent and linked services	An area for improvement, in particular intersectoral pathways. However, the extent of problems, i.e. how many patients actually experience problems, is unknown.
Free choice of health care provider	Fulfilled to a high degree
Easy access to information	Not explicitly addressed in the SWOT analysis, but the website <a href="http://www.sund.dk">www.sund.dk</a> and <a href="http://www.sundhedskvalitet.dk">www.sundhedskvalitet.dk</a> attest to the fact that something is being done. However, there is no readily available information about the extent of use
A transparent health care system	Difficult to pass judgment.
Short waiting time for treatment.	In view of both the experienced waiting time and the ‘waiting time guarantees’, e.g. extended free hospital choice, this is reasonably fulfilled.

Two major challenges were identified and will be coupled with the solutions presented below. The solutions will not in and by themselves put an end to the *challenges* but contribute to a coping strategy:

1. Fiscal sustainability: -> mechanisms for an explicit framework for priority setting and introduction of co-payment in more areas of the health care sector
2. Demography: -> the two previous proposals and faster implementation of the chronic care model along with increased use of telemedicine

In the section on *opportunities* telemedicine was mentioned and therefore has been included among the solutions

As regards *weaknesses* two important areas have been identified:

3. inequity – in particular inequity in health -> an inequity reducing project is proposed
4. prevention and health promotion -> health test and health consultation with GP is a possibility
5. adverse events like hospital infections -> project to reduce hospital infections
6. psychiatry -> various improvement projects
7. end of life -> increased use of palliative teams

### ***What is an added life year worth?***

The Consensus model is based on the idea that a cost-benefit analysis, CBA, is carried out for improvement proposals. In a CBA a monetary value is attached to both benefits and costs – and the monetary value of benefits, e.g. an added life year, ideally should reflect willingness to pay. A simple way to present the results is in terms of the cost-benefit ratio, e.g. for every DKK invested there are benefits of two DKK.

In health economics it is still the exception to use CBA because for many reasons it is very difficult to put a monetary value to an added life year and in general to monetarize health gains. Instead another type of economic evaluation is used – the so-called cost-utility analysis where the approach is to ask how much a quality adjusted life year, QALY, costs and then compare across possible alternative uses of money within the health care field. For instance, if investments are made for therapy X, the cost per QALY is DKK 95,000 compared to a cost per QALY of DKK 70,000 if the money alternatively is used for therapy Y. The simple rule then is to choose therapy Y because in this way one gets ‘most health per DKK’.

Without going into detail a QALY is a construction, where one tries to capture at one and the same time two of the important health benefits: Prolongation of life and added quality of life as e.g. (mental and/or physical) functioning (“add years to life and life to years”). Some treatments give added functional ability but do not prolong life, e.g. a hip replacement, while others add years to life, e.g. a liver transplantation. So by constructing a QALY one so to speak attempts to amalgamate these measures into a composite measure of health benefit. There are at least two limitations of this approach. First, vis-à-vis the consensus model one cannot compare with alternative use of the same money in other sectors, e.g. infrastructure. In the present context this is really not a big problem. Secondly, certain projects within health care and proposed below, for instance an institute for priority setting or introduction of co-payment, are very difficult, if not



impossible to translate into QALYies. Consider for instance whether or not we know if co-payment is harmful (or beneficial) to health?

As regards the value of an added life a Danish estimate(Nielsen 2008) of DKK 200,000 per extra life year will be used. It has been estimated based on the thinking behind willingness to pay. The estimate on purpose is chosen to be lowest value out of several possibilities. This is done in view of the uncertainty of this type of estimates. This means cost-benefit ratios likely will conservative estimates.

For cost-utility analysis QALY the simple decision rule is to pick the alternative with the lowest value of costs per QALY gained as illustrated above. However, it does not answer what is 'good value' in the sense what is a reasonable 'price' per QALY, i.e. should one for instance accept an improvement that costs for instance 2 million DKK per QALY gained? A rule of thumb has been introduced in England by the National Institute of Clinical Excellence, NICE, that use cost-utility analysis for priority setting. The heuristic rule is that anything below £ 20,000 is good value and ought to be introduced, while projects with from £ 20,000 to £ 30,000 per QALY are worthwhile considering, while one should be skeptical of projects costing more than £ 30,000 per QALY. Colleagues at the University of Southern Denmark have been working putting a monetary value on a QALY akin to the idea of the value of life year, (Gyrd-Hansen 2011). Based on the same data set but using different methods they arrived at willingness to pay estimates per QALY ranging from 20,404 DKK (€2720) per QALY to 722 743 DKK (€96 366). For this reason we abstain from putting a monetary value on a QALY.

In some cases it does not really make sense either to estimate a CBA-ratio or for that matter a cost per added QALY, e.g. terminal care or reduction of inequity. In this instance, however, it still makes sense to carry out a cost-minimization analysis. For instance, if three options are available for terminally ill patients: hospice, palliative care and usual care, the question is which care/treatment mode is the least costly assuming roughly the same quality of life for the patient. A similar reasoning may be applied to various ways of reducing inequity.

All estimates of cost-benefit ratios or costs per QALY are very rough estimates. They are not based on detailed calculation. Therefore they should only be taken as an indication.

### ***Telemedicine: Large scale pilot projects for monitoring the chronically ill.***

Telemedicine is one of the possible solutions to the challenges and opportunities in the health care sector in the future, in particular vis-à-vis the chronically ill. Today there are examples of telemedicine within many specialties – from tele-psychiatry across tele-dermatology and tele-radiology to tele-rehabilitation. Many studies of telemedicine in the current literature, sometimes with debatable quality of the study design, conclude that telemedicine strategies are cost saving or have the potential to become cost saving<sup>124-126</sup>. Telemedicine may save valuable resources provide high quality treatment/advice and may compensate for longer distances to hospitals in remote areas (Medcom 2010; Teknologisk Institut 2008; Alectia 2010)

The possible types of interventions include care/advice and monitoring at a distance, information and communication technologies in health care, internet based interventions for diagnosis and treatments and social care if this is an important part of health care and in collaboration with health professionals.



One type of telemedicine is simply that two health professions communicate over a distance. Another type is communication or interaction between a patient and a health care professional either directly by talking or videoconferencing or indirectly by monitoring of the patient's condition with possible feedbacks from the health professional.

The different types of technologies have different pros and cons and solve different types of issues (Dansk Selskab for Telemedicin 2011; International Society for Telemedicine and e-health, 2011; Medcom 2011; OECD 2004).

Today there are many on-going projects, for instance projects supported by ABT (ABT Fonden, 2011) or the projects listed at the website of the Danish Society for Telemedicine (Danske Selskab for Telemedicin 2011). There are also good examples of solutions that have already been integrated into daily practice.

The literature on telemedicine has increased in the last decade and a considerable number of reviews exist already, however, the meta-review provided by Ekeland et al 2010 shows that the literature on evidence on telemedicine is still very heterogeneous<sup>136</sup>. A considerable share of the reviews concludes that evidence is promising but incomplete and a considerable share also concludes that the evidence is limited and inconsistent<sup>136</sup>. The need and potential for telemedicine solutions is obvious, however, the limited and incomplete evidence of the effects of telemedicine is one of the main barriers for implementation of these technologies.

Another challenge for the implementation of telemedicine is economic issues. Investment costs, cost for training, reimbursement of telemedicine services. One of the necessary preconditions for implementation of telemedicine on a larger scale is more thorough documentation of the economic consequences. A number of reviews have concluded that there is lack of thorough and standardized measuring and reporting of economic consequences<sup>137</sup>.

Telemedicine is in some cases going to be complete substitutes for in-person encounters. However, in most cases telemedicine will not be a complete substitute for in-person encounters and some combination will probably be required. This raises an important question about what is the optimal substitution between in-person encounters and communication and monitoring by distance. It also raises questions about the need for dramatic reorganization of the in-person encounter while this will change not only in frequency but also in content. It also raises questions about organization of telemedicine solutions where economics of scale and joint production involve need for centralization of the personnel supporting the solutions still satisfying the need for optimal in-person encounters.

The following is a list of possible or existing telemedicine solutions:

1. Communication between health professionals with the same degree of specialization across two geographical sites where their communication can be supported by videoconferencing and digital pictures and online access to the same e.g. laboratory test results. This type of communication will support health professionals in cases of treatment of complex cases where decisions on the appropriate treatment may be improved by interaction.

Communication between distant specialized health professionals is not new but technologies, e.g. IT, digital pictures from x-ray, CT scan, online databases with laboratory results etc., will improve

the potentials of sparring. This likely, however, cannot be expected to result in lower costs but potentially better treatment decisions improving quality of treatment.

2. Communication may also support local or regional hospitals who do not have access to specialists, or may have difficulties in having specialists present at the hospital at all times. Here communications facilities may allow specialized treatment to take place close to the patients' closest hospital without a specialist being present at the site at all times. It may also improve flexibility for planning in small hospitals where it is too expensive to have a 24-7 capacity with present specialists. This type of use of telemedicine may therefore facilitate specialized treatment in more rural areas and decrease the need for capacity of specialists being present.

This type of telemedicine is presently being implemented in some Danish hospitals where e.g. parts of diagnostic procedures are performed by specialists in another hospital than where the patient is present. There is likely potential savings of implementing these types of solutions in the future but in the short run large investments in infrastructure and facilities are needed.

Some evidence indicate that telemedicine may be a safe, feasible and reliable system for providing treatment within e.g. acute stroke management, diabetes management, emergency departments<sup>127-129</sup>. Many more areas will be relevant for this type of telemedicine.

3. Yet another type of communication using telemedicine may be between primary care doctors or doctors in less specialized hospital communicate with specialists at hospital to decide whether there is a need for referral of the patient or the specialists may be able to guide the less specialized doctor on the distance. This can potentially improve quality of treatment, improve and reduce number referrals and decrease patients' costs for transportation.

One example of this type of facility has being implemented for communication and monitoring of new born babies at Ærø Sygehus which is a very small hospital on a small island. This hospital has very few doctors and no specialized pediatrician. This solutions facilitates that pediatricians can follow and advice health professionals at a distance which may be important in critical faces of the delivery and the first hours. Also it is important in situations where transfers are considered because of complications where specialized are better at judging whether a transfer is need and which type of transfer is optimal.

Another example is the communication using videoconferencing and picture by 3G mobile phones between home care nurses and specialized doctors judging diabetic wounds and the need for treatment. This solution enables the home care nurses to provide better care with easy access to specialists supporting their treatment and eventually assessments on the need to refer to more specialized care. This solution will save money by improving quality of treatment also improving quality of life for patients<sup>130</sup>.

Telemedicine with interaction or communication between health professionals involve at least two types of technologies. The first type involves direct communication between patient and health professions where another type involves monitoring of patients.

4. Direct patient and health professional can facilitate that patients are discharged earlier from hospital, avoid admission, outpatient visits or GP consultations by communicating with health professional one distance by internet or videoconferencing.

One examples of this is telemedicine consultations for chronic obstructive pulmonary disease (COPD) patients where patients receive a “briefcase” with videoconference equipment as well as equipment for medical check-ups. This approach has proven to reduce the number of bed days and the number of hospital readmissions and patients have been satisfied with being discharged earlier. This solution is now used in pilot project for many of Funen’s COPD patients. The solution meets the chronic patient’s wish to be hospitalized no longer than necessary. At the same time, it frees up resources at hospitals by reducing overcrowding problems, especially on medical wards. The solution seems still to increase total cost because of the price of the “briefcase”<sup>131</sup>. It could, however, be expected that the price of the briefcase will be reduced in the future making the solution cost-effective.

5. Monitoring of patients, especially chronic patients, provide opportunities of discharging patients earlier and avoiding outpatient visits. Furthermore optimization of treatment by feedback from monitoring potentially decreases or stabilizes disease progression benefiting the patient by increased quality of life and fewer complications in the future. It is still to be proven whether this is lowering costs which may intuitively be one of the consequences.
6. Yet another type of telemedicine is when patients and health professionals communicate with other types of personnel.

