Public Health England

NPIS
National Poisons Information Service

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Report 2015/2016

The National Poisons Information Service is commissioned by Public Health England on behalf of the UK health departments

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The main role of the National Poisons Information Service (NPIS) is to advise NHS healthcare professionals on the diagnosis, treatment and care of poisoned patients across the UK. Poisoning is an extremely common cause of hospital admissions in the NHS, being similar in number to admissions for myocardial infarction. NPIS advice ensures that healthcare staff have access to up-to-date information about treating poisoned patients and that patients without significant poisoning are not treated in hospital, thus reducing unnecessary use of NHS resources. The major workload of the NPIS is to advise hospital emergency departments, but minor injuries units and primary care services are also significant users of the service – the latter to a large extent involving NHS advice services (NHS 111, NHS 24 and NHS Direct).

NPIS units as of 31 March 2016:

NPIS Birmingham unit

City Hospital, Birmingham, hosted by Sandwell and West Birmingham Hospitals NHS Trust
Director: Professor J A Vale MD FRCP FRCPE FRCPG FFOM FAACT FBTS FBPhS FEAPCCT Hon FRCPSG

NPIS Cardiff unit

University Hospital Llandough, Cardiff hosted by Cardiff and Vale University Health Board
Director: Dr J P Thompson BMedSci MBChB FRCP FBTS FEAPCCT FBPhS

NPIS Edinburgh unit

Royal Infirmary of Edinburgh, hosted by NHS Lothian – University Hospitals Division
Director: Professor M Eddleston ScD FRCPE FEAPCCT

NPIS Newcastle unit

Regional Drug and Therapeutics Centre, Newcastle hosted by Newcastle upon Tyne Hospitals NHS Foundation Trust
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Front cover: TOXBASE app in use.© Medical Photography, NHS Lothian

Foreword

The NPIS, commissioned by Public Health England on behalf of the UK health departments, has been supporting healthcare professionals for over 50 years in the management of patients with suspected poisoning. This is an essential clinical service because of the substantial numbers of patients presenting each day and the enormous variety of substances and circumstances that might be involved. Frontline health professionals must have rapid 24/7 access to accurate, up-to-date and evidence-based advice on management of these patients and the substances that may be involved. The NPIS provides this advice via its online poisons information database TOXBASE and its telephone advice service, while specialist consultant advice is always available for more complex cases.

The provision of advice by NPIS improves the quality of patient management, thereby improving clinical outcomes. Also, the advice helps health professionals identify the many patients at low risk who do not need referral or admission to hospital and who can be managed safely at home. This results in substantial resource savings and reduced workload for hard-pressed, frontline clinical services such as general practitioners, ambulance services, emergency departments and hospital admission wards.

Each year the NPIS publishes an annual report to document its activity and as a statement of accountability and governance. This annual report also provides information about topics of current interest, including toxicity associated with drugs of misuse including new psychoactive substances, dinitrophenol, carbon monoxide, household products, electronic nicotine delivery systems and pesticides.

This year's report illustrates the substantial achievements of the NPIS and its staff in supporting the management of poisoned patients, as evidenced by the volume of enquiries handled, the user feedback on quality, the low rate of adverse critical incidents reported and the volume, quality and relevance of surveillance data published. These achievements have been made in spite of continuing financial pressures and reductions in staffing. It will remain a challenge to maintain the quality and integrity of the service in the future in this context.

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Background

The NPIS is commissioned to provide information and advice for NHS healthcare professionals to support the management of patients with suspected poisoning. This is a common presentation, with over 170,000 people attending hospitals in the UK each year. Many more are managed in primary care, including by NHS advice services such as NHS 111, NHS 24 and NHS Direct.

The NPIS provides information and evidence-based management advice about individual substances through its online database TOXBASE, the TOXBASE app for iOS and Android mobile devices, and its 24-hour telephone advice service, staffed by information scientists and supported by a rota of consultant clinical toxicologists. The availability of this expertise avoids unnecessary hospital referrals and admissions for patients at low risk of harm, while improving the quality of treatment and shortening hospital stay for those with clinical toxicity.

The NPIS also incorporates the UK Teratology Information Service (UKTIS), the national source of information and advice about exposures to drugs and chemicals during pregnancy.

Activity

Excluding educational sessions and those from the NPIS and associated poisons centres, there were 608,868 TOXBASE user sessions and 1.69 million separate page views of TOXBASE entries during 2015/16, increases of 5.2% and 5.4% respectively on the equivalent figures for the previous year. The most frequent users were hospital departments (65%) and NHS 111, NHS 24 and NHS Direct staff (15%).

The TOXBASE app was relaunched in September 2015 offering free access to NHS users and direct access to information on antidotes. Registrations have since increased 10-fold over the year and more than 23,000 pages have been accessed over the past six months.

The total number of telephone enquiries received during 2015/16 was around 48,000, a similar number to the previous year, with NHS 111, NHS 24 and NHS Direct staff, hospitals and primary care professionals the most frequent users. Just under 2,000 telephone enquiries were referred to an NPIS consultant, a decrease of 5.8% on 2014/15 – 89.9% of these came from hospital staff.

Telephone enquiries included around 2,100 exposures to drugs and chemicals during pregnancy referred to UKTIS, a 20.5% reduction compared with the previous year. The number of downloads of detailed pregnancy information from TOXBASE also decreased by 24.4% to 45,600. However, 173,000 UKTIS monograph summaries were downloaded, an

increase of 8.4% on 2014/15. In addition, patient information pages on the new UKTIS public-facing website ***bumps*** were accessed by the public on over 1,193,000 occasions in its second year (a five-fold increase on 2014/15).

It is essential to update the approximately 17,000 product entries in TOXBASE regularly. During 2015/16 NPIS and UKTIS staff wrote or revised over 3,800 entries.

It is important for the NPIS to have access to information about the content and toxicity of consumer products, especially in view of impending EU chemicals legislation; this is provided by the NPIS Product Data Centre. During 2015/16 over 23,000 safety data sheets (SDS) were added to the Centre, an 87% increase on last year; it now contains current SDS for 174,000 products.

Quality

Quality assurance exercises, conducted by questionnaire, continue to demonstrate very high user satisfaction with the services provided by the NPIS. The proportion of respondents scoring services as five or six out of six (very good or excellent) was 92% for the TOXBASE website, 98% for the telephone poisons information service and 96% for the UKTIS telephone service.

Surveillance

The development of a fully integrated service, with clinical information collected by the four NPIS units held on a common database, allows the NPIS to provide UK-wide information on referrals to the service. This is of great value for public health surveillance of poisoning. Examples of work done during 2015/16 are summarised below.

Drugs of misuse

During 2015/16, the NPIS received 1,613 telephone enquiries relating to 385 (35% more than in 2014/15) different drugs or branded products, constituting 3.4% of overall telephone activity. There were also more than 67,000 TOXBASE accesses to 839 (40% more than in 2014/15) different drugs, products or synonyms. The difficulties clinicians face in dealing with patients exposed to these drugs is illustrated by the very large and increasing number of compounds involved, requiring the addition of 78 new drugs of abuse and 257 synonyms to TOXBASE over the past year. Branded products (many of which will contain potentially highly toxic synthetic cannabinoid receptor agonists [SCRAs]), so-called ‘legal highs’ (where the specific drug was unknown), and SCRAs dominate activity by both telephone and TOXBASE and are increasing over time. At the same time, activity around classical drugs of abuse has been stable, while mephedrone calls and accesses have reduced by about 30%.

2,4-dinitrophenol

This compound, a synthetic industrial chemical that is sometimes dangerously used for weight loss and 'fat burning' remains a significant public health problem in the UK and a subject of much NPIS activity. Steep increases in the number of NPIS enquiries and TOXBASE accesses during 2015, reflecting increasing numbers of patients presenting to hospital with ill-effects, were reported to PHE and the Food Standards Agency (FSA). The resulting public health and food safety campaigns have been associated with a recent fall in the numbers of calls and accesses. Although this is gratifying, the situation needs to be kept under close review because of the severity of toxicity associated with DNP. Of 77 cases discussed in telephone enquiries with NPIS since 2008, 11 (seven male, four female) are known to have died, including six reported to NPIS during 2015. NPIS is well positioned to continue this epidemiological work.

Carbon monoxide

Carbon monoxide (CO) remains an important cause of illness and occasionally death in the UK. During the year, the NPIS established a collaboration with the Gas Safety Trust to try to increase the amount of information available on exposures to CO in the UK. This year, it received information on 516 exposures to CO involving at least 752 individuals.

Electronic nicotine delivery systems

The use of electronic nicotine delivery systems, including electronic cigarettes or e-cigarettes, continues to increase within the UK. The contents of e-cigarettes and their liquid refills vary, but many contain substantial amounts of nicotine, a highly toxic compound. Refill solutions contain larger quantities of fluid than individual e-cigarettes making them even more hazardous, particularly to children.

The NPIS received 272 telephone enquiries about e-cigarettes or refill solutions during 2015/16, a continuation of the year-on-year increase we have seen over the last five years. Thirty seven per cent of cases involved children under five years, a 48% increase on last year. Eighty three per cent of exposures were accidental. Of 21 reported cases of eye contact, eight occurred when the liquid was mistaken for eye drops, while five further cases occurred after the person mistook the liquid for ear drops. Eleven patients had moderate toxicity while three users experienced a cardiac arrest, one of whom died. These data emphasise the need for safe storage and packaging of these products, an issue addressed by the implementation of the Tobacco and Related Products Regulations in 2016.

Iron poisoning

Iron poisoning is one of the most potentially serious forms of poisoning in the UK. However, there is little data available on the most appropriate dose and duration of treatment with the

antidote desferrioxamine (DFO). NPIS therefore set up a prospective study in 2014. Over two years, NPIS received 1,210 calls relating to iron exposures, of which 397 related to patients in hospital who met one of the four criteria for follow-up, including 16 patients aged 15 or younger and four patients under five years. Although serious toxicity was rare, there were four patients who died, likely all from complications of other drugs taken in overdose or other pre-existing conditions. Forty eight patients required the antidote desferrioxamine (DFO) following iron overdose. Four patients received greater than the current recommendations of 80 mg/kg before reassessment. However, no adverse events were recorded. This study showed that enquiries about iron poisoning are an important part of NPIS's workload but that fewer cases are severe and relatively few patients needed antidotes (for example, compared with the 40-50% of paracetamol-poisoned patients who receive the antidote acetylcysteine).

Pesticides

The NPIS has surveyed pesticide and biocide exposures requiring medical attention in the UK on behalf of the Department for Environment, Food and Rural Affairs (Defra) since 2004 using accesses to 1,900 different TOXBASE entries and calls to the NPIS telephone service.

During 2015/16, the NPIS collated information on 1,107 exposures detected during the year, most (86%) being unintentional acute exposures. The agents most commonly involved in exposures, similar to previous years, were glyphosate, permethrin and metaldehyde. Most of the cases were not associated with toxicity, but there were three cases (0.3%) with severe toxicity and one death was reported following ingestion of paraquat. Eight exposures occurred in pregnant women. Fortunately, none were severe. The pesticide surveillance project continues to outperform all other systems in the UK in terms of cases identified and to offer invaluable information on the circumstances of exposure and acute effects of pesticide exposure.

Household products

The NPIS continues to study exposures to household products and is at the forefront of global efforts to understand the potential ill-effects, particularly amongst children, of these commonly and widely used chemical products.

Soluble film automatic dishwashing tablets, unlike their traditional individually wrapped solid predecessors, require no removal from an outer protective wrapper, reducing user contact and potentially increasing safety. Retrospective analysis of NPIS enquiries relating to these soluble film tablets found 498 enquiries over eight years from 2008 to 2015, almost all occurring at home (98%) and involving ingestion (96%) and children under five years old (93%). Reported clinical effects included vomiting (26%) and less commonly coughing and rash, as well as conjunctivitis from eye contact. No cases of severe toxicity were reported.

Automotive screenwashes may contain a mixture of ethylene glycol, methanol, isopropanol, and/or ethanol, alone or in combination with the other ingredients, at sometimes high concentration. Enquiries to the NPIS were analysed retrospectively for the four-year period January 2012 to December 2015. There were 295 enquiries involving 255 exposures, the majority of which followed ingestion (94.5%). Reassuringly, for such potentially toxic chemicals, clinical features were uncommon. The vast majority were asymptomatic or showed minor features of poisoning.

Oven cleaning products often contain corrosive substances, typically sodium or potassium hydroxide in concentrations of up to 30%. Retrospective analysis of NPIS enquiries relating to oven cleaning products found 780 cases over seven years from 2009 to 2015. Ingestion alone (36.5%) or skin contact alone (26.7%) accounted for the majority of cases. Fortunately, severe toxicity was rare, with 3% of patients developing moderate or severe toxicity and no deaths.

Poisoning in children

Over a quarter of telephone enquiries to the NPIS relate to exposures in children under five years of age. Few of these ingestions result in harm and the frequency of hospital admissions of children due to unintentional poisoning has been declining in the UK over the past 10 years. However, severe poisoning does still occur.