Interpretation services using videoconferencing is tested in a national pilot project at the moment and economic analysis indicates that this type of innovation may reduce unit cost per consultation with interpretation by 20-30%. Considerable investments are to be made implementing this type of technology and the technology involve, as with many of the other telemedicine technologies, major changes in the organizational routines<sup>132-135</sup>.

### **Proposal**

In view of the demographic challenges a large scale project about tele-monitoring and tele-advice for chronically ill persons – and in particular persons with more than one chronic illness – is proposed. The objective is to test ‘the briefcase’ approach to tele-monitoring-and advice mentioned above. It has already shown promise, but needs broader and more systematic testing and development, ideally within the framework of a so-called pragmatic trial combined with a rigorous economic evaluation. Rigorous economic evaluations should be one of the elements of the testing. A separate goal would be to estimate how many of the chronically ill can handle the technology and how much IT-support is needed at home.

End points to be measures are: (functional) health status, use of health services, ease of use and satisfaction with the technology provided.

The project should be a collaborative project involving a hospital medical department, one or more municipalities and GPs.

It should be ‘long term’ – i.e. run over 2-3 years and involve a substantial number of persons with chronic diseases.

Funding: (probably) around 100 million to ensure large scale and ‘long’ term. The money should come from the ABT fund.

Expected cost-benefit ratio (scale up results from the project): At least 1:1 and ideally 1:2

### ***Methods for prioritization and proposal for an institute for priority setting analyses***

The need for prioritization is obvious in general and in view of the problems with fiscal sustainability. The methodology and frameworks for priority setting, however, are less obvious and present different types of challenges. Health economists have long suggested and perfected economic evaluations to support decision making on priority setting. There are still few successful examples of transparent and explicit use of economic evaluation for priority setting. One exception may be NICE (National Institute for Clinical Excellence) in England established 1999 which is an organizational framework for priority setting explicitly applying cost-effectiveness analyses as an explicit part of their decision making. Some reservations for using cost-effectiveness explicitly still remain<sup>138, 139</sup>.

In view of the above discussed ambiguity towards priority setting and the fragmented structure and new institution is suggested. A number of the elements are inspired by NICE in England whereas especially the structure of the board for the institution is very different. NICE is debated and has also shown that there are no easy solutions to tackle the basic health economic problem of how to best allocate resources to satisfy all health care needs<sup>140, 141</sup>. As stated the problem of making explicit priorities are no easy. “To a large extent, denying access to health care by explicit means is bound to lead to discontent, because the general public interpret this as benefits being denied. The opportunity cost argument, which implies that benefits are only being denied because even greater benefits can be delivered elsewhere, is much more difficult to convey. Moreover, the technical nature of NICE’s work poses a potential barrier to broader public understanding of its remit and the processes underlying its guidance.”<sup>142</sup>. Although NICE is debated, NICE has also demonstrated that it is possible to manage a national framework for prioritization providing better prioritization or at least a better basis for prioritization.

This institution should be anchored within the existing national administrative structure but more importantly it should have a political anchoring with a board of national politicians to insure its political support as well as the legitimacy throughout the health care sector and in the population in general.

The anchoring in the existing national administrative structure should promote a quick implementation of the institutional and its’ contributions and ease the chance of success of the institution. The anchoring should, however, also be free of the existing limitations of the existing national administrative structure. The anchoring means that e.g. the National Board of Health, The Danish Medicines Agency and the Ministry of Health should be involved, but the new suggested institution should not be embedded in the existing authorities while the institution should be free to reach out into the health system with new approaches.

The board of politicians should be responsible for making strategic decisions for the institution guiding an established framework for priority setting. They should not be involved in or responsible for specific priority

settings suggested by the institution while we do not believe that politicians are able nor willing to stick to priorities when pressure groups raise questions the specific priorities. The politicians should be involved in setting criteria for prioritization and guiding overall prioritizations e.g. across prevention and treatment. The political board should have political representation from all political parties in the National Parliament and representation from all Regional councils and maybe representation from politicians from municipalities or the association of municipalities.

This national institution should have two overall visions. The primary aim is to increase the capacity and capability for rational prioritization in the health care system locally, regionally and nationally. The second overall aim of the institutions is to support specific prioritization initiatives.

The first aim should be achieved by two types of activities. Firstly, the institution should support the political board in setting up a national framework for priority setting which can be used for guiding specific priority settings at local, regional and national level. This framework provides overall descriptions of the goals for priority settings and provides guidelines for good processes for priority setting at local, regional and national levels. As in the NICE framework, it could be considered that this national prioritization framework should include a number of permanent committees. One committee, called the Partners Council, should include members from organizations with a special interest in institution's work including patient groups, health professionals, NHS management, quality organizations, industry and trade unions. The other committee, called Citizens Council, should have members of the public representing the population.

Secondly, the institution should offer and support education, course activities and conference activity which will enlarge capacity and capabilities to carry out priority setting at local, regional and national levels. The national framework represents the political *willingness and need* for transparency in priority setting and the educational activities represent the operational *capacity and capability* to carry out priority setting.

The national framework should be disseminated through courses and education. Furthermore there is a great need for educating politicians, hospital managers, health professionals and administrators to be acquainted with methods for prioritization. The methods for prioritizations include knowledge on evidence-based practice, clinical priority setting, economic evaluation, health technology assessment, etc. Regardless of highly educated personnel in the health care sector and in the administration, there is still a great need for education and training in methods for priority setting. Most of the institutions resources should be used for these educational activities.

The second aim of the institution is to support specific prioritization initiatives. This should be achieved by collecting and in some cases coordinating priority setting from the existing institutions or organizations and by in selected cases assisting the specific basis for priority setting. It is important that this institution promotes the use of the national framework for priority setting by using the actual priority settings from the other national authorities. Also, it is important that the basis for priority setting is coordinated. Denmark cannot afford to produce all material for priority setting and we should therefore benefits from as many reliable foreign sources for relevant material as possible. The institutions should therefore be responsible for facilitating reliable and easy access to relevant information useful for priority setting. Of specific activities one could imagine professional assistance for doing literature searches and assistance for

specific evaluations like systematic reviews, HTAs and economic evaluation. Another type of activity is to support permanent committees responsible for developing guidance programs according to the national framework.

There are at least three types of costs that should be considered when implementing this type of institutions<sup>143</sup>. First, the cost of running the institution itself and the support for a national framework. Second, the cost of providing education programs, courses and the resources used to support the basis for carrying out prioritization, be that reports, notes or evaluations. Third, the cost of enforcing the priority setting decisions.

The first two types of costs may be considerable seen throughout the whole health care sector but the third type of cost should not be neglected. This type of cost is less visible and cannot be measured but considerable resources may be need (and already used in the current situation). To reduce the third type of cost it is important that a national framework for prioritization is generated and that this framework have political and administrative legitimacy. An investment in a national institution support a national priority setting framework, which is a very visible amount of resources and seemingly an increase to the cost of the health care system, may not seem obvious in the current situation where hospitals lack money. However, it is argued here that by creating a national priority setting framework and by increasing the capability to carry out priority setting these resources are easily saved by improving priority setting in the health care sector. Some of the experiences from NICE indicate that providing a national framework for priority setting is cost-effective and in some cases cost saving, see <http://www.nice.org.uk/aboutnice/whatwedo/niceandthenhs/CostSaving.jsp>.

Establishing a more transparent and systematic national priority setting framework is intuitively appealing and will probably also lead to more efficient use of resources and more legitimate priority setting, Yet, it should be emphasized that there is limited solid evidence that such an explicit national framework for priority setting has actually improved the efficiency and legitimacy in the countries where it has been established. Some of the concerns include the cost and logistics of providing updated information for all types of treatments, the relatively lengthy process of collecting and evaluating evidence, the fact that the actual cost/effectiveness of health technologies varies considerably according to the organizational choices for implementation, and that the methods for evaluating prevention and health promotion activities tend to be underdeveloped.

A national institution with an annual budget of around DKK 50 million is suggested – enabling a staffing level of 15-20 persons and funds for commissioning studies from outside analysts. In view of the total public expenditure budget this will be less than 0.5%.

It is very hard to estimate the economic benefits of an institution for analyses supporting priority setting because much depends on the impact of the analyses, i.e. will the recommendations be followed. There are numerous studies showing net-savings if for instance suggested treatment guidelines are followed. Hence, it does not stretch the imagination to assume that at least 50 million DKK can be saved by following advice on cost-effectiveness or advice on treatment guidelines. **In other words there will be at least a cost-benefit ratio of 1:1 and most likely much higher.** However, it would be irresponsible to try to be more exact because numerous un-testable assumptions would have to be made. There is no doubt that if one looked at

the establishment of the Institute of Rational Pharmacotherapy with about 10 employees (IRF 2011) from a cost-benefit perspective the cost-benefit ratio is high.

### Co-payment

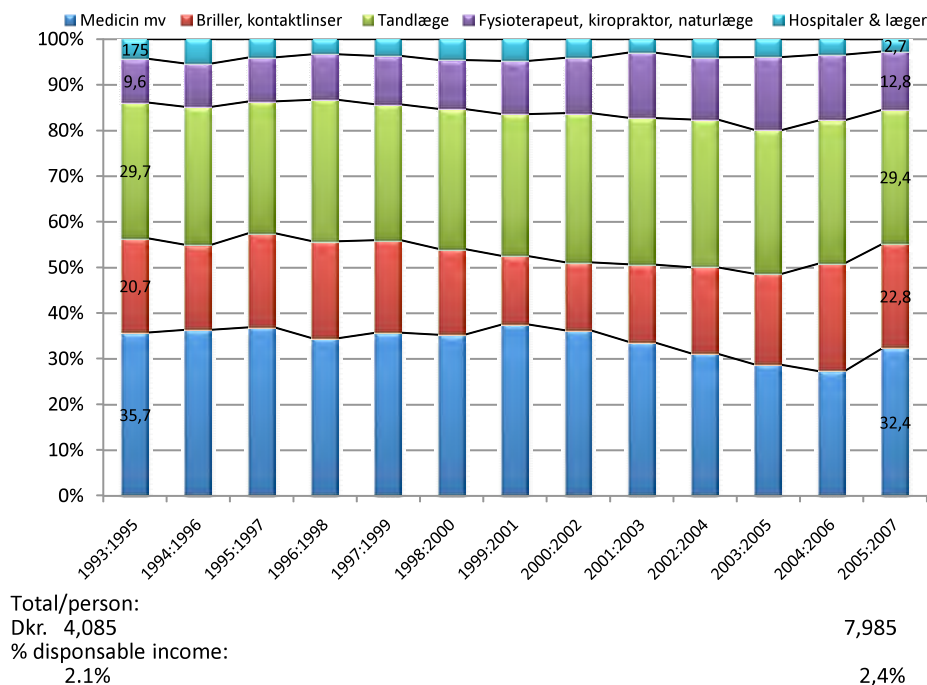
There is no way around not addressing fiscal sustainability. In the section on challenges it was noted that there were basically three ways of coping with fiscal sustainability: 1. 'overproportional' growth of public expenditures for health (at the cost of other public expenditure areas), 2. tax increases, 3. co-payment, and 4. a combination of the four. It is unlikely that the challenge can and will be met by just one of the first three.

To most political parties co-payment is a sacred cow, so it takes considerable courage to come up with a proposal. The cue word in the debate is 'inequity in access to health care' followed by argument like many cannot afford it (or is it that many don't give it high enough priority in the household budget?) or that postponement of use of health care because of co-payment may harm health.

### Co-payment in Denmark and the Nordic countries

In 2008 private expenditures (=co-payment) amounted to 21.8 billion Dkr. This is equal to 15% of the total sum of health expenditures, up from 12% in 1999<sup>2</sup>. It is debatable what the basis for this calculation should be because parts of municipal nursing home expenditures are part of the base. If the private expenditures are calculated from a base of regional public health expenditures the percentage in 2008 would be around 18%.

Figure 25: Co-payment in Denmark: Categories and development 1993-2007<sup>144</sup>





The main categories with co-payment in Denmark are seen in Figure 25. The main categories are drugs and adult dental treatment with around 30% each of total co-payment. Physiotherapy has been increasing over the period. As percentage of disposable income there has been an increase from 2.2% to 2.4 % in 2007.

Hospitalization exists in Finland, Norway and Sweden, Figure 26. It should be noted that there is a similar concern for equity in the other Nordic countries as in Denmark.

**Figure 26: Co-payment in the Nordic countries as of January 2010**<sup>145</sup>

User charges for a consultation with a physician					User charges for hospitalization (excluding outpatient services which are included in 'charges for consultation with physician')				
	Are there consistent rules for the whole country?	Size of user charge	Deviations	User charge in relation to total cost of consultation		Are there consistent rules for the whole country?	Size of user charge	Deviations	User charges in relation to total cost of hospitalization
Denmark	Yes	-	No	-	Denmark	Yes	-	No	-
Faroe Islands	Yes	-	No	-	Faroe Islands	Yes	-	No	-
Greenland	Yes	-	No	-	Greenland	Yes	-	No	-
Finland	Yes	Public EUR 0-13.70 EUR 18.80 if the visit occurs between 2000 and 0800 or on a Saturday, a Sunday or a public holiday. Private min. 60 per cent	No charge for children under 18 years of age	26 per cent	Finland	Yes	EUR 32.50 per day in overnight care for day surgery EUR 89.90	Payment for long-term stay according to means. For children 0-17 years max. 7 days	7 per cent
Åland	Yes	EUR 20 Outside opening hours for home visits, and specialist EUR 27	Free treatment after paying EUR 375 for children below 18 and people 65 + EUR 120	..	Åland	Yes	EUR 27 EUR 14 for psychiatric wards EUR 54 for day surgery	Payment for long-term stay according to means	..
Iceland	Yes	ISK 1 000-3 800 in primary care, other fees for specialized care	ISK 500- 1 850 for pensioners, disabled and long-term unemployed. ISK 800-3 200 for aged 67-69 with no or reduced pension. No charge for children under 18 years of age	Varies	Iceland	Yes	-	No	-
Norway	Yes	Consultation with a primary physician: NOK 132 (day), NOK 225 (evening) Consultation with a specialist: NOK 172 (day) and NOK 285 (evening)	In the case of pregnancy, childbirth, treatment of industrial injuries, war injuries, for prison inmates, children under 12 years of age, in the case of psychotherapy for persons under 18 years of age and for treatment of dangerous contagious diseases	Approx. 35 per cent	Norway	Yes	-	No	-
Sweden	No	SEK 100-300	Yes	..	Sweden	No	SEK 0-80 per day	..	-

## Proposal

The essential elements of this proposal have been lifted from the Welfare Commission's proposal from 2006<sup>146</sup>. The essential elements of the proposal has been pulled together in table 3 (tables 15.1 and 15.2 in the Welfare Commissions report) (Velfærdskommissionen 2005)

This means that services that have been free at the point of consumption for more than a century or more will be covered by co-payment. The level of payment, column 2 in table 3, does not deviate from the other Scandinavian countries, if anything slightly lower.

The net contribution to financing of health care will be around 2 billion Dkr. However, there will some net savings because demanded service volume will decrease as the price rises from 0 to 20-150 Dkr. per visit. The decrease in expenditures will be around 1.3 billion Dkr. (column 4). This is important for another reason, namely that it frees up capacity in that the total volume of services is expected to decrease by 25% (maybe a bit overoptimistic. The decrease more likely will be in range of 15-25%). The 'excess' capacity will create room for the increased demand that over the years will come from the aging population, but in the short term also means a decrease in income for GPs and specialists.



**Table 3: Co-payment proposal by the Welfare Commission: fee and total effects**

	Co-payment, Dkr.	Total effect Billion Dkr.	Of which volume decrease	Revenue
General practice		1.4	0.6	0.8
* consultation	75			
* telephone or e-mail contact	20			
* home visit	150			
Out-of-hours service, GP		0.3	0.1	0.1
* consultation	100			
* telephone contact and home visit	20			
* telephone contact	50			
* home visit	150			
Consultation with specialist	100	1.0	0.5	0.4
A&E visit	150	0.2	0.1	0.1
Visit out-patient dep.	125	0.4	0.0	0.4
Hospitalization	50/per day	0.2	0.0	0.2
<b>TOTAL</b>		<b>3.4</b>	<b>1.3</b>	<b>2.0</b>

*Note: It is assumed that utilization of GP services, specialist consultations, and A&E visits decrease by 25% after the introduction of co-payment. Hospitalizations and visits to outpatient departments are not affected by co-payment. - Numbers do not add up due to rounding-off.*

To counter inequity issues the Welfare Commission introduce a ceiling for co-payment equivalent to 1% of income, i.e. when total payment during a year reached 1% of income, services again become free. The price for this ceiling is a reduction of revenue by almost 38% (this reduction has been included in the numbers in column 5 in table 3. The 1% ceiling means that high income groups pay more in absolute terms than low income groups. There are other ways to minimize distributional consequences, for instance an absolute ceiling for everybody like in Sweden, for instance Dr. 1,500 but such a system would be more unfair than an income ceiling because it would weigh heavier on low income groups than high income groups. Another approach would be to follow the model for subsidies to prescription medicine, where co-payment decreases by increasing level of use and become zero after a cut-off level has been reached.

The Welfare Commission did not include the costs of administering the co-payment scheme. It obviously will not be free. Administration costs will depend on how the co-payment scheme is administered. If it is done by using the existing systems for reimbursement of GPs and specialists, e.g. that an invoice is sent to patients every quarter based on the electronically submitted reimbursement claims from GPs and specialists, then it can be administered at fairly low costs. For the hospitals a co-payment module can be added to the electronic patient record system. Both the GP/specialist systems and the new co-payment module for hospital care can be linked to the tax system to monitor the percentage of income going to co-payment. It is assumed that the administration costs will be 100-150 million Dkr.

If we assume 150 million Dkr. per year, this means that a **“cost-benefit ratio” of 13 will be the result.** However, it should be noted that it is not a cost-benefit ratio in the usual sense of the word because the benefits (=revenues) cannot by any stretch of imagination be interpreted as willingness to pay. In addition the benefits stemming for creating more fiscal sustainability has not been calculated either.

Within the Danish system of voluntary health insurance the introduction of co-payment will lead to increased demand for insurance in ‘denmark’ that essentially is a ‘co-payment insurance’ that reimburses patients for part of their co-payment. From a theoretical and empirical point of view this would lessen the volume impact of co-payment and hence the ‘savings’ due to decreased volume of utilization.

### ***Improve equity in health/use of health care***

As noted in the challenge section, there are three different equity issues: Access, utilization, and outcome (mortality and morbidity). The Health Act only mentions equity in access while the national policy on prevention also mentions equity in outcomes. As shown above there are no serious problems with equity in access while there are clear social gradients in outcome and underlying life style.

The issue of inequity in health is an important and difficult challenge. Persisting inequity is problematic in and by itself, as it represents failure to live up to the basic goals of our health system (to the extent that the health care system is the relevant causal party). Yet, there are other reasons for focusing on health inequity, as the part of the population with worst health status account for a major part of the health expenditure. By targeting this group we may thus achieve relative more health gain for our intervention than by a broader strategy. However, the problem is that there is much less agreement on possible means to improving equity in health because the causal mechanisms are difficult to attack and in many cases are located outside the health system narrowly defined.

Public health studies indicate that the determinants of health are very complex, e.g. figure 10 above, and include the interaction between genetic endowments, physical and social environments, prosperity, personal life style and perceived well being along with the health care system (Evans 1994; Marmot 2004). The difficulty in designing interventions is that we do not know the exact interaction between these factors, and that individual responses to interventions tend to vary. Yet, one thing is certain. It is not enough to introduce changes to the health care system per se in order to affect inequities in health. A range of supplementary interventions should be considered. First, it is well known that life style induced illnesses are more prevalent in some parts of the population than in others. Obesity, smoking and alcohol consumption, and the related illnesses of the cardio-vascular system and various forms of cancer are more prevalent in some social groups than in other. It therefore seems that a targeted intervention in this group might have significant potential for positive impact on health equity. Yet, the impact will depend on how the intervention is designed and how the group responds. The most radical intervention would be to ban access to certain types of substances (alcohol, tobacco, fatty foods), or to mandate exercise. However, such interventions are hardly feasible or desirable. A less radical route would be to restrict access either by making it difficult to obtain the substances e.g. by limitations in sales outlets, or to ban use of the substances in particular areas and at particular times. Another way of restricting access is via price mechanisms, where taxes can make the substance relatively more costly. All of these interventions are already used to some extent, although Denmark tends to have fairly liberal access. We predominantly rely on the price mechanism, and lately also restrictions in use at particular times. The problem with relying on

price mechanisms is that it can have unintended consequences for other life style choices. High price of alcohol and tobacco may lead to lower consumption of healthy and more expensive food.

Restrictions in access to fatty foods are very difficult to enforce. Another route could be to make healthier foods more easily available e.g. by reducing the VAT on selected types of goods. This might induce some consumers to shift their consumption. However, we do not know the exact effect, as food consumption is determined by a range of cultural factors in addition to price relations. It is therefore likely that such an intervention must be combined with targeted information campaigns etc to have full impact.

Inequities in use of health care may appear easier to change. Yet, like food consumption the use of health services depend on a range of cultural factors in addition to the practical availability. Cultural factors affect both the demand side, e.g. in terms of how often the individual wants to see a health professional, and the supply side in terms of how easy it is for the health professional to assess potential health problems and thus make the right diagnostic and treatment choices. Cultural factors also affect issues like compliance with treatment regimes and whether or not the person engages in life style changes that can support (or worsen) the treatment effects.

Due to the complexities and uncertainties of both direct and indirect effects it is inherently difficult to make precise estimates of cost and benefits of public health interventions. The national Danish Commission on Prevention<sup>74</sup> noted this point in their report from 2009. Yet, they calculated cost-effectiveness of a number of interventions, and concluded that e.g. a doubling of the taxation level for tobacco and alcohol was likely to have net benefits. And more generally that a carefully designed set of interventions against the main public health problems of smoking, drinking, excessive eating and lack of physical exercise could provide overall net benefit. The Commission did not analyze consequences for health equity, but as stated in the above there are inequities in the engagement in risky behavior across different social groups, and interventions targeting such behavior are thus likely to have an inequity reducing effect.

### **Proposal**

The only way to gather evidence on how to possibly change the social gradient in life style and health is to conduct some kind of experiment. It is not easy, but still feasible if a concerted effort is put into it from for instance departments of occupational medicine, GPs, municipalities and least but not last: companies. It is important to move from measuring and talking about inequity and try to do something about it.

A project is aimed at low-education, low-income groups that are occupationally active; typically un-skilled and to a certain extent skilled persons. The aim is influence the life style and health status. The most likely setting is a number of companies with relatively many employees in this group.

The project should be long term, i.e. 2-3 years, in order to be able to detect differences – and should be coupled with a an additional 2-3 years of follow up to evaluate whether a possibly changed life style is lasting.

A project to about 150 million DKK is envisaged. A good evaluation should be included, also including an economic evaluation. However, the important things as such is not economic benefits, but rather what does it cost to change the social gradient. Hence, in many respects it would be absurd to think in terms of a

cost-benefit ratio. The relevant approach would be a cost-utility approach based on quality adjusted life years.

It is important that the money concentrate on a few substantial projects and not 'spread thin' on many projects. If the latter approach is followed – all too common in publicly financed projects – then it is unlikely than it is possible to detect differences.

### ***Reducing the number of infections and adverse events***

There is much focus on new or improved treatments and their clinical benefits. However, in many respects there are even bigger benefits to be gained in terms of improved survival or better functional status to be gained by improve organizational quality. And even more interesting: While new and improved treatments most likely will lead to increasing expenditure level – despite 'good' cost-effectiveness ratios – improved organizational quality most likely will lead to net savings.