Unfortunately, there is little information about severe and fatal medicine poisoning in young children. To address this, the NPIS set up a study, complementing NPIS data on severe childhood poisoning with data from other national sources. Over 13 years, 28 children under five years died from unintentional pharmaceutical poisoning and over 11 years, 201 were admitted to intensive care. The study identified that the long-acting opioid medicine, methadone, was responsible for a disproportionate number of deaths and severe poisonings in young children. Further action is required to inform prescribers and carers of young children about the dangers of this medicine.

Education and research

NPIS and UKTIS staff continue to be active in education and research, with 76 manuscripts and 18 abstracts published in the scientific literature during 2015/16, including almost the entire contents of two volumes of the CPD journal ‘Medicine’. NPIS also hosts an active e-learning resource – TOXlearning – with almost 2,900 registered users and regularly contributes to CPD days for emergency medicine, intensive care and medical consultants and trainees.

1. Introduction

This report provides statistical information on the work of the NPIS and shows how different elements of the service work together. It also provides examples of NPIS activity and the value of data collected by the NPIS units, including data on drugs of abuse, 2,4-dinitrophenol and carbon monoxide poisoning across the UK, amongst others.

The NPIS is a network of dedicated units that is commissioned by Public Health England (PHE) on behalf of the UK health departments. All the NPIS units are linked to clinical treatment facilities within UK teaching hospitals.

The NPIS has provided information to healthcare workers in the UK by telephone since 1963. The poisons information database TOXBASE® * (www.toxbase.org) was developed in 1982 and in 1999 it was transferred online and adopted as the first-line information source for healthcare professionals in the UK. While the structure of the NPIS has changed over the years, its focus has always been to assist colleagues throughout the NHS to manage poisoned patients. The information and advice on TOXBASE is updated regularly and based on published literature, experience from NPIS telephone enquiry data, and direct clinical experience of treating poisoned patients in NPIS-linked clinical departments.

In 1995, UKTIS moved to Newcastle to become an integral component of NPIS activities. This report demonstrates the importance of UKTIS both for supporting women of child-bearing age, and their healthcare providers, and for collecting new information on the potential effects of exposure to drugs and chemicals during pregnancy, including the therapeutic use of medicines.

Poisoning continues to be an important public health issue in the UK. It accounts for around 170,000 NHS hospital admissions in the UK each year, a considerable workload for health service staff, especially in hospital emergency departments and medical admission units. The majority of poisoning in adults is related to self-harm, while unintentional poisoning is common in children.

Many thousands of different agents may be involved, making it very difficult for NHS staff to keep up to date on diagnosis and management, especially when new or unfamiliar agents are involved. In addition, around 40% of adults who poison themselves take alcohol at the same time which complicates identification of the poison taken, clinical assessment and management. Most hospitals do not have specialist clinical toxicology services, therefore access 24 hours a day to high-quality information and clinical advice about poisoning is essential for the safe and effective management of these patients.

A further current issue is the emergence of new drugs of misuse that present a particular challenge (see Section 6.1). The pattern of prescription drugs taken in poisoning has also

changed. For example, newer antidepressants and antipsychotic drugs are increasingly involved as the use of older, and sometimes more toxic, agents declines.

Hospital admission data, illustrated by NHS hospital episode statistics, do not reflect the very many poisoned patients who present to emergency departments across the UK but are discharged without admission. Nor does this data reflect the very large number of enquiries about suspected or actual poisoning received by the NHS advice services (NHS 111 in England, NHS 24 in Scotland and NHS Direct in Wales). The NPIS provides advice to emergency departments and NHS public access helplines to help their staff decide which patients need admitting to hospital and which can be managed safely at home. In this way NPIS services directly support appropriate triage, referral, assessment and treatment of patients at all levels of the NHS.

A key component of the services provided by the NPIS is obtaining information from treating clinicians on the effects and ultimate outcomes of cases of severe or unusual poisoning – this assists in providing current and accurate advice. The NPIS is trying to improve collaboration with users to improve feedback.

The NPIS is funded primarily through ‘government grant in aid’ from the UK health departments but receives some contract income for providing services in other territories and research income for specific projects. Overall funding for the service has reduced in real terms in recent years. As a consequence, there has been a reduction in the number staff employed for NPIS work by contributing NHS organisations.

* TOXBASE® is a registered trademark of the UK National Poisons Information Service

2. Structure of the NPIS

The NPIS provides a 24-hour, 365 days a year, consultant-supported clinical toxicology advice service to assist healthcare workers in their diagnosis and management of poisoned patients, including those exposed in chemical incidents.

The four NPIS units are currently based within NHS teaching hospitals (two in England and one each in Scotland and Wales). Three of the units (Birmingham, Cardiff and Newcastle) respond to telephone enquiries 24 hours a day based upon a national rota; the Edinburgh unit takes telephone enquiries during the working day while focusing on editing and production of the TOXBASE database.

The four units also take telephone calls about chemical incidents and forward this information to the Centre for Radiation, Chemical and Environmental Hazards (CRCE) of Public Health England (PHE). Reductions in numbers of information scientists employed for NPIS work in the contributing units has created pressure on rotas and reduced the capacity of the service for other work, including the maintenance of the TOXBASE database.

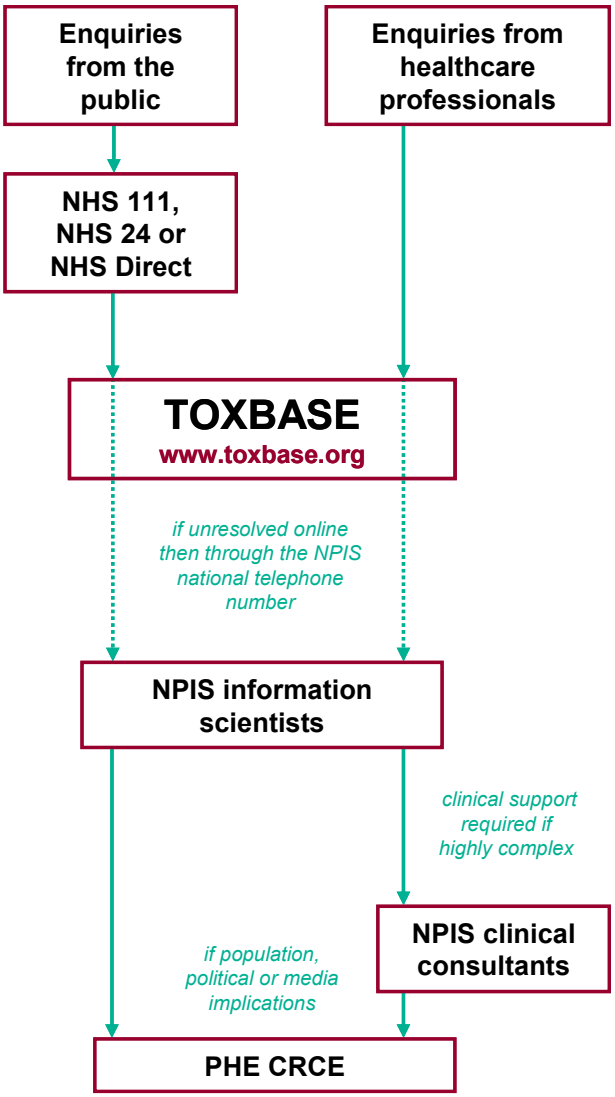

Figure 2.1 How poisons enquiries are answered

The service has 24-hour consultant clinical toxicologist support available to advise on the management of more seriously unwell patients. This is provided by NHS consultant staff in all four NPIS units and colleagues in two other NHS hospitals (Guy's and St Thomas' NHS Foundation Trust and York Hospitals NHS Foundation Trust). These NPIS consultant clinical staff also provide specialist services in clinical toxicology in their own hospitals. The availability of this expertise is important for UK resilience.

Because the NPIS receives many enquiries about children and from emergency departments, it has formalised existing support from consultants in paediatrics and emergency medicine.

The primary source of information provided by the NPIS is through its online database, TOXBASE (www.toxbase.org), which is available without charge to all UK NHS healthcare units who register for it, including hospital departments, primary care practices and NHS advice services – NHS 111, NHS 24 and NHS Direct. Ensuring that the information and management advice provided by TOXBASE is evidence-based and up to date is of paramount importance for patient safety and for maintaining the confidence of healthcare professionals in the website.

It is essential that the great majority of enquiries are made via the website as NPIS does not have the capacity to absorb the substantial increase in telephone enquiries that would result from TOXBASE information becoming outdated.

The TOXBASE app for iOS and Android mobile devices is also available without charge to UK NHS healthcare professionals. It provides the same information as TOXBASE but has the advantages of being available on personal mobile devices and being available offline.

TOXBASE is written to provide the majority of information required for the safe management of poisoned patients. However, it cannot provide all the answers for individual patients or complex cases and healthcare workers are encouraged to discuss more complex cases with the NPIS.

To this end, the NPIS provides a 24-hour telephone information service for healthcare professionals using a single national telephone number (0344 892 0111) for when such further advice or information is needed (see Box 2.1). NPIS activity is reflected in TOXBASE user sessions, TOXBASE page load views, TOXBASE app accesses and telephone enquiries.

When first received (Figure 2.1), telephone enquiries are managed by specialists in poisons information (SPIs). SPIs may have a scientific, nursing or pharmacy background, are qualified to at least degree level and usually also hold postgraduate qualifications in toxicology. In deciding the severity of each case, the SPIs use the WHO/IPCS/EC/EAPCCT poisoning severity score (PSS) to determine the severity of each case, with a PSS score of one being minor, two moderate, and three severe.[1] Enquiries about complex or severe cases are referred on to NPIS consultant staff on a 24/7 basis.

Audio recordings of all NPIS telephone enquiries are retained for governance purposes and clinical data is logged within a specially designed national database, the UK Poisons Information Database (UKPID). Data is uploaded to a central server, allowing access by other NPIS units that may be involved in managing a particular patient. This also allows easy collation of activity data and surveillance of the patterns of enquiries received.

The clinical information can help the treatment of subsequent similar cases. Data from UKPID can be used to support UK pharmaceutical licensing decisions by the Medicines and Healthcare Products Regulatory Agency, and for studying the epidemiology of poisoning as reported to the NPIS.

BOX 2.1 BT Cloud telephone system

Since June 2012, enquiries to the NPIS have been delivered by the BT Cloud telephone system. The Cloud system ensures that enquiries are routed to appropriately skilled NPIS staff members who are logged into the system, irrespective of location.

The BT Cloud system has been designed to accommodate all services provided by the NPIS (ie poisons, teratology and chemical) and the NPIS national rota and provides improved functionality, increased resilience and more efficient cooperative working between the NPIS units across the UK. Enquiries can be transferred, conference calls established and real-time reporting facilities made available. NPIS specialists in poisons information and consultants can also log in remotely, allowing rapid upscaling of telephone staffing if this is needed.

In Northern Ireland, the Regional Medicines and Poison Information Service in Belfast provides a daytime poisons information service. Out-of-hours enquiries from healthcare professionals are referred to the NPIS. The NPIS is also contracted to provide poisons information for users in the Republic of Ireland by providing TOXBASE access to major hospital emergency departments and to the National Poisons Information Centre in Dublin, as well as out-of-hours telephone support.

Information on the potential toxicity of drugs and chemicals in pregnancy is provided by UKTIS, both by telephone, by detailed information for health professionals held on TOXBASE, summary information held on the UKTIS website and public advice leaflets held on the best use of medicines in pregnancy (***bumps***) website. UKTIS (previously the National Teratology Information Service, NTIS) was established as part of NPIS Newcastle in 1995.

The NPIS maintains a consistent approach, irrespective of the NPIS unit answering an enquiry, through a formal UK-wide strategic framework for training and governance, agreeing clinical advice and supporting the management of the service. Operating procedures are updated regularly and made available to NPIS staff on TOXBASE.

Commissioning issues are dealt with by the PHE NPIS Commissioning Group, which meets at least quarterly. Clinical issues, including clinical governance, are discussed by the NPIS Clinical Standards Group, which also meets at least quarterly. These meetings are attended by a representative of the commissioner, a senior clinician from each of the four units and a senior specialist in poisons information from the service. Invitations are also sent to representatives of the National Poisons Information Centre in Dublin. Other senior NPIS staff are invited to attend as observers on a rotational basis.

BOX 2.2 TOXBASE editing

TOXBASE is produced and maintained by the NPIS, within an audit framework of user feedback and clinical governance. TOXBASE has seen continued growth in usage since its internet launch in 1999 and deals with over 90% of all enquiries to the NPIS from the UK (the total for 2015/16 being in excess of 660,000). Since 1999, UK health policy has been that TOXBASE should be the first (and often only) point of information for poisons enquiries.