There are three types of quality: Patient experience/satisfaction, professional quality like NIP discussed above, and organizational quality. Organizational quality is about work processes, structure, and organization. In many instances organizational quality is a prerequisite for both professional and patient experience quality: well organized processes can help support timely and professionally correct treatment and much of what patients experience depends how well things are organized.

To a considerable extent the underlying reasons for infections and adverse events is related to organizational quality in the sense describe. Hygiene – personal and within the hospital (cleaning, sterilization of utensils etc.) is very much about work processes. So are issues surrounding medication errors. It is increasingly being realized that improving organizational quality may save money as witnessed by a recent heading on the website of the project Safe Patient: "The health system of the future cannot afford waste and errors. Patient safety can be part of the solution to economic challenge facing the health system" (Sikker Patient 2011).

### **Proposal**

The interesting thing about decreasing the frequency of hospital infections and adverse events is that at the technological level it is not very demanding. The hurdle is to change behavior and ingrained work routines. WHO has shown in the project "Safe Surgery Saves Lives" adherence to proven standards in the form of a simple checklist with 19 items has improved compliance with standards and decreased complications from surgery in eight pilot hospitals where it was evaluated, (Gawande 2009; WHO 2009; Haynes 2009). Hospitals currently using the WHO Surgical Safety Checklist have begun to collect local evidence that the Checklist makes a difference in surgical care apart from what was documented in the Haynes article in the New England Journal of Medicine . According to the WHO website recently Stanford University presented their findings at the 2010 American College of Surgeons Annual Clinical Congress held in Washington D.C. Researchers at Stanford found that the observed/expected mortality ratio declined from .88 in quarter one to .80 in quarter two with the use of a modified version of the WHO Surgical Safety Checklist. Moreover, they found that the use of the Checklist increased the frequency in which staff reported "Patient Safety Never Events" while the number of Patient Safety Never Events that were related to errors or complications decreased from 35.2% to 24.3%. Overall, the Checklist has not only impacted outcomes, but it has also improved communication among the surgical team, and thus quality of care.

Similarly, again and again it has been documented that improved hand hygiene leads to a decrease in hospital infections.

The overall proposal is simply to implement initiatives of the kind just described. One might even contemplate to make the use of checklists compulsory. Such projects would be self-financing within a year. It has been estimated (very roughly) that reducing adverse events and infections would yield a cost-benefit ratio in the order of 1:17 and likely even higher, (Pedersen 2009).

### ***Screening for diabetes and health check up in general practice***

Close to 85% of Danes see their GP during a typical year. Therefore it would be natural to use this fact in a systematic way by introducing bi-annual checkups combined with screening for diabetes (type 2). The check-up – called ‘health test and health consultation’ – has been shown to be cost-effective in the Ebeltoft-experiment (Jacobsen 2001; Larsen 2006; Rasmussen 2006; Lauritzen 2008) for the 30-49 years old. The exact age interval, e.g. inclusion of the 50-65 years old, should be considered in connection with actual implementation.

#### **Proposal**

A few details on the experiment are in place, in part to elucidate the contents of the health test and the health consultation with the GP, along with providing documentation for the idea.

The target group was 30-49 years old. They were divided into three groups by randomization (lottery): A control group that only answered questionnaires. Intervention group 1 had a

- broad health test with written advice followed by a normal 10–15 minute consultation on demand. Intervention group 2 also had a broad health test with written advice, followed however by a planned 45 minute patient-centered consultation.

Participants in the two intervention groups were offered a comprehensive biomedical health test. Health tests were performed by specially trained laboratory technicians in one of the participating clinics. 2–3 weeks after the health test all participants received written information from their GP on the test results. Advice and possibilities for lifestyle changes were given if the test results were outside a pre-defined non-risk-range. Participants in intervention group 1 were advised to make an appointment for a normal consultation if the results were considered to be serious, i.e. elevated blood glucose or high risk of cardiovascular diseases. All participants in intervention group 2 were offered an appointment for a 45 minute patient-centered consultation. A one page questionnaire was included with the written advice asking participants to consider their health and what they could do to improve it. The participants were asked to fill it in and decide what to talk about with their GP. At the end of the health talk the GP asked each individual to set a maximum of three lifestyle-related goals. If needed, further annual health consultations lasting 30 minutes could be agreed upon.

The principal findings of the 5-year follow-up of were:

- A high participation rate to health tests and health consultations.
- A relevant, absolute reduction in the prevalence of people with elevated risk of CVD in the

- intervention groups compared to the control group.
- No psychological reaction.
- An initial increase in health care contacts followed by a decreasing trend. There was no overall increase in health care contacts.

An economically dominant effect, i.e. health tests and consultations produce significantly better life expectancy without extra direct and total costs.

Estimated life-years gained per participant were 0.24 and 0.3 years for intervention group 1 and 2 respectively - compared to 0.16 years for the control group. Compared to the control group the difference was statistically significant.

An overall positive perception by participants of having health tests and health consultations.

From a health economics perspective the results were interesting: there were no net-added cost over a six year period of providing the two intervention groups with additional services (health test and health consultation). In other words, the gains in estimated life expectancy came at no net cost. The average net-gain in life expectancy in two intervention groups was 0.13 compared to the control group. If we apply the value of an extra life year of DKK 200,000 this a net-benefit of DKK 26,000 ( $200,000 \cdot 0.13$ )

As a minimum health consultations and health tests should be introduced for the 30-49 years old – the target group for the original experiment. Inclusion of the 50-65 years old should be considered, but should be carefully evaluated.

### ***Improved psychiatry***

A psychiatric disorder can be defined in a variety of ways. Therefore the estimate of the number of persons suffering from a psychiatric disorder varies from 10-20% of the population (Sundhedsstyrelsen 2009) and in absolute numbers from 500,000 to 700,000 (Dansk Psykiatrisk Selskab 2004). This covers everything from schizophrenia over ADHD and autism to depression and anxiety.

An increasing number of Danes experience psychiatric disorders during their lifetime. Psychiatric care has generally received less attention from politicians than somatic care, cf. above where growth in psychiatry related expenditures lagged behind somatic expenditures. There may therefore exist opportunities for 'value for money' within psychiatry in the sense that health returns may be high. The question is where and how to invest? There are several possibilities.

### **Proposals**

1. *Increased focus on depression and anxiety.* According to the Danish Mental Health Fund (Psykiatrifonden 2011) at any time about 200,000 persons suffer from some kind of depression of which about 120,000 are relatively serious (graded from medium to serious). During their life time about 15% of the adult population at some time will suffer from depression. In terms of numbers this is only surpassed by anxiety where it is estimated that 200,000+ persons at any time suffer from anxiety, (Christensen 2007).

These groups of course receive treatment. However, there is no doubt that their situation can be improved considerably.

There are no Danish cost-effectiveness analyses either of treatment or prevention of depression or anxiety. At literature survey by WHO (WHO 2004), an Australian analysis (Issakidis 2004) and a Swedish analysis of depression oriented drugs and anxiety (Wessling 2008) together leave little doubt about the cost-effectiveness of treatment, i.e. that the costs per QALY is within normally accepted bounds. For instance, the WHO survey showed from \$ 15,463 to \$ 36,434 per QALY gained for treatment offered in the primary health care sector. It should also be noted that the societal costs of depression and anxiety in terms of not only treatment but also lost time from work or disability pensioning are considerable,

(Donohue 2007). About 50% of all new cases of disability pension have a psychiatric disorder (8,000 +) as the stated reason, (Ankestyrelsen 2011), but no publicly available information is available about the exact psychiatric diagnosis. There is no doubt that a number of suicides are related to depression. However, the exact number is not known with any degree of certainty, although professor Lars Kessing claims that about 20% of those with recurring depression eventually commit suicide, (Kessing 2011). If they were and there was hard evidence of the preventive effect one could estimate a cost-benefit ratio. However, we abstain from this here and rely on the costs per QALY.

2. *Increased focus on early intervention against non-psychotic diseases (e.g. depression and anxiety disorders):* Evidence points to positive long-term effects of early intervention. We suggest initiating a pilot project focusing on early intervention methods in general practice and municipal health care assisted by hospital specialists. The intervention consists of training and resources for increased opportunistic screening, and early referral to specialized care.
3. *Easier access to treatment and follow up via home care teams:* The intervention is to scale up the effort that is already done in many regions to institutionalize the capacity for ambulatory treatment and follow up in home care teams, and particularly to expand the home care teams to also cover non-psychotic conditions and criminal psychiatry. Home care teams have proven successful in helping patients increase compliance with treatment regimes and to reduce the risk of alcohol or substance abuse.

In the latter two cases it is very difficult to assess the cost/benefit ratio. Particularly the benefit side appears problematic, as both short term and long term benefits should be included. It should therefore be an explicit part of the project to develop economic evaluations that can create a clearer picture of costs and benefits in a Danish setting.

### ***End of life***

End-of-life issues are emotionally charged, but nevertheless need to be addressed in a level-headed fashion. Above the development in the number of hospice beds and palliative teams has been described, here we turn to the possibility of expanding this area further. However, there are other issues as well, namely drugs for terminally ill patients.



The question is not whether terminally ill patients at the end-of-life should be ‘denied’ treatment, but rather how and where care should be provided and the cost-effectiveness of these alternatives. The number of persons will be increasing and the possibilities for continuing active treatment to the very last. However, in order to provide possible answer the delineation of ‘terminally ill and ‘end-of-life’ need to be resolved.

Terminal illness is used to describe an illness/disease that cannot be cured or adequately treated and that is reasonably expected to result in the death of the patient within a relatively short period of time. This term is often used for progressive diseases such as cancer and advanced heart disease. In popular use, it indicates a disease which will end the life of the sufferer. Often, a patient is considered to be terminally ill when the life expectancy is estimated to be six months or less, under the assumption that the disease will run its normal course. The caveat is that it is a prediction – and there will be exceptions so that the persons in question live longer. In Denmark patients are usually admitted to hospice when they are expected to have one month remaining life time.

A recent article in the highly prestigious New England Journal of Medicine reported on a lottery based trial where patients with newly diagnosed metastatic non-small-cell lung cancer were randomly assigned to receive either early palliative care integrated with standard oncologic care or standard oncologic care alone. The results are interesting. Among patients with metastatic non-small-cell lung cancer, early palliative care led to significant improvements in both quality of life and mood. As compared with patients receiving standard care, patients receiving early palliative care had less aggressive care at the end of life but longer survival (Temel 2010). No economic evaluation has been carried out, but the article raises many interesting questions. For instance, ‘aggressive treatment to the very end’ vs. palliative care towards the end. In an accompanying editorial it was noted that

*“Despite the increasing availability of palliative care services in U.S. hospitals and the body of evidence showing the great distress to patients caused by symptoms of the illness, the burdens on family caregivers, and the overuse of costly, ineffective therapies during advanced chronic illness, the use of palliative care services by physicians for their patients remains low. Physicians tend to perceive palliative care as the alternative to life-prolonging or curative care — what we do when there is nothing more that we can do — rather than as a simultaneously delivered adjunct to disease-focused treatment”, (Kelley 2010)*

There are not very many economic evaluations where standard care, palliative care, and hospice care is compared head to head. A couple of studies looking at in-home palliative care vs. standard care show that provision of interdisciplinary home-based palliative care at end of life for patients with CHF, COPD, and cancer can lead to significant cost savings, (Brumley 2007; Enguidanos 2005; Morrison 2008; Penrod 2006; Penrod 2010; Stephens 2008).

Denmark has recently (January 2011) experienced a debate about something akin to terminally ill patients, namely the so-called ‘secret codes’ in the patient files. Secret codes are codes unknown to the patient (and strictly against the law) that indicate that in case of a worsening of the patient’s situation there should be no transfer to intensive care or resuscitation basically indicating that additional/intensive treatment at best

would increase life marginally. Apart from the legality of the procedure used there is both an ethical and economic issue.

The English priority-setting institute NICE (National Institute of Clinical Excellence) in 2009 introduced supplementary appraisal rules for life extending drugs to terminally ill patients. This case illustrates several things: in general how difficult priority setting around end-of-life issues is and specifically that it seems that NICE softened the rules established by the costs per QALY thinking.

The background was that a number of drugs for renal carcinoma (cancer) in terms of cost/QALY were not even close to the £30 000. In addition, in comparing 2 of the drugs under consideration, an extra £31,185 only extends patient's life by 5 months. These conclusions were subsequently endorsed by NICE who immediately became the target of intense organized lobbying from stakeholders. The criticism was intense from press and politicians.

In view of the criticism NICE issued a supplementary guideline concerning 'end-of-life' related drug use. The supplementary advice is to be applied in the following circumstances and when all the criteria referred to below are satisfied:

- for patients with a short life expectancy, normally less than 24 months and;
- sufficient evidence to indicate that the treatment offers an extension to life, normally of at least
- an **additional 3 months**, compared to current NHS treatment, and;
- is licensed or otherwise indicated, for small patient populations

When the conditions described above are met, the NICE Appraisal Committee will consider:

- The impact of giving greater weight to QALYs achieved in the later stages of terminal diseases, using the assumption that the extended survival period is experienced at the full quality of life anticipated for a healthy individual of the same age, and
- The magnitude of the additional weight that would need to be assigned to the QALY benefits in this patient group for the cost-effectiveness of the technology to fall within the current threshold range

### **Proposal**

For many reasons it is important to start focusing on end of life issues despite the fact that it is a highly emotional subject. A point of departure may be the terminally ill and how to care and treat this group. Three, not necessarily exclusive, alternatives need to be considered: Normal (more or less aggressive) hospital treatment, palliative care (in various forms) and hospice care. Looked at from a cost-minimizing perspective – assuming equal quality of life/life expectancy - there may be an advantage to palliative care/hospice care, cf. studies referred to above. However, this very much needs to be subjected to a rigorous cost-effectiveness study.

### ***Diagnostic centers/fast track diagnosing and evaluation***

Delay of diagnostic procedures has at least two consequences. For a number of diseases the disease may progress further while waiting for a specific diagnosis, e.g. cancer, and in most cases delays in diagnosis

lead to patient anxiety and worry. It has also been shown that long term sickness absence can be shortened by coordinated and fast diagnosing (Kilsgaard 2006). Here the issue for instance is waiting time for medical certification by (practicing) specialists (KAD 2002). Diagnosing often involves several parties: GP, practicing specialist, and the hospital showing that coordinated and concerted actions are needed. Fast track evaluation and diagnosis may (to a certain extent) alleviate the two mentioned problems. Fast track evaluation and diagnosing is already in place for cancer and certain heart diseases, but may to advantage be extended further. A 'diagnosis guarantee' has been proposed similar to the guarantee about treatment, (Eriksen 2009; Bundgaard 2009). However, the initial enthusiasm apparently has dampened and apart from the two mentioned diseases not much has happened apart from a parliamentary proposal by the Social democrats about creating diagnostic centers (Andersen 2010).

Fast track diagnosing and evaluation is not an unconditional blessing. First of all, unless it is available to all patient groups, a possible side effect may be that patient groups not covered by fast track procedures are neglected/pushed aside. One might argue that fast track diagnosis only should be available for patients with 'serious diseases'. However, the question is how to define 'serious disease'. It is definitely more than life threatening diseases, e.g. the recently approved Finance Act for 2011 has resources for diagnosis of 'murky/unclear indications of cancer' (diagnostic package), for instance also patients with rheumatism where early intervention has been shown to be important, however logically requiring early diagnosis (Deighton 2010). Secondly, to make sense fast track diagnosing obviously requires that treatment is available after diagnosing. By fast tracking the diagnostic process the whole idea is to initiate treatment as fast as possible. Thus, if the bottleneck in reality is not the diagnostic phase but treatment there will be a need to look at this bottleneck to harvest some of the important benefits of fast diagnosing. Fast tracking also decreases patient anxiety independent of possible health benefits: 'What am I suffering from?' Many patients complain that the worst is waiting time with uncertainty. For patients fearing cancer it turns out that many do not have cancer, but 'only' another less serious disease.

A recent Danish study of fast track diagnosing of neck and head cancer showed that it was possible to reduce waiting times in head and neck cancer. Through logistic changes, employment of a full-time case manager, strengthening the multidisciplinary tumor board and giving higher priority for head and neck cancer patients, the overall time from first suspicion of cancer until treatment start was reduced from 57 calendar days to 29 calendar days, (Toustrup 2011).

As this example shows an important tool for fast tracking is logistics and efficient clinical pathways which include coordinated booking of and availability of specialists and diagnostic facility like imaging and laboratory facilities. Assuming that the question more is a question about efficient use of existing manpower and facilities rather than shortage of the same there should be no doubt that fast tracking should be cost-effective. However, it has not been possible to identify cost-effective or cost-benefit analyses of either fast track diagnosing or dedicated diagnostic centers. However, there are several studies on fast track treatment (search Pubmed using 'fast-track') showing favorable economic results and even resource savings. **In view of the often low costs of establishing fast track procedures, e.g. improved logistics and/or a critical look at bottlenecks, a *guesstimate* of a cost-benefit ratio is at least 1:1 and most likely 1:>1.**

## Summary for solutions

Table 4 shows a summary of the solutions, the issues they address and the rough cost-benefit ratios and/or costs per QALY.

**Table 4: Summary of the 10 solutions**

	<b>Solution</b>	<b>The solution addresses the following SWOT-elements and objectives</b>	<b>Cost-benefit ratio and/or costs per quality adjusted life years, QALY</b>
1.	Increased use of telemedicine: Project with brief-case for tele-monitoring/advising the chronically ill	Demographic challenge (the chronically ill), the fiscal challenge and population expectations	CBA ratio 1: 1 - 2
2.	Cost-effective preventive activities/health promotion: Health tests and health consultations ad modum Ebeltoft	Demographic challenge (the chronically ill) and the low life expectancy	CBA- ratio: 1: 26 (a net-benefit per participant of DKK 26,000)
3.	Hospital palliative care – hospice at end of life	Demographic challenge and the population’s expectations	Cost-minimization analysis points to palliative care/hospice care.
4.	Improve equity in health/use of health care	Inequity issues	Somewhat meaningless to develop a CBA-ratio
5.	National Institute for Priority Setting, NIPS, Methods for (explicit) priority setting	Fiscal challenge and legitimacy of the public health care system	CBA-ratio: at least 1:1 and most likely 1: >1
6.	Expensive medicine	Institution for priority setting	CBA-ratio: at least 1:1 and most likely 1: >1
7.	Reducing the number of infections and adverse events’	Fiscal challenge and quality of care	CBA-ratio: at least 1:17
8.	Co- payment	Fiscal challenge	CBA-ratio: 1:13
9.	Improved psychiatric treatment/care	Weakness, psychiatry has fallen behind	For depression the costs per QALY range from \$ 15-35,000 - which is ‘good value’. No cost-benefit ratio has been estimated.
10.	Diagnostic centers/fast track diagnosing	Access and coherent patient pathways	<i>Guesstimate</i> CBA-ratio: 1:1 and likely 1:>1

Be careful with the interpretation of the cost-benefit ratios. They cannot be equated to 'savings' in the health care system. Consider, for example, Solution 2 in the table above. The cost-benefit ratio is 1:26. This means that individual willingness to pay for an additional life year leads to this result (in accordance with the thinking behind cost-benefit analysis). However, viewed from the health care system's perspective, the solution is 'cost neutral'. For practical purposes it is this result that is of interest. However, if one wants to put a monetary value on the added life time, this can be done by applying an estimate of the individual's willingness to pay for (a fraction of) an extra life year. It should be obvious that this cannot be interpreted as 'savings', but rather is the monetary value of additional life time. It should be noted that the individual willingness to pay may differ from the political willingness to pay for an added life year – and resource allocation in health care essentially is political.

## Endnotes

1. Sundhedsstyrelsen. Forbrug af sundhedsydelser 2006 (use of health care services 2006). Copenhagen: Sundhedsstyrelsen/National Board of Health, 2007
2. Indenrigs-og sundhedsministeriet, (Ministry of the Interior and Health). Sundhedsvæsenet i nationalt perspektiv. Copenhagen: Indenrigs-og sundhedsministeriet/Ministry of the Interior and Health, 2010
3. Enheden for brugerundersøgelser. Den landsdækkende undersøgelse af patientoplevelser (Country wide survey of patient experience). Copenhagen: Enheden for Brugerundersøgelse, 2009
4. Sundhedsstyrelsen. Gennemsnitlig erfaret ventetid til udvalgte operationer, januar 2010 - august 2010 (dage) /Average experienced waiting time for selection operations. Copenhagen: Sundhedsstyrelsen/National Board of Health, 2011
5. Statens Serum Institut, Central Enhed for Infektionshygiejne. CEI-NYT Landsprævalensundersøgelser /Information Letter - country wide prevalence of hospital infections. 2010113.)
6. OECD. OECD Economic Surveys: Denmark. Chapter 5: Health a major fiscal challenge. 2008.
7. Sundhedsministeriet. International benchmarking af det danske sygehusvæsen/International benchmarking of the Danish Hospital System. Copenhagen: Ministry of Health, 2010
8. Christiansen T. A SWOT analysis of the organization and financing of the Danish health care system (whole issue dedicated to the Danish Health Care System). Health Policy 2002;59(2):99-188.
9. Velfærdskommissionen. Befolkningsudvikling, velstandsdilemma og makroøkonomiske strategier. København: 2005.
10. Velfærdskommissionen. Fremtidens Velfærd - vores valg: kapitel 15: Brugerbetaling og forebyggelse. 2005
11. Hansen MF, Pedersen LH. Sundhedsudgifter og finanspolitisk holdbarhed. Nationaløkonomisk Tidsskrift 2010;148(3):21-42.
12. Bronnum-Hansen H, Baadsgaard M. Increasing social inequality in life expectancy in Denmark. Eur J Public Health 2007;17(6):585-586.
13. Pedersen KM. Manglen på arbejdskraft i sundhedsvæsenet og hvordan man kan tiltrække og fastholde kvalificeret arbejdskraft (Manpower shortage in the health care sector and how to attract and retain qualified personnel). Research Unit of Health Economics, University of Southern Denmark, 2011Health Economic Papers 2008:2.)
14. Det økonomiske råd, Council of Economic Advisors. Dansk Økonomi • Efterår 2009. Sundhed (Danish Economy - autumn 2009 - health). 2009.
15. Arnberg S, Bjørner TB. Sundhedsudgifter og levetid (health expenditure and life time). National Økonomisk Tidsskrift (Danish Journal of Economics) 2010;148(1):43-66.

16. Sundhedsministeriet. Sund hele livet - de nationale mål og strategier for folkesundheden 2002-10. København: Sundhedsministeriet, 2002
17. Dahlgren G, Whitehead M. Policies and Strategies to Promote Social Equity in Health. Stockholm: Institute for Future Studies; 1991.
18. Bronnum-Hansen H, Baadsgaard M. Increase in social inequality in health expectancy in Denmark. Scand J Public Health 2008;36(1):44-51.
19. Arendt J. Forebygger uddannelse sygdomme? Om sociale forskelle i sundhed. (Does education prevent illnesses. About social differences in health). In: Lauridsen JT, Pedersen M, editors. Sundhedsøkonomi - fra teori til praksis (health economics - from theory to practice). Copenhagen: Jurist- og Økonomforbundets Forlag; 2009:31-46.
20. Statens Institut for Folkesundhed. SUSY database. Copenhagen: 2011.
21. Zimmermann E, Ekholm O, Curtis T. Arbejdsnotat om udviklingen i social ulighed i selv vurderet helbred og sundhedsadfærd i Danmark (note about social inequity in self assessed health and health behavior in Denmark). Copenhagen: Statens Institut for Folkesundhed, 2005
22. Juel K, Davidsen, M. Risikofaktorudviklingen i Danmark fremskrevet til 2020 (Risk factor development prognosis for 2020). Copenhagen: Statens Institut for Folkesundhed, 2009
23. Frandsen AG, Gyrd-Hansen D, Petersen S, Slothuus U. Danskernes ønsker til sundhedsvæsenet. Odense: Odense Universitetsforlag; 2000.
24. Mandag Morgen. Brugernes Sundhedsvæsen. Oplæg til patientreform. Copenhagen: Mandag Morgen; 2007.
25. Mandag Morgen Strategisk Forum. Når patienten vågner. Et debatoplæg om det 21. århundredes patientkultur. Copenhagen: Mandag Morgen; 1999.
26. Enheden for Brugerundersøgelser. Den Landsdækkende Undersøgelse af Patientoplevelser (LUP). København: 2009
27. Hemmingsen MA. Hver fjerde ung føler sig dårligt behandlet hos lægen. Dagens Medicin 2010;20. December.
28. Colombo F, Tapay N. Private Health Insurance in OECD Countries: The Benefits and Costs for Individuals and Health Systems. Towards high-performing health systems: policy studies. Paris: OECD; 2004.
29. OECD. Proposal for a taxonomy of health insurance (OECD Study on Private Health Insurance). Paris: OECD; 2004.
30. Martinsen DS, Vrangbæk K. The Europeanization of Health Care Governance : Implementing the market imperatives of Europe. Public Administration 2007;86(1):169-184.
31. Mossialos E, Permanand G, Baeten R, Hervey T, (eds.). Health Systems Governance in Europe: The role of European Union law and policy. Cambridge: Cambridge University Press; 2010.