Therefore, it is essential that the information it contains is kept as up to date and as relevant as possible. Keeping the monographs up to date creates a very substantial workload that is shared by all the NPIS units while being led from Edinburgh. Revising TOXBASE entries is a complicated process involving a comprehensive literature search together with information from case-based experience to develop clinical advice through a robust, defendable, editing process, inclusive of explicit clinical governance processes.

All TOXBASE entries are peer reviewed before publication and key entries, eg for highly toxic agents or commonly accessed agents, are agreed at a national level before being published. The NPIS TOXBASE Editing Group includes representatives of clinical and information staff from all four NPIS units, representatives from related poisons centres and a public health physician or scientist from the PHE Centre for Radiation, Chemical and Environmental Hazards. It meets four times a year by web/teleconference to agree policy for TOXBASE development, discuss the format of TOXBASE monographs and agree and prioritise work programmes.

Areas of clinical controversy or uncertainty are discussed at the TOXBASE Editing Group and/or by the NPIS Directors at the quarterly NPIS Clinical Standards Group meetings, as appropriate. Monthly literature reviews are circulated as ‘Current Awareness in Clinical Toxicology’ (see Section 3.4) to assist in updating TOXBASE.

The NPIS aims to review each of the approximately 17,000 entries on TOXBASE at least every four years, requiring the review of over 4,000 entries in a typical year. During 2015/16, 3,875 entries were added or edited.

An important component in the review process of TOXBASE entries is user feedback from a variety of sources, eg the TOXBASE quality assurance forms (see Section 5.2), questionnaires on TOXBASE for new and unusual products, responses to follow up on cases of interest, or by email, letter or telephone. Users may also raise queries on existing entries or provide clinical data. Any issues specific to entries are dealt with as they arise or discussed at the TOXBASE Editing Group and/or NPIS Clinical Standards Group meetings.

To ensure a common and evidence-based approach to the clinical management of poisoning, all NPIS clinical and information staff are invited to attend continuing professional development (CPD) meetings which deal with new data and important clinical issues. These occur up to four times a year and are hosted by all the NPIS units in turn.

There are regular teleconferences of the TOXBASE Editing Group to ensure consistent and nationally agreed database content (see Box 2.2). The National Poisons Information Centre in Dublin and the Northern Ireland Regional Medicines and Poison Information Service also contribute to TOXBASE development and review. The UKPID User Group meets regularly to discuss issues relating to this IT platform.

Reference

1 Persson HE et al. Poisoning severity score. Grading of acute poisoning. *J Toxicol Clin Toxicol* 1998; 36: 205-13.

3. NPIS activities in 2015/16

3.1 Overall service profile

Direct use of TOXBASE online by healthcare professionals continued to rise in 2015/16 as reflected by increased TOXBASE user sessions and individual page loads (or accesses) (Figure 3.1.1). There was also a substantial increase in use of the TOXBASE app by healthcare professionals in the UK, with over 23,000 product accesses made during the first 9 months following its re-launch in September 2015. This is in addition to the page loads reported above for the online use of TOXBASE. The total number of TOXBASE user sessions (defined as one logon to the TOXBASE site during which the user may access one or more products several times) was 660,940, an increase of 5.1% on the figure for 2014/15 (628,740).

There were 1,930 referrals to consultant toxicologists in 2015/16. As noted in last year's report, the large number of consultant referrals in 2012/13 and 2013/14 coincided with major changes to the treatment of paracetamol overdoses in the UK. Taking that into account, the number of consultant referrals in 2015/16 are consistent with the underlying upward trend in referrals since 2000 (Figure 3.1.1).

In 2015/16 there were 47,873 telephone enquiries, 46,885 of which were patient-related. This number has remained consistent since 2006/7 and reflects the sub-set of more complex or unusual enquiries (~10% of the number of enquiries received pre TOXBASE online) that cannot be answered by reference to TOXBASE alone. This emphasises the importance of maintaining TOXBASE as the primary source of poisons information, as small reductions in use of TOXBASE would result in substantial increases in telephone enquiry numbers.

Educational and international users and user sessions from all NPIS units, the Northern Ireland Regional Medicines and Poison Information Service, and National Poison Information Centre, Dublin, have been excluded from further detailed analyses. This is because poison centres also access TOXBASE to answer telephone enquiries, for training/educational purposes and to access operating procedures or for monograph-writing purposes (NPIS units only). Therefore, a total of 608,868 user sessions originating from healthcare workers in England, Northern Ireland, Scotland and Wales have been analysed further in this report. The total number of user sessions originating in the UK has increased by 5.2% compared with the 2014/15 figure (578,764).

There were 1,943,950 individual views of product pages in 2015/16 (several product pages might be accessed during a single user session), up from 1,858,979 in 2014/15, an increase of 4.5%. Applying the same criteria as for session data gives a total of 1,686,409 page views from UK-based, non-poisons centre users. This number is an increase of 5.4% on the 2014/15 figure (1,599,458).

As in previous years, hospital departments were responsible for the majority (65.2%) of TOXBASE sessions in 2015/16 with the majority of hospital enquiries (340,741; 86.1%) originating in hospital emergency departments.

By mid-2015, the UK population had increased by 4.6% from mid-2010. Table 3.1.1 demonstrates that the increase in rate at which healthcare professionals access TOXBASE per head of population has far exceeded the rate at which the UK population has grown. TOXBASE user sessions per head of population have increased by 30% over the past five years.

As hospital episode statistics for England do not show a significant increase in the number of poisoned patients attending emergency departments in recent years (see www.hscic.gov.uk; 152,483 patients in 2011/12 and 153,621 in 2012/13) then the increase in user sessions is likely due to a familiarity and reliance on TOXBASE by UK healthcare professionals when treating poisoned patients. Furthermore, 171,000 poisoned patients attended emergency departments in England in 2013/14 (www.hscic.gov.uk) and in that year there were 270,321 user sessions originating from emergency departments in England. This suggests that TOXBASE is frequently accessed more than once in relation to many of these poisoned patients.

Figure 3.1.2 shows that following the recent transition from NHS Direct to NHS 111 in England the number of telephone enquiries received from triage services has increased while the number of TOXBASE user sessions has decreased. The move to NHS 111 was completed in 2014; the trend seems to have remained the same.

The majority of telephone enquiries received in 2015/16 related to accidental (53.2%) ingestions (86.2%) of pharmaceuticals (61%) at home (86.7%). Similar to previous years, 20% (9,378) of all enquiries received in 2015/16 related to exposures that occurred intentionally. Thirty per cent (14,022) of all telephone enquiries in 2015/16 related to children aged four years or under (Figure 3.1.3).

Regardless of which information source users choose to use, the top pharmaceutical agents involved in information requests are similar (Table 3.1.2), as are the types of agents involved in telephone enquiries and TOXBASE accesses (Figure 3.1.4).

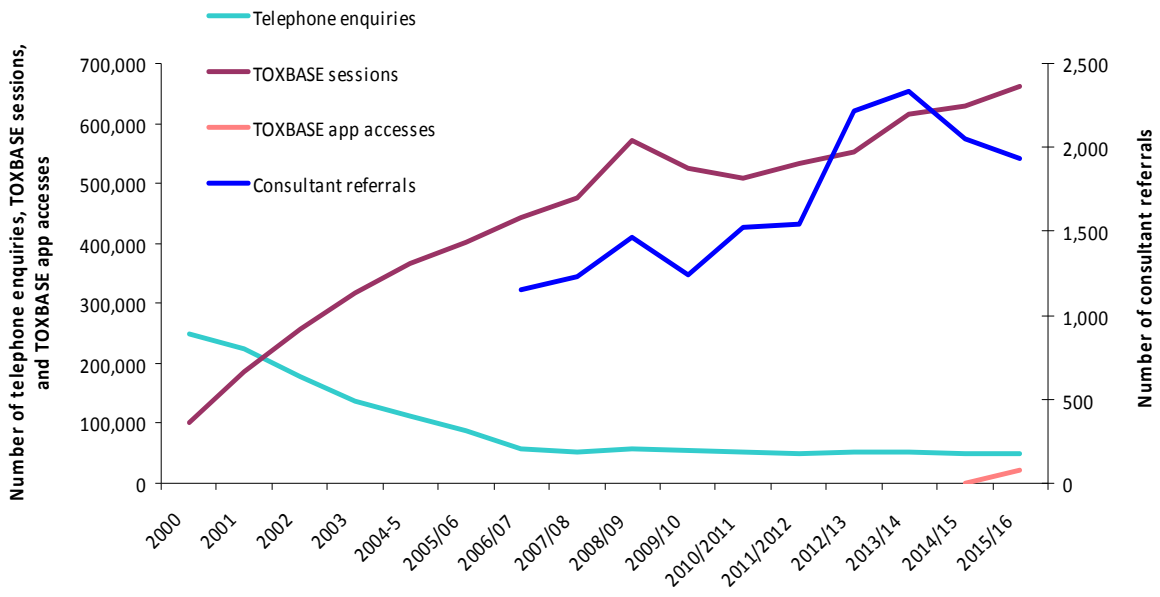

Figure 3.1.1 Annual number of telephone enquiries to NPIS, TOXBASE sessions, consultant referrals and TOXBASE app accesses from 2000 to 2015/16

Table 3.1.1 Country of origin of TOXBASE user sessions together with rate of enquiry per 100,000 population in 2010/11 and 2014/15

	2010/11		2015/16	
Country	**Number**	**Rate per 100,000 population***	**Number**	**Rate per 100,000 population****
England	376,657	721.1	502,476	917.2
Northern Ireland	10,620	590.2	13,475	727.7
Scotland	49,807	953.8	60,533	1,126.6
Wales	28,027	932.2	30,384	980.4
UK	**465,111**	**747.0**	**606,868**	**932.0**

** Based on mid 2010 population estimates viewed June 2011 (UK total = 62,261,300)*
www.statistics.gov.uk/statbase/Product.asp?vlnk=15106

*** Based on mid 2015 population estimates viewed July 2016 (UK total = 65,110,000)*
www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2015

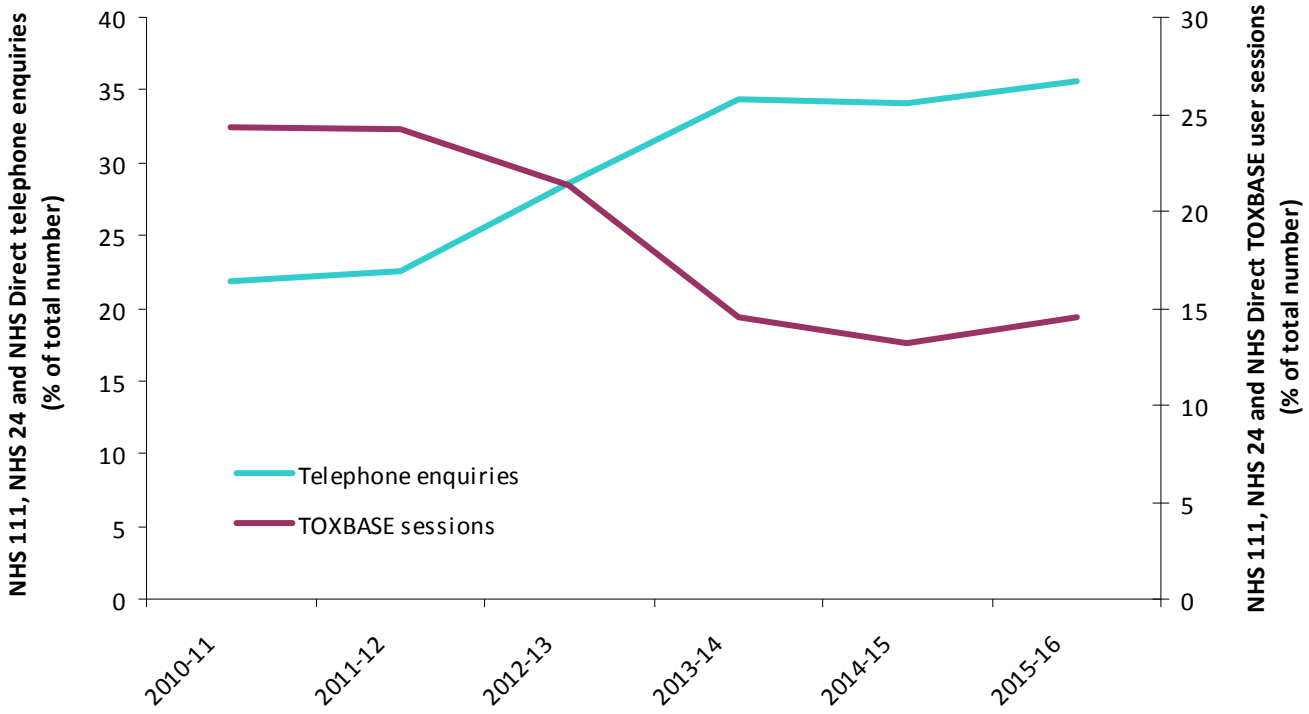

Figure 3.1.2 Number of telephone enquiries received from NHS 111, NHS 24 and NHS Direct users relative to the number of TOXBASE sessions originating from NHS 111, NHS 24 and NHS Direct units