32. Brancheforeningen for privathospitaler og klinikker. Den private sygehussektor i tal 2010. En faktuel rapport om den private sygehussektor udarbejdet på baggrund af en spørgeskemaundersøgelse sommeren 2010 /the private hospital sector in numbers. Copenhagen: BPK, 2010
33. Sundhedsstyrelsen, National Board of Health. Sengepladser /hospital beds. 2011. 10-1-2011. Ref Type: Online Source
34. LeGrand J. The Other Invisible Hand: Delivering Public Services through Choice and Competition. Princeton University Press.; 2007.
35. Conti R, Veenstra DL, Armstrong K, Lesko LJ, Grosse SD. Personalized Medicine and Genomics: Challenges and Opportunities in Assessing Effectiveness, Cost-Effectiveness, and Future Research Priorities. Med Decis Making 2010;30(3):328-340.
36. Ministeriet for Videnskab ToU. FORSK2015. København: Ministeriet for Videnskab, Teknologi og Udvikling, 2008
37. Davis J, Ma P, Sutaria S. The microeconomics of personalized medicine. McKinsey Quarterly 2010;(February).
38. Nielsen FC, Borregaard N. Farmakogenetik og skræddersyet medicinsk behandling. Ugeskrift for Læger 2009;171(10):790-794.
39. Skejby Sygehus. Ny visionær afdeling skal sikre patienterne skræddersyet behandling. <http://www.skejby.dk/pressen/nyheder/visnyhed?visNyhed=39024>, 2009 (Accessed January 15, 2011).
40. Aarhus University. Bacheloruddannelsen i Molekylær medicin. [http://studieinfo.au.dk/bachelor\\_introduktion\\_dk.cfm?fag=7170](http://studieinfo.au.dk/bachelor_introduktion_dk.cfm?fag=7170), 2011 (Accessed January 19, 2011 [http://studieinfo.au.dk/bachelor\\_introduktion\\_dk.cfm?fag=7170](http://studieinfo.au.dk/bachelor_introduktion_dk.cfm?fag=7170)).
41. Grøn L, Vang S, Mertz MKH. Den kroniske patient - Nærbilleder af livet med kronisk sygdom. København: DSI, 2009DSI rapport 2009:4.)
42. Strandberg-Larsen M, Nielsen MB, Vallgåarda S, KA, rangbæk K. Denmark Health system review. European Observatory on Health Systems and Policies; 2007.
43. Sundhedsstyrelsen, National Board of Health. [web site]. Sundheds A-Å/patient rettigheder [Health A-Z/patient rights]. (<http://www.sst.dk/Sundhed3A/Patientrettigheder.aspx>, 2011 (Accessed November 4, 2005 (<http://www.sst.dk/Sundhed3A/Patientrettigheder.aspx>)).
44. Retsinformation. Legal Information [Retsinformation] (2005) [website]. Sundhedsloven, LOV nr 546 [Law of Health, Law no. 546]. Copenhagen, Civilstyrelsen [Civil Affairs Agency]accessed 27 Au. [http://147.29.40.91/\\_GETDOCM\\_/ACCN/A20050054630-REGL](http://147.29.40.91/_GETDOCM_/ACCN/A20050054630-REGL), 2007 [http://147.29.40.91/\\_GETDOCM\\_/ACCN/A20050054630-REGL](http://147.29.40.91/_GETDOCM_/ACCN/A20050054630-REGL)).
45. Vallgåarda S, Krasnik A. Sundhedstjeneste og sundhedspolitik - en introduktion, 3. udgave / Health services and health policy - an introduction, 3rd edition. Copenhagen: Munksgaards Forlag; 204.

46. Amtsrådsforeningen, Association of Counties. [web site]. Copenhagen, Amtsrådsforeningen. www arf dk, 2005 <http://www.arf.dk>.
47. Birk HO, Henriksen LO. Brugen af det frie sygehusvalg inden for tre amter, 1991-1999. Ugeskrift for Læger 2003;165:3613-3616.
48. Sundhedsvæsenets Patientklagenævn. Statistiske oplysninger 2009. 2010
49. Christiansen T. A SWOT analysis of the organization and financing of the Danish health care system. Health Policy 2002;59:99-106.
50. Christiansen T. Summary of the SWOT panel's evaluation of the organisation and financing of the Danish health care system. Health Policy 2002;59:173-180.
51. Christiansen Tr. International vurdering af organisation og finansiering af det danske sundhedsvæsen. Odense: Syddansk Universitetsforlag; 1999.
52. Índenrigs-og sundhedsministeriet, Danske Regioner. Løbende offentliggørelse af produktivitet i sygehussektoren - VI delrapport - Udviklingen fra 2008 til 2009 / Ongoing publication of productivity result sin the hospital sector - report VI. Copenhagen: Ministry of the Interior and Health, 2010
53. Sundhedsstyrelsen. Pakkeforløb /fast track approach. 2011. 15-1-2011.  
Ref Type: Online Source
54. Sundhedsministeriet. Landsdækkende undersøgelse af patienters oplevelser på offentlige sygehuse og privathospitalers-og klinikkers ambulatorier . København: 2008.
55. Hospiceforum. Hospice. <http://www.hospiceforum.dk>, 2011 (Accessed January 14, 2011 <http://www.hospiceforum.dk>).
56. Gawande A. Letting Go. What should medicine do when it can't save your life. The New Yorker 2010;(August).
57. Economist Intelligence Unit. The quality of death. Ranking end-of-life care across the world. London: The Economist Intelligence Unit, 2010
58. Pedersen KM. Sundhedspolitik - beslutningsgrundlag, beslutningstagen og beslutninger i sundhedsvæsenet. Odense: Syddansk Universitetsforlag; 2005.
59. IKAS, The Danish Institute for Quality and Accreditation in Healthcare. Quality assurance, accreditation. 2011.  
Ref Type: Internet Communication
60. Moth G, Stabel HH, Kudsk AZ, Hansen L, Rask MT, Mainz J. Akkreditering i medicinsk teknologivurderingsperspektiv. Ugeskr Læger 2004;166(19):1800-1802.
61. Rhode P, Mainz J. Har akkreditering effekt? Erfaringer og oplevelser fra mock survye og besøg hos Joint Commission International i Chicago. Tidsskrift for Dansk Sundhedsvæsen 2009;85(3):70-73.

62. Pedersen KM. Kan kvalitetsudvikling betale sig? Side presentation at OLAU-kursus 22. september 2008. 2008.  
Ref Type: Slide
63. Mainz J, Krogh RB, Bjørnshave B, Bartels P. Nationwide continuous quality improvement using clinical indicators: the Danish National Indicator Project. *International Journal for Quality in Health Care* 2004;16(1 - supplement):45-50.
64. NIP, National Indicator Project. Quality monitoring. 2011.  
Ref Type: Internet Communication
65. NIP. National auditrapport 2009. Apopleksi. Århus: NIP, 2010
66. NIP. National auditrapport 2009. Apopleksi (borgerrapport). 2011.  
Ref Type: Internet Communication
67. Svendsen ML, Ehlers LH, Andersen G, Johnsen SP. Quality of care and length of hospital stay among patients with stroke. *Med Care* 2009;47(5):575-582.
68. Palnum KD, Petersen P, Sorensen HT et al. Older patients with acute stroke in Denmark: quality of care and short-term mortality. A nationwide follow-up study. *Age Ageing* 2008;37(1):90-95.
69. Vrangbæk K. The interplay between central and sub-central levels: the development of a systemic standard based programme for governing medical performance in Denmark. *Health Economics, Policy and Law* 2009;(Special issue 04):305-327.
70. Sundhedsstyrelsen, National Board of Health. Evaluering af sundhedsaftalerne. Opfølgning og indikatorer. Copenhagen: Sundhedsstyrelsen /National Board of Health, 2011
71. Christensen JG, Mouritzen PE, Nørgaard AS, eds. De store kommissioner Vise mænd, smagsdommere eller nyttige idioter. Odense: University of Southern Denmark Press; 2009.
72. KL, Danske Regioner, Finansministeriet, Sundhedsstyrelsen, Ministeriet for Sundhed og Forebyggelse. Rapport vedrørende bedre grundlag for forebyggelsesindsatsen i kommunerne. København: Ministeriet for Sundhed og Forebyggelse, 2008
73. Højgaard B, Sørensen J, Sjøgaard J. Evidensbaseret forebyggelse i kommunerne - dokumentation af effekt og omkostningseffektivitet. København: DSI, 2006(DSI rapport 2006.07.)
74. Forebyggelseskommissionen. Vi kan leve længere og sunderer. Forebyggelseskommissionens anbefalinger til en styrket forebyggende indsats. 2009
75. Bech M, Lauridsen J. Exploring the spatial pattern in hospital admissions. *Health Policy* 2008;87(1):50-62.
76. Bech M, Lauridsen J. Exploring spatial patterns in general practice expenditure. *European Journal of Health Economics* 2009;10(3):243-254.
77. Bech M, Lauridsen J. Exploring the small area variation and spatial patterns in outpatient treatments. *Health Services and Outcomes Research Methodology* 2009;9(3):177-196.

78. Pedersen KM. Kommunal medfinansiering af sundhedsvæsenet: En idé på sandbund? Odense: University Press of Southern Denmark; 2005.
79. Kidholm K, Ehlers L, Korsbek L, Kjmrby R, Bech M. Assessment of the quality of mini-HTA. *International Journal of Technology Assessment in Health Care* 2009;25(01):42-48.
80. Ankjær-Jensen A, Rosling P, Bilde L. Variable prospective financing in the Danish hospital sector and the development of a Danish case-mix system. *Health Care Management Science* 2006;9(3):259-268.
81. Bilde L, Hansen AR, Søgaard J. Økonomi og styring i sygehusvæsenet. København: Dansk Sundhedsinstitut, 2010
82. Pedersen KM, Bech M, Hansen MB. Incitamentsstyring i sygehusvæsenet: Virkningen af øget takststyring og tilhørende incitamenter. Odense: Syddansk Universitetsforlag; 2006.
83. Middellevetidsudvalget. Danskernes dødelighed i 90erne (in Danish: The mortality of Danes in the 90ies). Copenhagen, Ministry of Health, 1998 .  
Ref Type: Generic
84. Middellevetidsudvalget. Levetiden i Danmark. København: Sundhedsministeriet; 1994.
85. Juel K. Middellevetid og dødelighed i Danmark sammenlignet med i Sverige. Hvad betyder rygning og alkohol? *Ugeskr Laeger* 2008;170(33):2423-2427.
86. Pedersen KM. Er der sammenhæng mellem udviklingen i middellevetid og sundheds- og medicinudgifterne? *Rationel Farmkoterapi* 2008;(3):1-4.
87. Nolte E, McKee M. Measuring the health of nations: analysis of mortality amenable to health care. *BMJ* 2003;327(7424):1129.
88. Nolte E, McKee CM. Measuring the health of nations: updating an earlier analysis. *Health Aff (Millwood )* 2008;27(1):58-71.
89. Bech M, Christiansen T, Dunham K et al. The influence of economic incentives and regulatory factors on the adoption of treatment technologies: a case study of technologies used to treat heart attacks. *Health Econ* 2009;18(10):1114-1132.
90. Packer C, Simpson S, Stevens A. International diffusion of new health technologies: a ten-country analysis of six health technologies. *Int J Technol Assess Health Care* 2006;22(4):419-428.
91. LIF. Cancer drugs - acces/Danskerne får ikke den nyeste kræftmedicin (accessed January 19, 2010). 2007.  
Ref Type: Internet Communication
92. Wilking N, Jönsson B. A pan-European comparison regarding patient access to cancer drugs. Stockholm: Karolinske Instituttet, 2005
93. Jonsson B, Kobelt G, Smolen J. The burden of rheumatoid arthritis and access to treatment: uptake of new therapies. *Eur J Health Econ* 2008;8 Suppl 2:S61-S86.

94. Sundhedsstyrelsen. Eksperimentel behandling. Årsrapport 209. Copenhagen: National Board of Health, 2010
95. Sundhedsministeriet. Kræftindsatsen får et massivt løft. 2011. 19-1-2011.  
Ref Type: Online Source
96. Sundhedsstyrelsen. National Kræftplan. Status og forslag til initiativer i relation til kræftbehandling / National Cancer Plan. Copenhagen: National Board of Health, 2000
97. Sundhedsstyrelsen. Kræftplan II. Sundhedsstyrelsens anbefalinger til forbedringer af indsatsen på kræftområder . Copenhagen: National Board of Health, 2005
98. Sundhedsstyrelsen. Opfølgning på kræftplan II /Follow-up on cancer plan II. Copenhagen: National Board of Health, 2007
99. Sundhedsstyrelsen, Sundhedsministereit. Aftale om Kræftplan III. Copenhagen, 2010
100. Sundhedsstyrelsen. Kræftbehandling / Treatment of cancer. www sst.dk/Planlaegning%20og%20kvalitet/Kraeftbehandling.aspx, 2011 (Accessed January 15, 2011 <http://www.sst.dk/Planlaegning%20og%20kvalitet/Kraeftbehandling.aspx>).
101. Sundhedsstyrelsen. Diagnostik og behandling af iskæmis hjertesygdom i Danmark - KAG, PCI, BY-PASS og KLAPKIRURGI. Copenhagen: National Board of Health, 2005
102. Sundhedsstyrelsen. Ny analyse og status: Dansk hjertebehandling på internationalt niveau. 2005. 19-1-2011.  
Ref Type: Online Source
103. Sundhedsstyrelsen. Egenomsorg. Et særligt perspektiv på forebyggelse og sundhedsfremme. København: Sundhedsstyrelsen; 2006.
104. Sundhedsstyrelsen. Kronisk Sygdom. Patient, sundhedsvæsen og samfund. 2005.
105. Sundhedsstyrelsen. Kronisk Sygdom. Patient, sundhedsvæsen og samfund. Forudsætninger for det gode forløb. 3269. København: Sundhedsstyrelsen; 2005.
106. Sundhedsstyrelsen. Patientuddannelsesprogrammet. Lær at leve med kronisk sygdom. København: Sundhedsstyrelsen; 2005.
107. Sundhedsstyrelsen, National Board of Health. Chronic Disease Management A National Strategy Disease Management Programmes and Self-Management Support. Copenhagen: Sundhedsstyrelsen /National Board of Health, 2007
108. Sundhedsstyrelsen. Forløbsprogrammer for kronisk sygdom. Del I: generisk model Del II: Diabetes. Copenhagen: Sundhedsstyrelsen / National Board of Health, 2008
109. Sundhedsstyrelsen. Patientuddannelse - en teknologivurdering. Copenhagen: Sundhedsstyrelsen / National Board of Health, 2009

110. Sundhedsstyrelsen, National Board of Health. Chronic Conditions. Patient, Healthcare and Community. Summary and recommendations. 20 A.D.
111. Sundhedsstyrelsen, National Board of Health. Sundhedsaftaler /Health Agreements. [www.sst.dk/Planlaegning%20og%20kvalitet/Sundhedsaftaler.aspx](http://www.sst.dk/Planlaegning%20og%20kvalitet/Sundhedsaftaler.aspx), 2011 (Accessed January 14, 2011 <http://www.sst.dk/Planlaegning%20og%20kvalitet/Sundhedsaftaler.aspx>).
112. Improving Chronic Illness Care I. The chronic care model. 2011. 14-1-2011.  
Ref Type: Online Source
113. Sundhedsstyrelsen. Egenomsorg ved kronisk sygdom Tema-avis fra nordisk konference om egenomsorg. Copenhagen: Sundhedsstyrelsen / National Board of Health, 2011
114. APO. Folkesygdomme i almen praksis Forekomst og forebyggelsesperspektiver vurderet i forbindelse med en auditregistrering. Odense: APO, 2005
115. Indenrigsministeriet. Samordning i sundhedsvæsenet. Betænkning nr. 1044. København: Indenrigsministeriet, 1985
116. Johnsen AT, Jensen CR, Pedersen C, Grønvold M. Kræftpatientens verden. - En undersøgelse af, hvilke problemer danske kræftpatienter oplever. Litteraturgennemgang og interviews. Copenhagen: Kræftens Bekæmpelse, 2006
117. Enheden for Brugerundersøgelser. Landsdækkende undersøgelse af kræftpatienters oplevelser En spørgeskemaundersøgelse blandt 19.455 kræftpatienter. Copenhagen: Enheden for Brugerundersøgelser, 2010
118. Danske Patienter. Rehabilitering. 2011. 19-1-2011.  
Ref Type: Online Source
119. Herløv-Pedersen K. Rehabilitering og leddegigt.Indsatser med evidens, fagligt grundlag og vigtige faggrupper (slide-præsentation). 2010.  
Ref Type: Slide
120. Rehabiliteringscenter Dallund. Litteratur om rehabilitering. 2011. 19-11-2011.  
Ref Type: Online Source
121. Rehabiliteringsforum. Rehabilitering i Danmark 2010 - beskrevet gennem praksishistorier. Rehabiliteringsforum Danmark, 2010
122. Sundhedsstyrelsen. Hjerterehabilitering - en medicinsk teknologivurdering. Evidens fra litteraturen og DANREHAB-forsøget - sammenfatning. Copenhagen: National Board of Health, 2006
123. Sundhedsstyrelsen. Genoptræning. [www.sst.dk/Behandlingsforloeb%20og%20rettigheder/Genoptraening%20og%20fysioterapi/Genoptraening.aspx](http://www.sst.dk/Behandlingsforloeb%20og%20rettigheder/Genoptraening%20og%20fysioterapi/Genoptraening.aspx), 2011 (Accessed January 19, 2011 <http://www.sst.dk/Behandlingsforloeb%20og%20rettigheder/Genoptraening%20og%20fysioterapi/Genoptraening.aspx>).

124. Kairy D, Lehoux P, Vincent C, Visintin M. A systematic review of clinical outcomes, clinical process, healthcare utilization and costs associated with telerehabilitation. *Disability and Rehabilitation* 2009;31(6):427-447.
125. Kristiansen IS, Poulsen PB. Milliardbesparelser ved telemedisin: tro eller faktum? En oversikt over økonomiske analyser av telemedisinske applikasjoner. *Tidsskrift for Norske Lægeforening* 2000;120:2305-2311.
126. Polisena J, Coyle D, Coyle K, McGill S. Home telehealth for chronic disease management: A systematic review and an analysis of economic evaluations. *International Journal of Technology Assessment in Health Care* 2009;25(3):339-349.
127. Johansson T, Wild C. Telemedicine in acute stroke management: Systematic review. *International Journal of Technology Assessment in Health Care* 2010;26(2):149-155.
128. Keane MG. A review of the role of telemedicine in the accident and emergency department. *J Telemed Telecare* 2009;15(3):132-134.
129. Verhoeven F, van Gemert-Pijnen L, Dijkstra K, Nijland NN, Seydel E, Steehouder M. The contribution of teleconsultation and videoconferencing to diabetes care: A systematic literature review. *Journal of Medical Internet Research* 2007;9(5).
130. Afdelingen for Kommunesamarbejde RS. Telemedicinsk understøttelse af behandlingen af sårpatienter – en mini-MTV vedrørende telemedicin og sårbehandling i Sønderjylland. Vejle: Region Syddanmark, 2009
131. Forsknings- og MTV-afdelingen. Sygehusbehandling af KOL patienter i eget hjem. Odense: Odense Universitetshospital, 2009
132. Ammentorp J, Rasmussen AM, Kofoed P-E. Telefontolkning forbedrer vilkårene for patienter. *Sygeplejersken* 2006;(2):52-55.
133. Azarmina P, Wallace P. Remote interpretation in medical encounters: a systematic review. *J Telemed Telecare* 2005;11(3):140-145.
134. Chan YF, Alagappan K, Rella J, Bentley S, Soto-Greene M, Martin M. Interpreter services in emergency medicine. *J Emerg Med* 2008.
135. Medcom. National udbredelse af tolkning via videokonferenceudstyr. Odense: Medcom, 2009
136. Ekeland AG, Bowes A, Flottorp S. Effectiveness of telemedicine: A systematic review of reviews. *International Journal of Medical Informatics* 2010;79(11):736-771.
137. Bergmo TS. Economic evaluation in telemedicine - still room for improvement. *J Telemed Telecare* 2010;16(5):229-231.
138. Bryan S, Sofaer S, Siegelberg T, Gold M. Has the time come for cost-effectiveness analysis in US health care? *Health Econ Policy Law* 2009;4(Pt 4):425-443.
139. Eddama O, Coast J. Use of economic evaluation in local health care decision-making in England: a qualitative investigation. *Health Policy* 2009;89(3):261-270.



140. Carroll S. Is There Anything Nicer than NICE? A Question the Conservative Shadow Health Team Is Right to Ask. 2009.
141. Drummond M. Can NICE Be Nicer? In a World of Budget Constraints There Are No Easy Solutions. 2009.
142. Drummond M, Sorenson C. Can NICE Be Nicer? In a World of Budget Constraints There Are No Easy Solutions. *Value in Health* 2009;12(5):634-636.
143. Sculpher M, Drummond M, O'Brien B. Effectiveness, efficiency, and NICE - A NICE start but evidence costs money. *British Medical Journal* 2001;322(7292):943-944.
144. Danmarks Statistik, Statistics Denmark. F Forbrugerundersøgelser. Danmarks Statistik Bank. <http://www.statistikbanken.dk/statbank5a/default.asp?w=1280>, 2011 (Accessed January 20, 2011 <http://www.statistikbanken.dk/statbank5a/default.asp?w=1280>).
145. NOMESCO, Nordisk Medicinalstatistisk Komité. Health Statistics in the Nordic Countries with data from 2008 . Copenhagen: 2010
146. Velfærdskommissionen, the Welfare Commission. Fremtidens Velfærd - vores valg: kapitel 15: Brugerbetaling og forebyggelse / Welfare of the future - our choice. Chapter 15: Co-payment and prevention. 2005

## References

References refer to (round brackets) in text.

ABT Fonden and Anvendt borgernær teknologi. (2011). *Teleløsninger og informations-og kommunikationsteknologi*.

Alectia 2010, *Telemedicin Hvad er telemedicin? Hvad betyder det for hospitalerne?Antallet af sengepladser?Anlægsinvesteringer?Driftsudgifter? (en slide-serie)*, Alectia A/S, København.