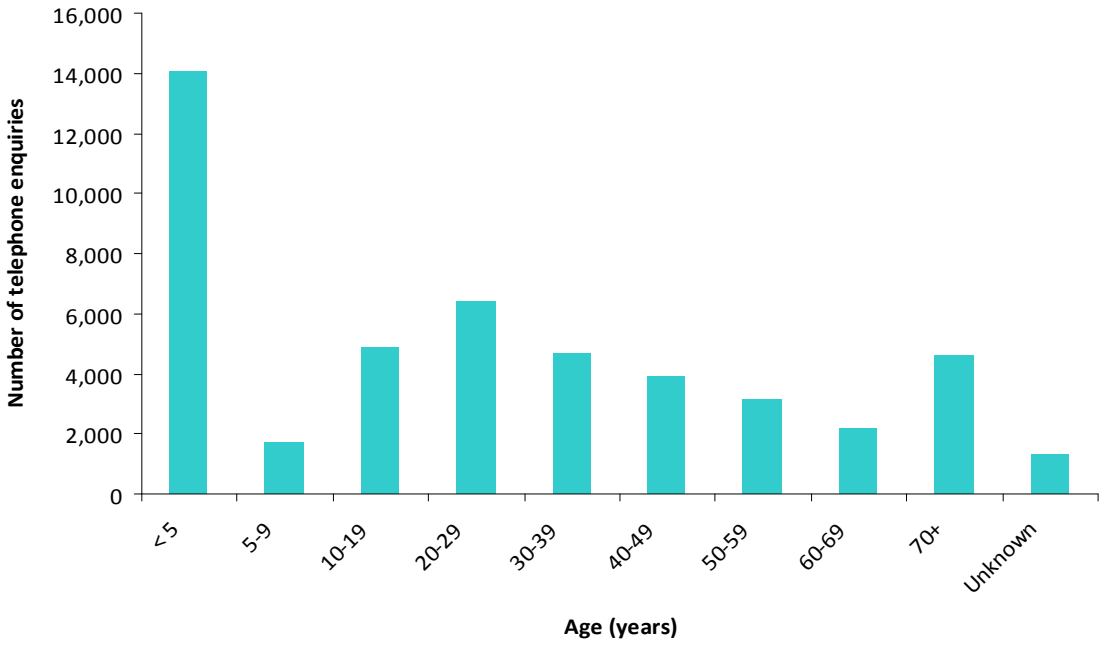

Figure 3.1.3 Age of poisoned patients as reported in telephone enquiries to the NPIS in 2015/16

Table 3.1.2 Pharmaceutical agents: top telephone enquiries, TOXBASE online and TOXBASE app accesses in 2015/16

	Telephone enquiries		TOXBASE online accesses		TOXBASE app accesses	
Rank	Agent	Number	Agent	Number	Agent	Number
1	Paracetamol	5,116	Paracetamol	186,444	Paracetamol	1,754
2	Ibuprofen	2,208	Ibuprofen	54,451	Amitriptyline	515
3	Co-codamol	1,369	Codeine phosphate	39,148	Ibuprofen	314
4	Sertraline	755	Diazepam	29,009	Sertraline	304
5	Diazepam	742	Sertraline	28,927	Diazepam	300
6	Citalopram	699	Citalopram	24,475	Citalopram	266
7	Mirtazapine	683	Mirtazapine	21,395	Zopiclone	255
8	Zopiclone	622	Zopiclone	20,344	Tramadol	218
9	Tramadol	616	Quetiapine	20,170	Mirtazapine	203
10	Quetiapine	588	Tramadol	19,840	Quetiapine	203

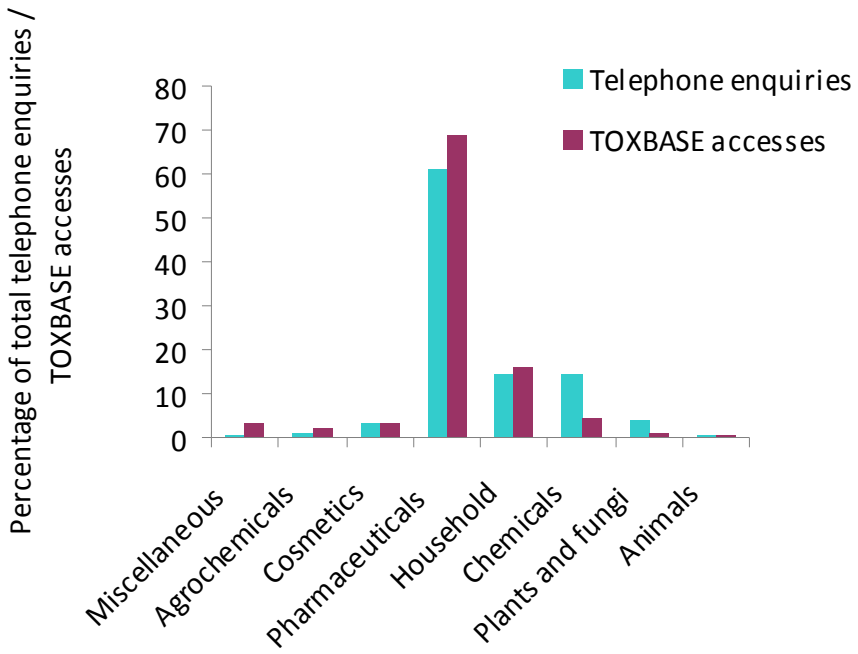

Figure 3.1.4 Types of agents involved in telephone enquiries to the NPIS and TOXBASE accesses in 2015/16

3.2 Consultant referrals

Background

The NPIS has operated a national consultant clinical toxicology on-call rota for the UK and the Republic of Ireland (out-of-hours) since May 2005. Thirteen consultant clinical toxicologists from the four NPIS units and three consultants from hospitals in York and London contribute to out-of-hours cover (weekdays 18:00–09:00 hours, weekends and public holidays).

All staff on the rota are involved in the care of poisoned patients in their own local NHS hospitals. A nationally agreed protocol is used to determine when specialists in poisons information should refer enquiries to a consultant. The national consultant rota is managed from NPIS Edinburgh.

For daytime cover, units make local arrangements and may be supported by consultants, academic clinical staff and specialist registrars who are not on the UK NPIS consultant toxicologist rota, but all enquiries are answered under the supervision of NPIS consultants.

NPIS Edinburgh also provides consultant support for enquiries from Northern Ireland during the working week. Units provide cross-cover in emergencies and occasionally support colleagues in other units during the working week.
Details of all telephone calls to the NPIS are stored on the UKPID central server and sent to the relevant consultant for local or national audit and checking. In addition, consultants keep contemporaneous local records of advice given which are added to the records by the NPIS unit that took the original call.

Consultant referrals

There were 1,930 referrals made to NPIS consultants (daytime and out-of-hours) in 2015/16, a decrease of 5.8% on 2014/15 (Figure 3.1.1). Figure 3.2.1 shows the number of referrals by month over the past three years. The distribution of these referrals by day of the week is shown in Figure 3.2.2. The median number of referrals per day was five (interquartile range, IQR, 3-7), with fewer referrals at the weekend. Referrals by country are shown in Table 3.2.1. The great majority of consultant referrals came from calls originating in hospitals (1,736 or 89.9%: Table 3.2.2), with calls from GPs/primary care being the next most common source (118 or 6.1%). The proportion of consultant referrals following calls from NHS 111, NHS 24 and NHS Direct, which had previously been dropping (5.9% in 2012/13, 1.9% in 2013/14, 1.1% in 2014/15), rose slightly to 1.5% of referrals.

The enquiries

Table 3.2.3 shows the most common types of agents involved in referrals to consultants. Heading the list are products containing paracetamol, drugs of misuse, digoxin and toxic alcohols or glycols (eg ethylene glycol, methanol and antifreeze). For 153 referrals, the product taken (if any) was unknown and help with diagnosis was required. Ethanol was reported to be involved in 134 consultant referrals.

Feedback into NPIS services

Analysis of the consultant referrals is used to improve the services offered by the NPIS. Outcomes include additions and changes to TOXBASE entries that reflect user needs.

Issues highlighted by difficult or complex calls are discussed further among NPIS staff by email or telephone at regular TOXBASE Editing Group meetings or at the NPIS CPD meetings.

Conclusions

The NPIS national out-of-hours on-call consultant rota continues to work well. Frequent contact by email and telephone – together with regular educational meetings – helps to ensure consistency of advice and patient care. Information gleaned from analysis of the enquiries has assisted in identifying toxicological and methodological problems, improving the clarity of TOXBASE entries and informing the need for research in a number of areas.

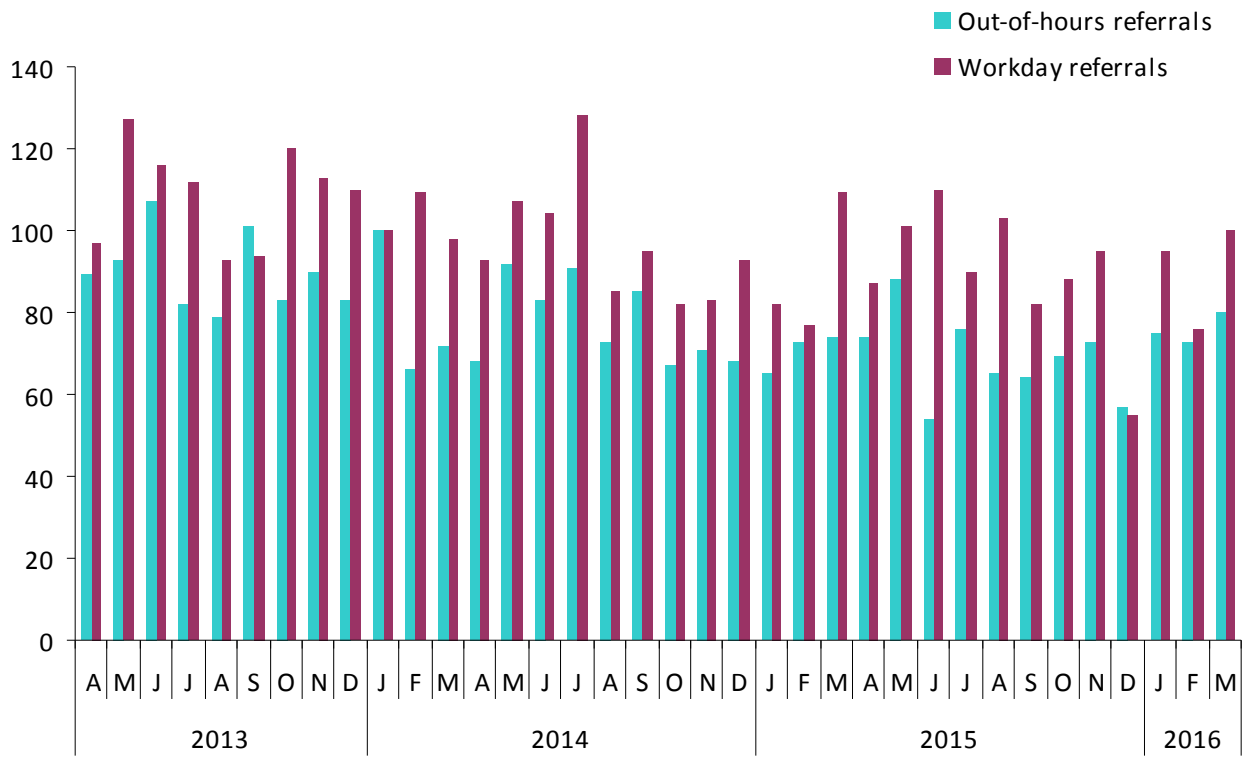

Figure 3.2.1 Monthly consultant referrals (give as out-of-hours and workday referrals) from April 2013 to March 2016

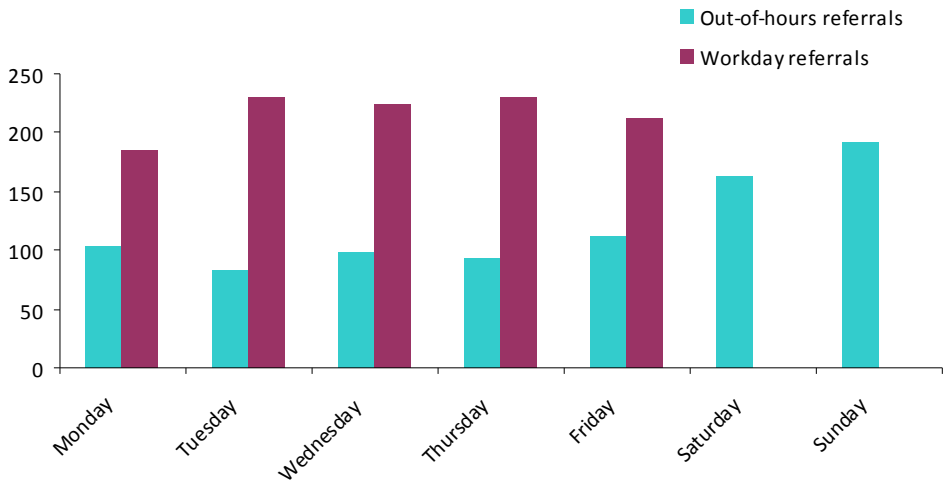

Figure 3.2.2 NPIS consultant referrals by day of the week (given as out-of-hours and workday referrals) in 2015/16

Table 3.2.1 NPIS consultant referrals by country in 2015/16, with 2014/15 percentage values for comparison

	2015/16			
Country	**Number of referrals**	**Rates per 100,000 population***	**% in 2015/16**	**% in 2014/15**
England	1,508	2.8	78.2	77.8
Northern Ireland**	27	1.5	1.4	1.3
Scotland	224	4.2	11.6	12.1
Wales	138	4.5	7.2	6.0
Republic of Ireland	27	-	1.4	2.1
Other & unknown	15	-	0.3	0.7
Total	**1,930**			

** Based on mid 2015 population estimates viewed July 2016 (UK total = 65,110,000)*
www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2015

*** overnight cover only*

Table 3.2.2 NPIS consultant referrals from hospital by department in 2015/16

Source	Number of referrals	% of total (1,930)
Emergency departments	824	42.7
Intensive care units	357	18.5
Other hospital units	131	6.8
Paediatrics	147	7.6
General medicine	101	5.2
Admission/assessment units	72	3.7
Unspecified hospital units	52	2.7
Medicines information & pharmacy	16	0.8
Surgical	14	0.7
Psychiatric units	11	0.6
Minor injuries units	11	0.6
Total	**1,736**	

Table 3.2.3 Agents commonly involved in NPIS consultant referrals in 2015/16

Rank	Agent	Number of referrals
1	Paracetamol (including 68 co-codamol)	374
2	Drugs of misuse	215
3	Drug/substance unknown	153
4	Digoxin	69
5	Ethylene glycol, methanol and antifreeze	68
6	Bites and stings	61
7	Citalopram	60
8	Ibuprofen	57
9	Amlodipine	52
10	Amitriptyline	51

3.3 NPIS Product Data Centre

In order for the NPIS to provide accurate advice on the treatment and management of patients exposed to consumer products, reliable information on the composition of these products is necessary. Manufacturers' SDS also provide information for updating TOXBASE, enabling end-users to obtain specific advice on many common products. All NPIS staff have 24/7 access to the NPIS Product Data Centre.

NPIS Birmingham has the responsibility for the NPIS Product Data Centre and for liaising with manufacturers to ensure that the data held is comprehensive and up-to-date. In 2015/16, 43,000 SDS were added to the NPIS Product Data Centre which now holds 174,000 current SDS. The database is indexed by product name, manufacturer, date of SDS and the accession date for the SDS to the database. If these fields are insufficient, the database is also fully text searchable, which enables searches to be made on any other criteria, eg active ingredients or use.

3.4 NPIS Literature database and Current Awareness in Clinical Toxicology

To ensure that NPIS staff are equipped to answer enquiries on all aspects of human toxicology and that TOXBASE is kept up to date, access to current scientific literature is essential. All NPIS staff have 24/7 access to the NPIS literature database, which was created and is maintained by NPIS Birmingham. The database currently contains 115,000 citations on all aspects of clinical, occupational and environmental toxicology. In 2015/16 7,500 references were added to the database, which is fully searchable using keywords, authors, journals and text words. Citations are selected using searches specially developed for the purpose run against Medline, Embase and Science Direct. In addition, the tables of contents of key journals are scanned for suitable papers on publication.

With the assistance of the other NPIS units, NPIS Birmingham produces ‘Current Awareness in Clinical Toxicology’ each month. Each issue lists more than 500 citations, with 15 to 20 key papers highlighted because of their importance to the clinical management of poisoning and the updating of TOXBASE. Current Awareness is distributed by the international clinical toxicological societies to all poisons units worldwide. The underlying database, including monthly updates, is provided to all NPIS staff for inclusion in their personal citations manager (Reference Manager™ or End Note™).

3.5 NPIS website

This website (www.npis.org) is focused primarily on providing information to members of the public. It contains information on the structure and function of the NPIS, details of the range of services provided to health professionals on all aspects of poisoning and links to affiliated organisations and relevant websites. Visitors to the website can also download NPIS publications, including annual reports back to 2004.

The website was created and is maintained by NPIS Birmingham in collaboration with the other units. The website is updated continuously, particularly with the data in each new annual report. Between April 2015 and March 2016, the site had 40,000 visitors, 75,000 page views and 3,400 documents were downloaded, the most popular were the latest two NPIS annual reports. Visitors came predominantly from the UK, the US, Australia, Ireland, India and Germany.

3.6 TOXBASE app for iOS and Android mobile devices

Developed in response to advancing technology and user feedback, the TOXBASE app for iOS and Android mobile devices offers greater user mobility and - for the first time - makes TOXBASE information available offline. The app was first made available in October 2012 for iPhone and iPad and for Android devices in May 2013. At that time an annual subscription was payable by all users. Uptake was steady, but low, with 458 subscribers as of 31 March 2015. On 27 September 2015 a new version of the app was launched providing NHS and PHE users with full and free access. NHS/PHE subscribers validate their accounts using their NHS/PHE email addresses. For non-NHS subscribers, a ‘paid’ version of the app is available which contains around 1,000 key TOXBASE entries considered by the NPIS to be most useful to those seeking poisons information from around the world. Funds from the small fee charged are used to fund development and hosting costs.

By the end of March 2016 there were 4,435 current subscribers (3,502 NHS/PHE (79%) and 316 non-NHS/PHE), a 10-fold increase (Figure 3.6.1). Included within this total are the NPIS physicians and specialists in poisons information who have access to support their NPIS duties and increase service resilience in case of local or national failures of internet access. Only 3.2% of subscribers were located outside the UK. The top workplace and user type are shown in Table 3.6.1 with ambulance personnel the most common.

Over a six-month period, subscribers accessed 18,822 product pages, 3,752 information pages and 643 antidote pages. Table 3.6.2 shows the top product pages being accessed on the app.

Table 3.6.1 Top workplace and user type of current TOXBASE app subscribers September 2015 to March 2016

Workplace type	NHS/PHE	Non-NHS	All
Ambulance	1,847 (53%)	80 (25%)	1,927 (43%)
Emergency department	544 (16%)	112 (35%)	656 (15%)
Admissions	250 (7%)	20 (6%)	270 (6%)
ITU/HDU	222 (7%)	21 (7%)	243 (5%)
General practice	249 (7%)	28 (9%)	277 (6%)
Pharmacy	56 (2%)	13 (4%)	69 (2%)
Psychiatry	52 (1%)	3 (1%)	55 (1%)
User type	**NHS/PHE**	**Non-NHS**	**All**
Doctor	1,139 (33%)	171 (54%)	1,310 (30%)
Ambulance*	1,492 (43%)	62 (20%)	1,554 (35%)
Allied health professional*	425 (12%)	24 (8%)	449 (10%)
Nurse	237 (7%)	22 (7%)	259 (6%)
Pharmacist	57 (2%)	11 (3%)	68 (2%)

** many of those working within ambulance services select 'allied health professional' when registering*

Table 3.6.2 Top product pages accessed on the TOXBASE app September 2015 to March 2016

	Product pages	No. accesses		Product pages	No. accesses
1	Paracetamol	1,754	7	Zopiclone	255
2	Amitriptyline	515	8	Tramadol	218
3	Ibuprofen	314	9	Quetiapine	203
4	Sertraline	304	9	Mirtazapine	203
5	Diazepam	300	10	Codeine	187
6	Citalopram	266			

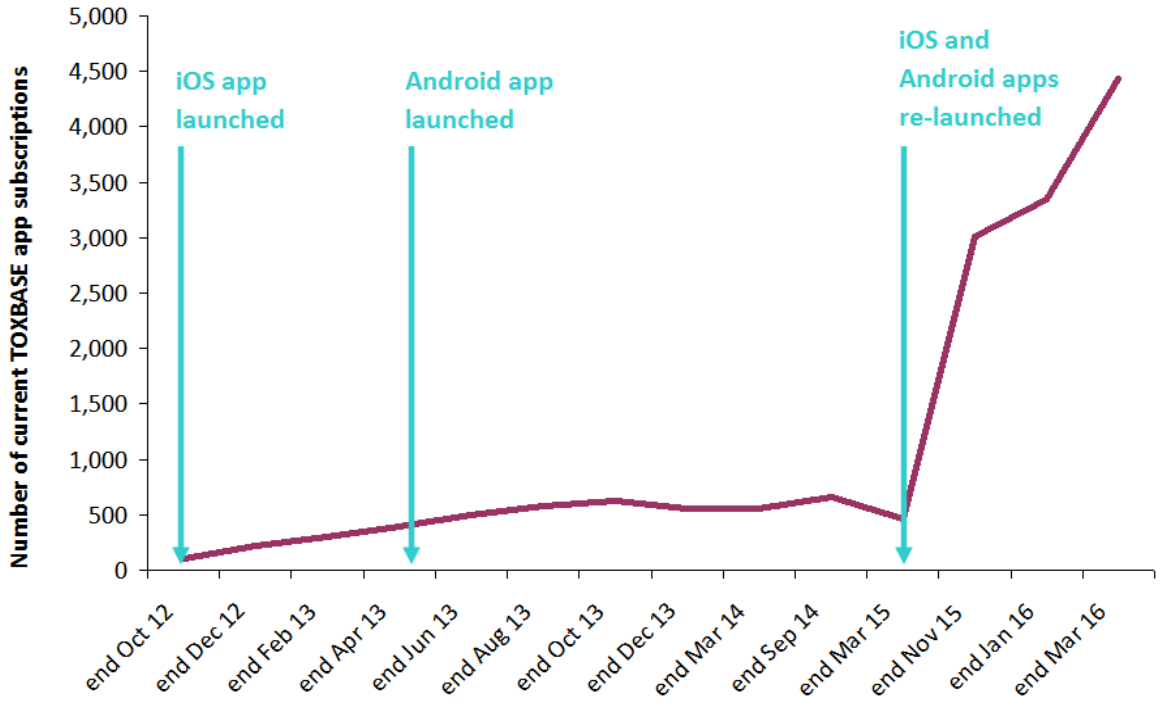

Figure 3.6.1 TOXBASE app subscriptions October 2012 to March 2016

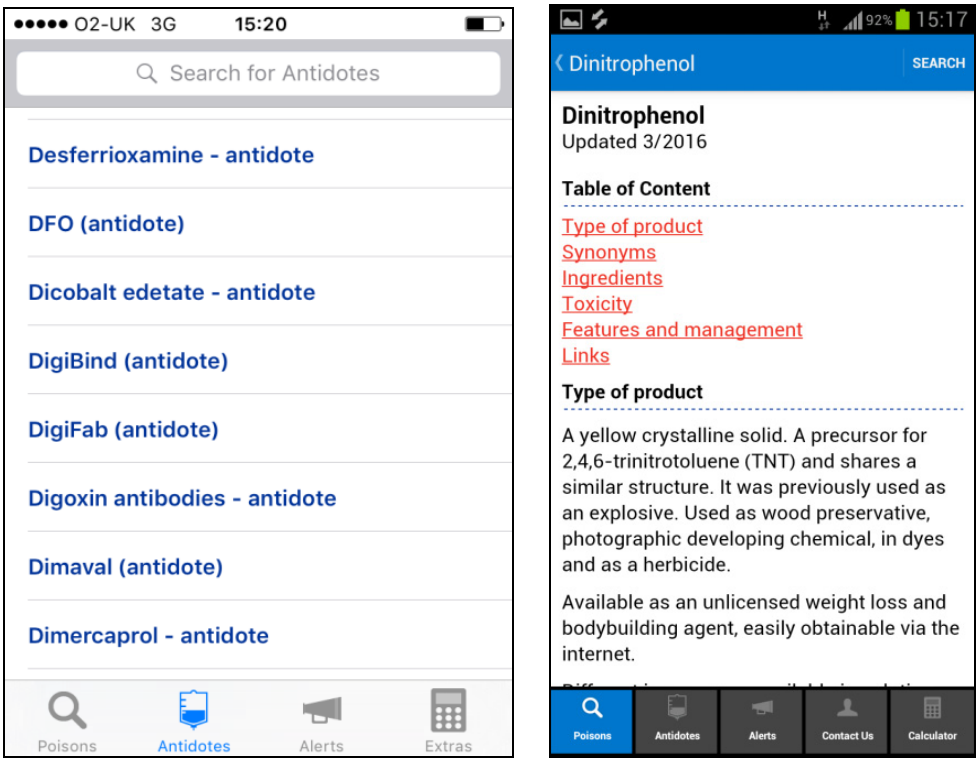

Figure 3.6.2 TOXBASE app screenshots

BOX 3.6.1 Feedback from TOXBASE app subscribers

"Working in the pre-hospital environment I find this application invaluable."