Andersen SH 2010. B 1 Forslag til folketingsbeslutning om oprettelse af diagnosecentre (2010-2011). *Folketinget* - [www.ft.dk/samling/20101/beslutningsforslag/b1/beh1/forhandling.htm?startItem=-1](http://www.ft.dk/samling/20101/beslutningsforslag/b1/beh1/forhandling.htm?startItem=-1)

Ankestyrelsen 2011. *Førtidspensioner: Årsstatistik 2009* København, Årsstatistik.

Barbash, G.I. & Glied, S.A. 2010. New technology and health care costs--the case of robot-assisted surgery. *N.Engl.J Med*, 363, (8) 701-704 available from: PM:20818872

Brumley, R., Enguidanos, S., Jamison, P., Seitz, R., Morgenstern, N., Saito, S., McIlwane, J., Hillary, K., & Gonzalez, J. 2007. Increased satisfaction with care and lower costs: results of a randomized trial of in-home palliative care. *J Am.Geriatr.Soc.*, 55, (7) 993-1000 available from: PM:17608870

Bundgaard B 2009. Diagnosegaranti på vej. *Ugeskrift for Læger*, 171, (43) 3044

Christensen M, Albæk J, & Ankjær-Jensen A 2007. *Undersøgelse af angstsygdomme* København, DSI.

Coleman K, Austin BT, Brach C, & Wagner EH 2009. Evidence on the Chronic Care Model in the new millennium. *Health Aff*, 28, (1) 75-85

Dansk Psykiatrisk Selskab 2004. *Hvidbog - Psykiatriens kerneopgaver og udfordringer 2004 2010* København, Dansk Psykiatrisk Selskab.

Dansk Selskab for Telemedicin. (2011). *Dansk Selskab for Telemedicin*.

Deighton, C. & Scott, D.L. 2010. Treating inflammatory arthritis early. *BMJ*, 341, c7384 available from: PM:21196485

Due TD, Waldorff SB, Aarestrup AK, Laursen B, & Curtis T 2008. *Sundhedscentre i Danmark – organisering og samarbejdsrelationer* Copenhagen, National Institute of Public Health.

Enguidanos, S.M., Cherin, D., & Brumley, R. 2005. Home-based palliative care study: site of death, and costs of medical care for patients with congestive heart failure, chronic obstructive pulmonary disease, and cancer. *J Soc.Work End.Life Palliat.Care*, 1, (3) 37-56 available from: PM:17387068

Eriksen TE. S, V og K vil have diagnose-garanti. <http://www.dr.dk/Nyheder/Politik/2009/09/26/122518.htm> . 2009. 8-2-2011.

Ref Type: Electronic Citation

- Evans R, Barer M, & Marmor T 1994. *Why Are Some People Healthy and Others Not?: The Determinants of Health of Populations* Aldine Transaction.
- Gawande A 2009. *The chec-list manifesto: How to get things right* Picador.
- Gyrd-Hansen D & Kjær T 2011. Disentangling WTP per QALY data: different analytical approaches, different answers (early view available on website of Health Economics). *Health Economics*
- Hansen EB, Jessen A, & Jørgense TS 2010. *Effekter af en sundhedsfremmende indsats i tre kommuner. En sammenligning af indsatsen i Assens, Greve og Hjørring Kommuner* Copenhagen, AKF.
- Hansen EB & Jørgensen TS 2008. *Organisering af forebyggelse og sundhedsfremme. – Erfaringer fra kommunernes første år* Copenhaagen, AKF.
- Hansen, M. & Stephsen P 2010, *Danmarks fremtidige befolkning. Befolkningsfremskrivning 2010 (the future population of Denmark. Population prognosis 2010).*, DREAM sekretariat, Copenhagen.
- Haynes AB & et al 2009. A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population. *New England Journal of Medicine*, 360, 491-498
- International Society for Telemedicine and e-health. Telemedicine. \* . 2011. 20-1-2011.  
Ref Type: Electronic Citation
- IRF and Institute of rational pharmaco therapy. (2011. *Telefonbog IRF /telephone list IRF.*
- Issakidis C, Sanderson K, Corry J, & et al 2004. Modelling the population cost-effectiveness of current and evidence-based optimal treatment for anxiety disorders. *Psychol Med*, 34, (1) 19-35
- Jacobsen ET 2001. *Sundhedsprojekt Ebeltoft". Praktiserende lægers vurdering af organisatoriske aspekter ved implementering af forebyggende helbredsundersøgelser og -samtaler i almen praksis* København, DSI.
- KAD & SID 2002. *Hvorfor vente? Initiativer for hurtiger og bedre indsats for sygemeldte.*
- Kelley, A.S. & Meier, D.E. 2010. Palliative care--a shifting paradigm. *N.Engl.J Med*, 363, (8) 781-782 available from: PM:20818881
- Kessing Lars. Selvmord. <http://www.depnet.dk/universe1/suicide/> . 2011. 2-8-2011.  
Ref Type: Electronic Citation
- Kilsgaard J, Sherson D, Bültman U, Olsen J, Pedersen J, & Lund T 2006. *Koordineret Indsats for Arbejdsfastholdelse (KIA) af sygemeldte med længerevarende smertegener fra bevægeapparatet.* København, Arbejds miljøinstituttet.
- Kommunernes Landsforening 2008. *Godt i gang - en kvantitativ undersøgelse af den kommunale forebyggelsesindsats i 2008* Copenhagen, Kommunernes Landsforening.
- Larsen EL, Thomsen JL, Lauritzen T, & Engberg M 2006. *Forebyggende helbredsundersøgelser og helbredssamtaler i almen praksis - en analyse af patientperspektivet* København, Sundhedsstyrelsen.

- Lauritzen, T., Jensen, M.S., Thomsen, J.L., Christensen, B., & Engberg, M. 2008. Health tests and health consultations reduced cardiovascular risk without psychological strain, increased healthcare utilization or increased costs. An overview of the results from a 5-year randomized trial in primary care. The Ebeltoft Health Promotion Project (EHPP). *Scand.J Public Health*, 36, (6) 650-661 available from: PM:18775821
- Lorig, K. & et al 1999. Evidence Suggesting That a Chronic Disease Self-Management Program Can Improve Health Status While Reducing Hospitalization: A Randomized Trial 3270. *Medical Care*, 37, (1) 5-14
- Lotan, Y., Cadeddu, J.A., & Gettman, M.T. 2004. The new economics of radical prostatectomy: cost comparison of open, laparoscopic and robot assisted techniques. *J Urol.*, 172, (4 Pt 1) 1431-1435 available from: PM:15371862
- Marmot M 2004. *The Status Syndrome. How social standing affects our health and longevity* New York, Time Books.
- Medcom 2010. *Udredning om Telemedicin. Udarbejdet af MedCom for ABT-fonden København*, ABT Fonden. Medcom. Telemedicin. \* . 2011. Ref Type: Electronic Citation
- Morrison, R.S., Penrod, J.D., Cassel, J.B., Caust-Ellenbogen, M., Litke, A., Spragens, L., & Meier, D.E. 2008. Cost savings associated with US hospital palliative care consultation programs. *Arch.Intern Med*, 168, (16) 1783-1790 available from: PM:18779466
- Nielsen JS 2008. *Valuing gains in life expectancy - Theoretical and empirical issues. Ph.d-afhandling, Syddansk Universitet* Odense.
- OECD 2004. *Proposal for a taxonomy of health insurance (OECD Study on Private Health Insurance)* Paris, OECD.
- Patel, H.R., Linares, A., & Joseph, J.V. 2009. Robotic and laparoscopic surgery: cost and training. *Surg.Oncol.*, 18, (3) 242-246 available from: PM:19560913
- Pedersen KM 2009, *Er der brug for fem milliarder mere i sundhedsvæsenet? Hvad kan de bruges til?*, Department of Public Health, health economics, University of Southern Denmark, Health Economics Papers 2009:2.
- Peikes, D. 2006. Disease management: promising, but not yet proven. *Expert.Rev.Pharmacoecon.Outcomes.Res.*, 6, (3) 241-244 available from: PM:20528517
- Peikes, D., Chen, A., Schore, J., & Brown, R. 2009. Effects of care coordination on hospitalization, quality of care, and health care expenditures among Medicare beneficiaries: 15 randomized trials. *JAMA*, 301, (6) 603-618 available from: PM:19211468
- Penrod, J.D., Deb, P., Dellenbaugh, C., Burgess, J.F., Jr., Zhu, C.W., Christiansen, C.L., Luhrs, C.A., Cortez, T., Livote, E., Allen, V., & Morrison, R.S. 2010. Hospital-based palliative care consultation: effects on hospital cost. *J Palliat.Med*, 13, (8) 973-979 available from: PM:20642361

Penrod, J.D., Deb, P., Luhrs, C., Dellenbaugh, C., Zhu, C.W., Hochman, T., Maciejewski, M.L., Granieri, E., & Morrison, R.S. 2006. Cost and utilization outcomes of patients receiving hospital-based palliative care consultation. *J Palliat.Med*, 9, (4) 855-860 available from: PM:16910799

Psykiatrifonden. Depression. <http://www.psykiatrifonden.dk/Forside/Psykiske+sygdomme/Depression> . 2011. 8-2-2011. Ref Type: Electronic Citation

Rasmussen SR, Kilsmark J, Hvenegaard A, & et al 2006. *Forebyggende helbredsundersøgelser og helbredssamtaler i almen praksis. En sundhedsøkonomisk analyse af "Sundhedsprojekt Ebeltoft"* København, DSI og Sundhedsstyrelsen.

Russel LB 2009. Preventing chronic disease: an important investment, but don't count on cost savings. *Health Aff*, 28, (1) 42-45

Sikker Patient. Fremtidens sundhedsvæsen har ikke råd til fejl og spild. Patientsikkerhed kan blive en del af løsningen på sundhedsvæsenets økonomiske udfordring.

<http://www.sikkerpatient.dk/nyheder/laeringsseminar2.aspx> . 2011. 22-1-2011.

Ref Type: Electronic Citation

Statens Serum Institut & Central Enhed for Infektionshygiejne. 2010, *CEI-NYT - Landsprævalensundersøgelser /Information Letter - country wide prevalence of hospital infections.*

Stephens, S. 2008. Hospital-based palliative care: cost-effective care for patients with advanced disease. *J Nurs.Adm*, 38, (3) 143-145 available from: PM:18327063

Sundhedsministeriet 2008. *Rapport vedrørende bedre grundlag for forebyggelsesindsatsen i kommunerne* Copenhagen, Ministry of Health.

Sundhedsstyrelsen & National Board of Health 2009. *National Strategi for Psykiatri /National Strategy for Psychiatry* Copenhagen, National Board of Health.

Teknologisk Institut 2008. *Analyse af samfundsøkonomiske effekter ved båndbredskrævende telemedicin.*

Temel, J.S., Greer, J.A., Muzikansky, A., Gallagher, E.R., Admane, S., Jackson, V.A., Dahlin, C.M., Blinderman, C.D., Jacobsen, J., Pirl, W.F., Billings, J.A., & Lynch, T.J. 2010. Early palliative care for patients with metastatic non-small-cell lung cancer. *N.Engl.J Med*, 363, (8) 733-742 available from: PM:20818875

Toustrup, K., Lambertsen, K., Birke-Sorensen, H., Ulhoi, B., Sorensen, L., & Grau, C. 2011. Reduction in waiting time for diagnosis and treatment of head and neck cancer - a fast track study. *Acta Oncol.* available from: PM:21261506

Velfærdskommissionen & the Welfare Commission 2005, *Fremtidens Velfærd - vores valg: kapitel 15: Brugerbetaling og forebyggelse / Welfare of the future - our choice. Chapter 15: Co-payment and prevention.*

Wessling A & Ramsberg J 2008. *Genomgangen av läkemedel mot depression* Stockholm, Tandvård och Läkemedelförmånsverket.



WHO 2009. Safe surgery saves lives. <http://www.who.int/patientsafety/safesurgery/en/> Accessed 2 February 2011.

WHO Regional Office for Europe's Health Evidence Network 2004. *What is the evidence on effectiveness of capacity building of primary health care professionals in the detection, management and outcome of depression?* Copenhagen, WHO.