"Just wanted to let you know that the new TOXBASE app is excellent. Having immediate access to the resource without needing to go via the website is tremendously helpful. I downloaded it over the weekend and have used it five times already. Thank you!"

"Essential app. This is a phenomenal resource for toxicologists, acute and emergency care physicians or anyone with an interest in toxicology and poisoning. The navigation is simple, logical and the app is very quick in action. Will use it daily."

"An excellent updated app which is reliable and working well. Thankyou."

"Really handy. Really glad to see this app is now free for NHS. I found it works really well and I use it a lot."

"I have successfully logged into the app after following your instructions. Thank you so much for your assistance. It's a really useful app for me in my role as a paramedic."

"TOXBASE is a very helpful application and necessary for my job."

4. UKTIS activities in 2015/16

4.1 Overall service profile

UKTIS is commissioned by PHE to provide evidence-based information and advice to UK health professionals and to conduct surveillance on the foetal effects of maternal exposure to medicines and other chemicals during pregnancy. The service was established in London in 1983 and subsequently transferred to be part of the NPIS (Newcastle) unit in 1995.

Initially, almost all enquiries to the service were made by telephone, but in recent years UKTIS has concentrated on the provision of online information because this is usually more efficient and cost-effective, allowing telephone enquiries to be reserved for more complex cases. For registered health professionals, detailed, fully referenced, clinically focused scientific monographs on the potential foetal effects of maternal exposure to over 400 medications and chemicals are available via TOXBASE. There is also open access to the summaries of these monographs via the UKTIS website (www.uktis.org). More recently, UKTIS has developed information leaflets designed for use by the general public and hosted on our public-facing

website, ***bumps*** – best use of medicines in pregnancy (www.medicinesinpregnancy.org), which was launched in April 2014.

Information provision

Taking telephone enquiries and online accesses together, UKTIS information was accessed almost 1.5 million times during 2015/16. There were more than 45,000 scientific monograph downloads from www.toxbase.org and 2,098 telephone enquiries from NHS-affiliated health professionals across the UK. In addition, monograph summaries were accessed more than 173,000 times via the open www.uktis.org website. Trends in enquiry numbers by year are shown in Table 4.1.1, demonstrating the growing use of online information by health professionals and the planned reduction in telephone enquiries.

By the end of March 2016, the public facing ***bumps*** website hosted 126 online patient information leaflets produced by UKTIS, with 14 of these added during 2015/16. These attracted 1.19 million page views during the year, a more than five-fold increase on the figure for 2014/15 (221,000). Daily views increased from 2,500 in April 2015 to more than 4,000 in March 2016.

Table 4.1.1 Telephone enquiries, full monograph (www.toxbase.org), monograph summary (www.uktis.org) and *bumps* leaflets downloads (www.medicinesinpregnancy.org) over six years

	Telephone enquiries		TOXBASE (registered user access)		UKTIS (open access, launched 2012)		*bumps* (open access, launched 2014)		
Year	n	%	n	%	n	%	n	%	Total
2010/11	3,722	9.0	37,591	91.0					41,313
2011/12	3,260	5.4	46,061	76.7	10,697	17.8			60,018
2012/13	2,888	2.0	58,067	40.6	81,952	57.4			142,907
2013/14	2,866	1.5	64,876	34.2	121,780	64.3			189,522
2014/15	2,529	0.6	56,799	13.0	160,351	36.4	221,053	50.2	440,732
2015/16	2,098	0.15	45,635	3.2	173,851	12.3	1,193,811	84.4	1,415,395

4.2 Service developments

bumps **online self-reporting facility**

One of the potential benefits of providing public access information via the ***bumps*** website is to seek information on maternal exposures and subsequent foetal outcomes directly from the women using the website. To enable this, an online self-reporting facility was launched in April 2015. So far, promotion of this tool has been low key to allow for the monitoring and correction of problems with the system. Nevertheless, 186 users spontaneously created a personal

password-protected 'my ***bumps*** record' during 2015/16 (Figure 4.1). The majority of registrants live in the UK (114), with the remainder coming from various countries around the world (Figure 4.2). From these registrants, 68 medication exposures in pregnancy were reported for 56 unique medications, the most common being levothyroxine (5), amitriptyline (4), paracetamol (4) and cyclizine (3).

It is too soon to evaluate the impact of ***bumps*** as a surveillance tool, particularly with regards to longer term effects of an exposure on behaviour or learning ability, but experience from the past year demonstrates that international data collection using this tool is feasible. A few adjustments to the system do, however, need to be implemented to optimise follow-up of ongoing pregnancies and live born infants. Collation and analysis of data collected through ***bumps*** will also need to be streamlined if the existing infrastructure is to be used for pregnancy registries or surveillance where real-time data collection and analysis is required to inform immediate public health policy and clinical practice. An example might include data collection during a future pandemic.

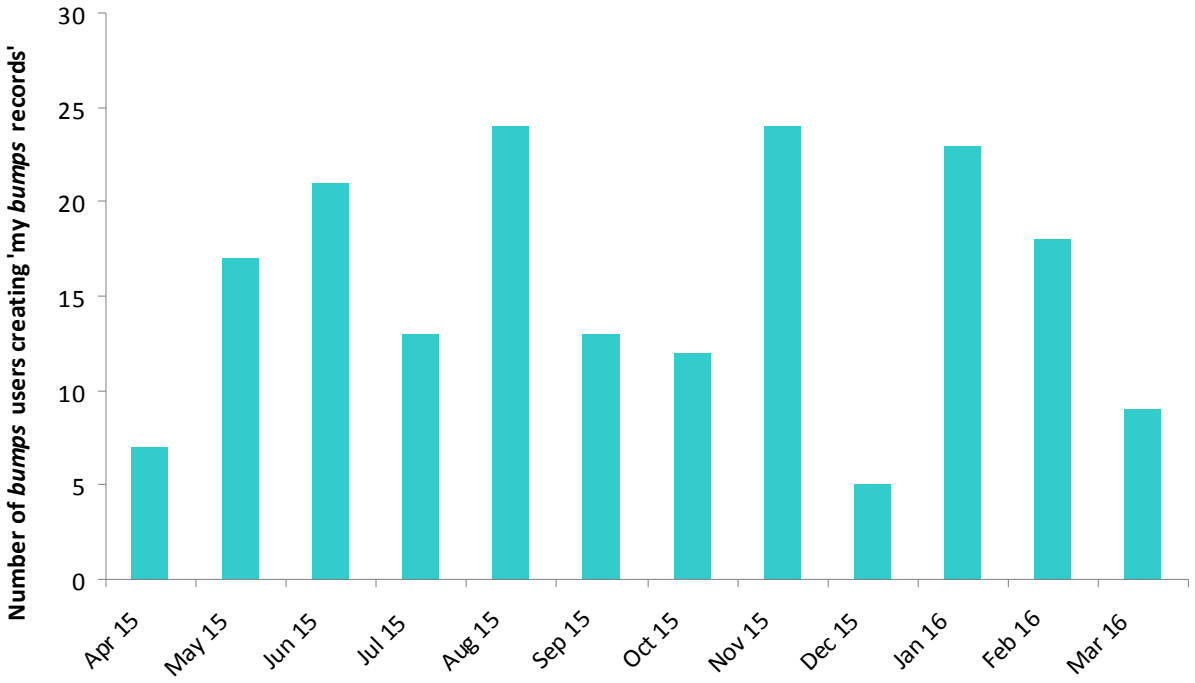

Figure 4.1 Number of 'my *bumps* records' created each month during 2015/16

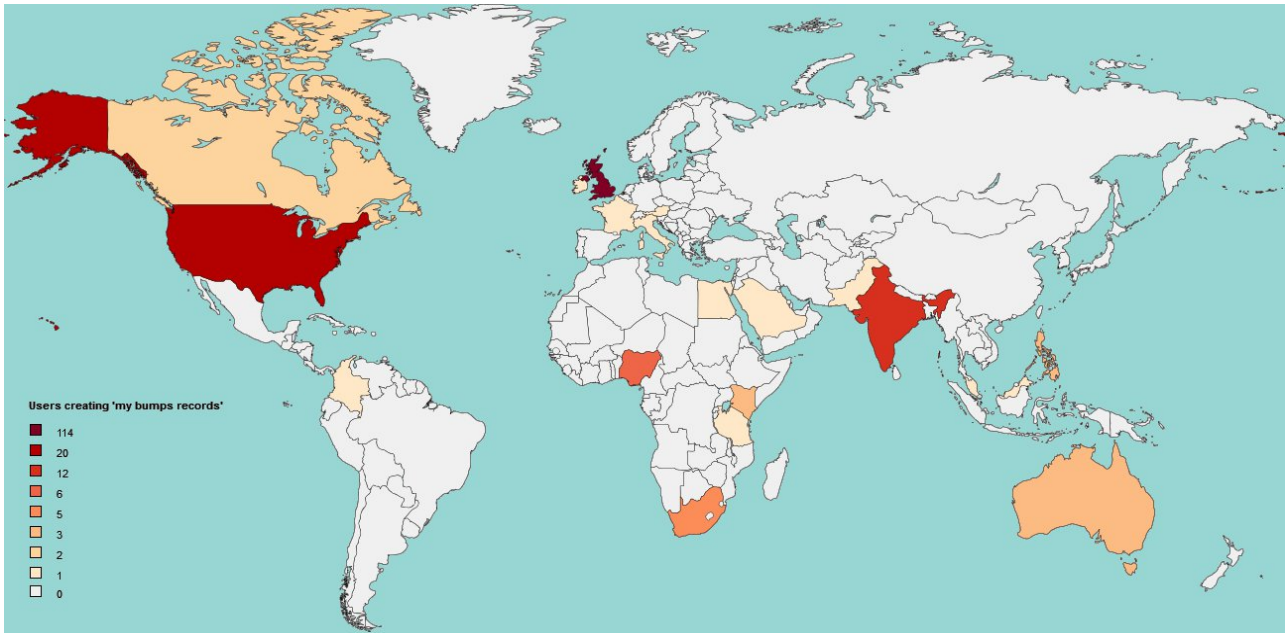

Figure 4.2 Heat map showing country of residence of women creating a *bumps* record

4.3 Surveillance and research

The analysis and publication of surveillance data collected by UKTIS remains an essential function of the service. At each UKTIS monograph update, pregnancy outcomes of women about whom UKTIS were initially contacted are analysed for signals of teratogenicity for the exposure(s) concerned. Where published human data is limited or absent, UKTIS can provide unpublished case reports or small case series. Although individual datasets are small and the conclusions that can be drawn are limited, this data is valuable for answering patient-specific enquiries. Further benefit can be obtained by combining UKTIS case series with those collected by other teratology services around the world.

During 2015/16 data collected by UKTIS has been included in recently published or presented studies assessing the foetal risks of maternal exposure to aripiprazole, antidepressants or TNF-α inhibitors in pregnancy. Although not published within the financial year, peer-reviewed studies involving UKTIS data completed during 2015/16 and now accepted for publication include an NIHR HTA funded systematic review of treatments for hyperemesis gravidarum and two international collaborative ENTIS studies of pregnancy outcome following exposure to methylphenidate and pregabalin. UKTIS staff have also completed an EU-funded (Innovative Medicines Initiative) study examining the feasibility and cost effectiveness of direct data collection from women via a website with two papers about medicines exposure during pregnancy published during 2015/16.

5. Clinical governance

In previous annual reports, we have described the clinical governance mechanisms that the NPIS has adopted to ensure that the services provided are as safe and effective as possible. Key aspects include appropriate staff training and continuous professional development, access to appropriate information sources, detailed operational procedures and continuous availability of consultant staff (see Box 5.1).

In spite of these precautions, things can go wrong, especially in a service with such a high volume of clinical enquiries, and it is important that lessons are learned across the service when this happens. To achieve this, all NPIS staff are encouraged to report critical events, complaints, adverse comments or near misses so that these can be investigated, focusing on the lessons that need to be learned rather than the allocation of blame.

All reported incidents are first reviewed by the director of the originating unit and those with exclusively local implications are handled using the clinical governance arrangements of the provider NHS Trust. Those with possible relevance to other NPIS units are referred to the NPIS Clinical Standards Group, where details are considered and recommendations for further actions are made. If an urgent issue arises, mechanisms are available for rapid discussion amongst NPIS units and early national implementation of any required changes.

5.1 Analysis of critical events

During the 2015/16 reporting year, 11 critical events were reported and discussed nationally. In three of these cases adverse clinical outcomes were reported, prompting review of the appropriate TOXBASE entry. In all cases, no substantial changes to the clinical advice provided were considered necessary, but minor changes were made to make the advice clearer. One of the cases remains under investigation and further changes to TOXBASE guidance may take place once that process is completed.

There continue to be occasional critical incidents related to TOXBASE, with four episodes reported in 2015/16. One was an attempt to make a large scale download of data from the website; this was prevented by security arrangements implemented following a previous attempt to steal data. On one occasion, there was loss of the ‘search’ function on TOXBASE for 90 minutes. After review of the cause, risk of recurrence is considered low.

BOX 5.1 Key features of NPIS clinical governance

- appropriate induction, training and appraisal of all staff
- nationally organised continuous professional development with discussion of contentious issues, ensuring consistency of approach
- access to high-quality information sources
- early peer review of enquiry answers and a programme of enquiry audit
- continuous support from senior staff including 24-hour availability of a consultant clinical toxicologist
- detailed and regularly updated national operational policies
- reporting and review of critical incidents, complaints and near misses so that lessons can be learned and shared throughout the service.
- regular quality assurance exercises encompassing all aspects of NPIS work

In the remaining two cases, service failure was caused by a widespread loss of function of BT Broadband services, so that two of the four NPIS units, as well as a small number of external users, were unable to access the TOXBASE main site over several hours. The affected NPIS units were also unable to access the BT Cloud system to manage telephone enquiries. The affected units were, however, able to resume answering telephone enquiries within a few minutes by using the backup telephone contingency designed for this eventuality. The backup TOXBASE site (www.toxbasebackup.org) remained unaffected by the issue and an observed increase in usage data over this period confirmed that users were able to access the backup site to obtain poisons information.

Three other critical incidents related to telephone functionality; two cases involving a problem with the BT Cloud system and the third was caused by a local power failure affecting computers – normal working of the affected unit was restored by moving staff to a different building using previously established contingency arrangements.

Overall, there is an ongoing small risk to service provision resulting from occasional loss of telephone or internet functionality. These episodes have become less common than in earlier years and impact on service users has been minimised by development of appropriate contingency arrangements.

5.2 Quality assurance exercises

Telephone enquiry service

NPIS units have performed an annual stakeholder quality assurance exercise since 2002 to evaluate user satisfaction and service performance and to identify areas for improvement. This section details the findings of the 2015/16 national quality assurance exercise conducted in line with PHE contractual arrangements.

A random sample of telephone enquiries was selected using the same methodology for each unit. The aim was to survey 5% of telephone enquiries received by the Birmingham, Cardiff and Newcastle units and 10% of enquiries received by Edinburgh (to obtain an adequate sample size because it is not open 24/7 and therefore takes fewer telephone enquiries).

Between 1 April 2015 and 31 March 2016, a total of 46,885 patient-specific enquiries were answered, similar to the number for 2014/15 (46,711). There were 3,054 questionnaires sent out and 718 responses received, giving a response rate of 23.5%, slightly lower than the response rate of 26.6% achieved last year but generally typical of a survey of this type. The most common responder groups were general practitioners (30.9% of all responses), NHS 111 nurses (15.2%) and other nurses (13.1%).

Overall, those checking TOXBASE before telephoning the service increased further this year to 50.1%, compared to 48.4% during 2014/15. Of the 50.1% respondents who checked TOXBASE prior to telephoning the service, 194 (52.9%) users cited the reason for phoning to be inadequate information on TOXBASE for their enquiry, a slight increase on the figure for last year (51.2%). Other commonly chosen reasons were: special circumstances for the call (36.2% vs 36.3% in 2014/15), inability to interpret information on TOXBASE (6.6% vs 8.1% in 2014/15), a local protocol to call NPIS (2.2% vs 4.0% in 2014/15) and the information on TOXBASE contradicted other information they had (2.2% vs 1.1% in 2014/15).

The reasons noted for not accessing TOXBASE before telephoning the NPIS directly are presented in Table 5.1.

To evaluate user satisfaction, respondents were asked to what extent they agreed or disagreed with a series of statements relating to the particular enquiry they made to the NPIS. The responses received demonstrate excellent satisfaction with the way the enquiry was dealt with, with the majority of variables assessed resulting in satisfaction scores exceeding the results of 2014/15 (Table 5.2).

Overall user satisfaction with the service was graded using a scale of one to six, with one indicating a very poor service and six an excellent service. The overall satisfaction rating of users grading the service a five or a six (excluding non-respondents) was 98.4%, compared with 97.2% last year.

Summary

Respondents continue to have a very high level of satisfaction with the service overall and for individual elements of the survey. User satisfaction was high for calls handled by all the NPIS units. As in previous years, the low response rate could potentially introduce bias in either direction.

Table 5.1 Reasons why telephone enquirers did not consult TOXBASE first

Reason	% of respondents	
	2014/15	2015/16
"I don't know what TOXBASE is"	18.2	17.9
"We don't have it in our department"	23.9	23.9
"It was in a part of the department that we didn't have access to"	3.0	3.1
"We couldn't get logged on/the connection wasn't working"	17.2	16.2
"We've not be trained to use it yet"	11.1	12.2
Other	26.6	26.7

Table 5.2 Satisfaction scores 2014/15 vs 2015/16

Question	Satisfaction score %*	
	2014/15	2015/16
"The person I spoke to was polite and pleasant"	98.3	98.1
"Once my call was answered by a specialist in poisons information the enquiry was dealt with promptly"	97.1	97.4
"The information was given to me at an appropriate speed"	96.7	97.5
"I had confidence in the reply I was given"	95.2	97.1
"The reply from NPIS was relevant and useful"	94.9	96.2
"I was given an appropriate amount of information for my needs"	94.6	95.8
"My telephone call was answered without delay by a specialist in poisons information"	91.1	92.2

** satisfaction score is the proportion of respondents who agree 'completely' (6) or 'a lot' (5) [excluding non-respondents]*

TOXBASE

Formal quality assurance from TOXBASE users is obtained using an online questionnaire. A selection of users are automatically asked to complete and submit one of a series of short quality assurance forms during their online session. To combat user fatigue, differing forms are presented throughout the year. Invitations are generated every five to 15 database logins; this number is varied throughout the year. A total of 780 returns were received between 1 April 2015 and 31 March 2016. On type of enquiry (355 responses), 53.8% users reported that they primarily used TOXBASE for 'routine enquiries', 27.6% for a 'triage decision' and 18.6% for 'complex enquiries'. On frequency of use (355 responses), 43.9% reported using TOXBASE weekly, 23.1% daily and 32.7% only occasionally. Users were asked to grade a series of

statements on a scale of one to six where one = disagree completely, and six = agree completely. Satisfaction scores were high (Table 5.3). Of those asked to indicate their overall satisfaction with TOXBASE (355 responses) 325 (91.5%) scored either five or six, on a scale of one to six where one = poor and six = excellent.

TOXBASE user feedback and service improvements

An important component in the review process of TOXBASE entries is user feedback. Feedback may be received from a variety of sources including TOXBASE quality assurance forms, questionnaires linked to products of interest, responses to follow up on cases of interest, or by email, letter or telephone. Users may raise queries or provide clinical data. Issues specific to entries are dealt with as they arise or may be collated for discussion at the TOXBASE Editing Group or Clinical Standards Group meetings.

TOXBASE quality assurance forms: free text comments

Of the 780 returns, 175 (22.4%) included free text comments which can be grouped as shown in Table 5.4. The few negative comments centred on the search facility; improvements are due to be implemented on this aspect over the coming year. Box 5.2 gives examples of positive comments about TOXBASE from returned forms.

Table 5.3 Summary of user satisfaction scores

Rank	No. of responses	Question	Satisfaction score (%)*
1	406	I had confidence in the information for my query	94.8
2	406	Logging on to the database was easy	88.1
3	362	The information was sufficient for managing this case	86.2

** satisfaction score is the proportion of respondents who agree 'completely' (6) or 'a lot' (5)*

Table 5.4 Summary of free text comments on TOXBASE from quality assurance returns

Type of comment	Number (% value) *
Positive comments and thanks	94 (57.7%)
Suggestions	45 (25.7%)
Specific issues	19 (10.8%)
Information technology	17 (9.7%)
Comment related to other NPIS services	6 (3.4%)
Negative comments	5 (2.8%)

** users often offered multiple comment types within one response*

BOX 5.2 Examples of positive comments about TOXBASE from the quality assurance returns

"Excellent reference tool with professional NPIS backup if required."

"I have always found TOXBASE an excellent and definitive source of information on poisons and toxins."

"Thank you for providing this excellent and reliable service."

"I am always glad that TOXBASE advice is always thorough but not excessive, always to the point and in particular never evasive."

"TOXBASE is a brilliant resource and has helped me to manage patients and avoid unnecessary hospital admissions on many occasions. I only wish all health resources were as easy to use and informative as this site."

"A very useful tool in A&E. Makes our practice much easier and of course safer."

"A great asset for toxicology information."

"TOXBASE is brilliant – don't know where I'd be without it!"

"Your site is formidable in all ways!"

New, uncommon and products of interest questionnaire

Between 1 April 2015 and 31 March 2016, 47 online questionnaires related to products of NPIS interest on TOXBASE were completed by users (50 in 2014/15).

The NPIS adds this questionnaire to a range of products of interest which include new products (eg black triangle drugs), uncommon agents and novel treatments such as the use of intravenous lipid emulsion for cardiotoxicity unresponsive to standard treatments. The feedback received can be very useful for keeping entries up to date.

The most common category of agent reported was household products (15 exposures), 12 were liquid laundry detergent capsules. All liquid laundry detergent capsules exposures occurred in children aged less than five years. Three patients reported no symptoms. Vomiting occurred in nine patients. Other symptoms reported included abdominal pain (2), cough (2), diarrhoea (1), somnolence (1), swollen lips (1), buccal irritation (1) and skin irritation (1).

Two of the other household product exposures were to laundry additives. Neither exposed child had symptoms. The final exposure to a household product involved an adult male who inhaled waterproofing spray. He reported tightness in his chest and some pain on deep breathing. On examination, some mild shortness of breath was noted and he was referred to hospital for observation.

New psychoactive substances (NPS) were reported in 14 exposures. These included synthetic cannabinoid receptor antagonists (9), mephedrone (3), methedrone (1) and flubrozolam (1). All patients exposed to these NPS products were symptomatic. Common symptoms reported

included: convulsions (5), reduced conscious level (5), agitation (4), tachycardia (3), reduced respiratory rate (3), psychosis (2), hallucinations (1), respiratory arrest (1) and elevated creatine kinase (1).

Pharmaceutical products accounted for 13 exposures. Those reported included memantene (3), letrozole (2), finasteride (2), anastrozole (1), dalteparin (1), dutasteride (1), perampanel (1), trospium chloride (1). Most pharmaceutical exposures reported no features of toxicity (11). In the first of two cases where symptoms were reported an adult female patient ingested 5 mg of letrozole. She developed nausea and headache. In the second case a teenage female who ingested 18 mg of perampanel initially experienced agitation followed by confusion. The only management required in hospital was observation.

One exposure to a weight loss product was reported (raspberry ketone). The patient reported abdominal pain and distension which worsened after eating. She was advised by NHS 111 to take an antacid and seek attention from the out-of-hours GP if symptoms did not settle.

As randomised controlled trial data is not easily obtained on the management of poisoned patients, a body of evidence on individual patients can be a valuable source of clinical evidence for the NPIS. We therefore request all users to feed back information to the NPIS by using the electronic forms provided within TOXBASE, or by email, letter or telephone.

UKTIS quality assurance

Telephone enquiry service

Formal feedback on UKTIS is sought continuously from a random sample of telephone enquirers, with questionnaires sent out between one and four weeks after the enquiry. During 2015/16, 350 enquiries (17% of the total enquiries) were selected for quality assurance monitoring in this way. As of April 2016, 89 (25%) feedback forms had been returned, from a range of enquirers including GPs (47), pharmacists (20), hospital consultants (12), junior hospital doctors (3) and nurses (7).

Of the 89 responders, 9% had used the service more than five times, 49% had used the service between one and five times previously and 36% were first-time enquirers. Enquirer satisfaction scores demonstrated a 96% overall degree of satisfaction with the service (Table 5.5).

Constructive criticism was received from a small number of responders. As in previous years, the need to increase awareness of the service was raised more than once. One responder requested faster telephone answering, another shorter data collection forms. Free text comments suggested that where the information provided by UKTIS was rated as not being ‘relevant or useful’, this reflected the lack of available pregnancy data rather than a shortcoming of the service.

***bumps* leaflets and website**

This year, telephone enquirer feedback forms included additional questions relating to the new ***bumps*** website. Sixty-three of the 89 healthcare providers who provided feedback having contacted UKTIS via the national telephone line were not aware of the new ***bumps*** website. Of the 22 responders who had visited ***bumps***, six found the website 'very easy' to use, 14 'easy' and two 'neither easy nor difficult'. Ten responders reported that a ***bumps*** leaflet was available for the exposure they were interested in; eight reported that no leaflet was available at that point, with the remaining four responders regarding the question as 'not applicable'. Thirteen respondents rated the information on ***bumps*** as being 'about right', with none assessing it as too detailed or not detailed enough.

Spontaneous feedback was also received from 39 visitors to the ***bumps*** website via the e-feedback form, 79% of whom resided in the UK. Fifty one per cent of visitors providing feedback were not healthcare professionals and, although the remaining 49% were healthcare professionals, a number were pregnant themselves with only 23% of users providing feedback classifying themselves as 'not pregnant'. Of this group, 19 regarded ***bumps*** as 'very easy' to use, 13 as 'easy', seven as 'neither easy nor difficult' and one as 'difficult'. All but two users provided free text comments, the majority of which were requests for information on exposures not yet covered in the ***bumps*** leaflets or positive feedback on the information found.

Table 5.5 Summary of UKTIS telephone enquirer experience

Question	% answering 'Yes'
"The reply from UKTIS was relevant and useful"	95
"Once I got through, the enquiry was answered within an acceptable timeframe"	98
"The information was given to me at an appropriate pace"	99
"The person I spoke to was polite and pleasant"	99
"I had confidence in the reply I was given"	97
"Will you use the service again"	99
"Overall satisfaction with the service"	96

BOX 5.3 UKTIS and *bumps* end-user feedback

"I am so glad I found this (***bumps***) website as at the moment me and my partner are trying to conceive and I have a number of (quite minor) health problems for which I take regular medication. The information here is much more detailed than on any other comparable website and makes it easier to make informed decisions, whilst the language is still clear and simple for people like me who are not scientists!" (*spontaneous via website*)

"I have used a lot of your (***bumps***) leaflets for patients, they are very helpful to support conversations about drugs in pregnancy…. great site and extremely beneficial to patient care. The more you do, the better!" (*spontaneous via website*)

Good service, useful advice at time of calling allowing counselling of patient and risk stratification. (*healthcare professional via UKTIS questionnaire*)

Super service and immediate response - super for patient and doctor. (*healthcare professional via UKTIS questionnaire*)

5.3 Training and continuing professional development

Continuing professional development (CPD) forms an essential component of the clinical governance structure of the NPIS. A national CPD programme equips both clinicians and scientific staff with the necessary knowledge and expertise to provide up to date, accurate, evidence-based advice on all aspects of poisoning.

Training for scientific staff

Learning objectives covering all aspects of clinical toxicology, from the mechanisms of toxicity to the management of poisoned patients, are defined in a national training curriculum. Each unit provides structured in-house training and assessment in both clinical and non-clinical (eg communication) skills to prepare scientific staff for dealing with healthcare professionals who contact the NPIS for advice. A postgraduate qualification in toxicology may also be undertaken to further enhance knowledge and expertise.

Continuing professional development

The NPIS annual CPD programme consists of four meetings hosted in turn by each of the NPIS units. It is the responsibility of the CPD lead, an NPIS consultant appointed by the directors every three years, to organise the rolling programme of meetings (see Box 5.4). An NPIS scientist is also appointed every two years to ensure the needs of the scientific staff are well represented within the educational programme.

The primary role of the CPD meetings is to ensure that clinicians and scientists remain up to date with the latest developments within clinical and academic toxicology. This includes education on new poisons, new antidotes and other emerging treatment modalities as well as new developments of existing treatments. Additionally, the CPD meetings provide an ideal

forum to educate NPIS staff about strategic developments within the service as a whole, discuss challenging clinical cases and an opportunity to debate new research proposals.

Finally, these meetings offer the chance for face-to-face contact between clinical and scientific staff who may previously have only had contact via the phone.

All NPIS staff unit are encouraged to participate in research and submit papers to peer-reviewed journals and national and international meetings such as the British Toxicology Society and the European Association of Poisons Centres and Clinical Toxicologists.

BOX 5.4 NPIS CPD meeting, NPIS Edinburgh

10 September 2015: Postgraduate Education Centre, Royal Infirmary of Edinburgh

Morning session chair: Euan Sandilands

10.30: Extracorporeal membrane oxygenation (ECMO) and the poisoned patient

General principles of ECMO and its use in toxicology *Mike Gillies*

Case examples of ECMO use in acute overdose management *David Wood*

11.45: Severe poisoning in children *Mark Anderson*

12.15: Exotic snake envenoming and the NPIS response *Michael Eddleston & Richard Adams*

Afternoon session chair: Arvind Veiraiah

13.45: Confirming death in the poisoned patient; case and discussion *Euan Sandilands & James Dear*

14.30: Nitrous oxide – still no laughing matter *Claire Gilfillan*

14.50: Energy drink consumption and caffeine poisoning in children and adolescents *Victoria Eagling*

15.10: NPIS referrals from UK schools *David Stewart*

15.30: Feedback and close

6 Areas of interest in 2015/16

6.1 Drugs of misuse including new psychoactive substances

Introduction

Drugs of misuse commonly cause acute toxicity, which can be severe and sometimes fatal. For example, during 2014 two thirds of deaths caused by drug poisoning were associated with drugs of misuse[1]. It is therefore not surprising that drugs of misuse form an important component of NPIS activity. An important recent development has been the increasing number of telephone enquiries and TOXBASE accesses related to new drugs of misuse, now termed new psychoactive substances (NPS)[2] and dealing with these is a particular challenge. There is often little information available about their pharmacology and toxicology, while the use of many different brand names for NPS-containing products makes it more difficult to identify the specific chemicals involved in episodes of toxicity.

Overall activity

During this reporting year there were 1,613 NPIS telephone enquiries relating to 385 different substances or products, accounting for 3.4% of all NPIS telephone enquiries. In comparison there were 1,722 telephone enquiries about 286 substances made during 2014/15. The mean age of patients in these enquiries was 28 years old and 70.5% were male, in keeping with other drug of misuse demographic data and NPIS reports for previous years. During 2015/16 there were also 67,228 TOXBASE accesses to 839 different substance or product pages, representing 4.0% of TOXBASE activity overall. This compares to 69,537 accesses to 598 different substances during the previous year. This TOXBASE data is likely to under-represent the total accesses associated with drug misuse as it excludes pharmaceutical substances that may be taken for misuse purposes. For example, there were 48,204 TOXBASE accesses to information about medicinal drugs that may be subject to misuse, including benzodiazepines, drugs used in ADHD and opioids. It is not possible to determine if toxicity caused by these drugs resulted from misuse, self-harm or medication errors.

The large number of different drugs, each with a variety of street names, and the vast number of different branded products means that it continues to be a significant challenge for NPIS and healthcare professionals to remain up to date with drugs of misuse. Using intelligence from the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), the UK Focal Point, the Advisory Council on the Misuse of Drugs (ACMD), other sources and literature, NPIS added 78 new drugs of misuse and a further 257 synonym pages to TOXBASE over the reporting period. Because the exact chemical involved is often unknown, NPIS has continued to promote the recognition of the toxicological syndrome (toxidrome) as the most appropriate guide to clinical management.

The top 10 substances by number of telephone enquiries or TOXBASE accesses are shown in Table 6.1. Longer-term trends in telephone enquiry numbers and in TOXBASE accesses for drugs of misuse are shown in Figures 6.1-6.4.

Synthetic cannabinoid receptor agonists

Branded products, such as 'Black Mamba', 'Vertex' or 'Sweet Leaf' were the most common reason for health professionals to contact NPIS by telephone in regards to drugs of misuse (Table 6.2). Analytical data published by other sources, such as WEDINOS[3], suggest that the great majority of these contain synthetic cannabinoid receptor agonists (SCRAs).

Enquiries relating to branded products fell compared with the previous year, but there has been a marked increase in those enquiry numbers where the health professional suspected exposure to a SCRA. In only eight of the 108 telephone enquiries (7.4%) the caller reported the specific chemical involved, meaning in most cases the caller had recognised that a SCRA of some type was involved.

Overall, these drugs currently dominate NPIS activity relating to drugs of misuse – both telephone enquiries and TOXBASE – accesses reflecting the substantial problem they are posing to UK healthcare professionals.

Table 6.1 Top 10 telephone enquiries and TOXBASE accesses relating to drugs of misuse

Telephone enquiries	n (2015/16)	% change (from 2014/15)	TOXBASE accesses	n (2015/16)	% change (from 2014/15)
Branded products	276	-29.41%	MDMA	10,128	1.56%
Cocaine	172	4.88%	Cocaine	9,492	10.84%
Legal high (unknown)	159	-22.06%	Amphetamines	5,857	21.69%
MDMA	131	7.38%	Branded products	5,703	54.18%
Heroin	124	5.08%	Heroin	5,626	7.76%
Cannabis	109	-6.84%	SCRAs**	4,770	87.50%
SCRAs**	108	45.95%	Mephedrone	4,385	-33.78%
Diazepam	77	-3.75%	Cannabis	4,295	15.86%
Methadone	64	-15.79%	Methylphenidate	3,759	14.12%
Amphetamines	61	-29.07%	Legal high (unknown)	2,728	4.12%
Mephedrone	55	-35.29%	Methadone	2,248	-14.03%

*** synthetic cannabinoid receptor agonists*

Table 6.2 Top five branded products involved in telephone enquiries and TOXBASE accesses

Telephone enquiries	n	TOXBASE accesses	n
Black Mamba	45	Black Mamba	2,388
Vertex	22	Pandora's Box	682
Sweet Leaf	17	Vertex	351
Pandora's Box	14	Sweet Leaf	299
Voodoo	11	Skyhigh	151

Stimulants

NPIS activity related to established stimulant drugs such as cocaine, MDMA and amphetamine remained high and was relatively unchanged compared with the previous year. For example, MDMA, cocaine and amphetamine were the three most common drugs of misuse accessed on TOXBASE (Table 6.1). The synthetic cathinone mephedrone persists in the top 10 for telephone enquiries and TOXBASE accesses, but activity by both means reduced this year by around 30% compared to 2014/15. Drugs used in the treatment of ADHD continued to be an important component of the NPIS workload, with 3,759 accesses to the TOXBASE entry for methylphenidate during the year, a 14% increase compared with 2014/15, although telephone enquiries relating to misuse were relatively infrequent.

Opioids

Opioids, particularly heroin and methadone, continue to dominate mortality data for drugs of misuse. NPIS telephone enquiries for heroin increased by 5% and TOXBASE accesses by 7.8% compared with the previous year. In contrast, there were reductions in telephone and TOXBASE activity relating to methadone.

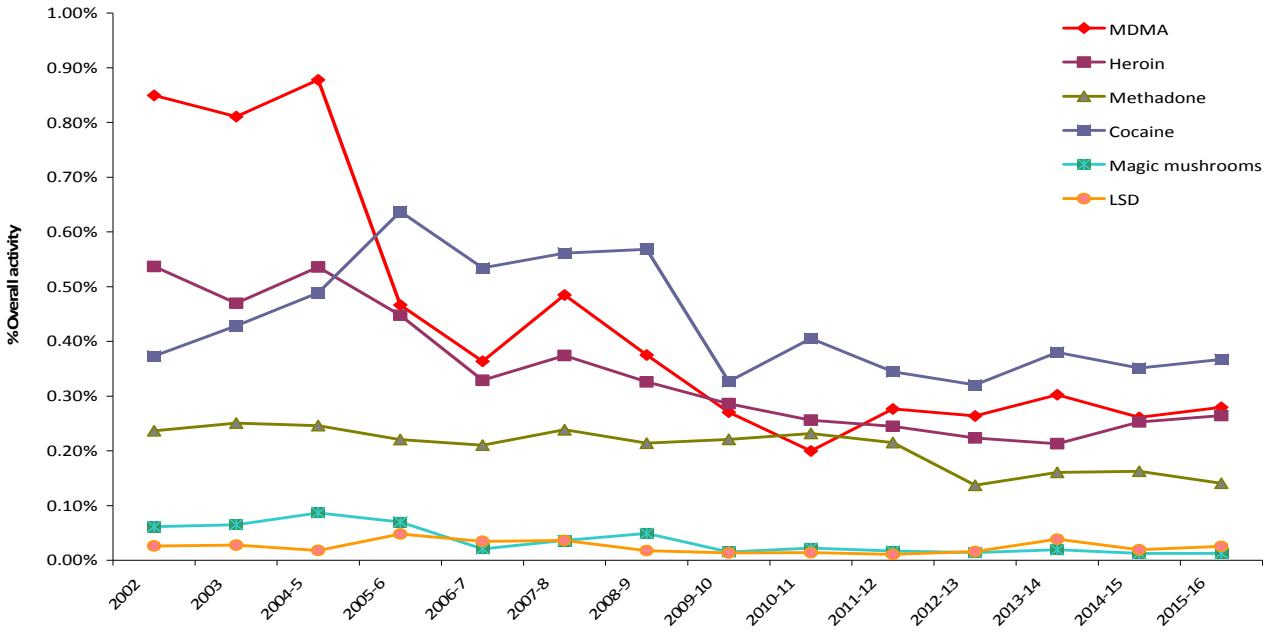

Figure 6.1 Annual telephone enquiries to NPIS regarding selected class A drugs 2002-2015/16

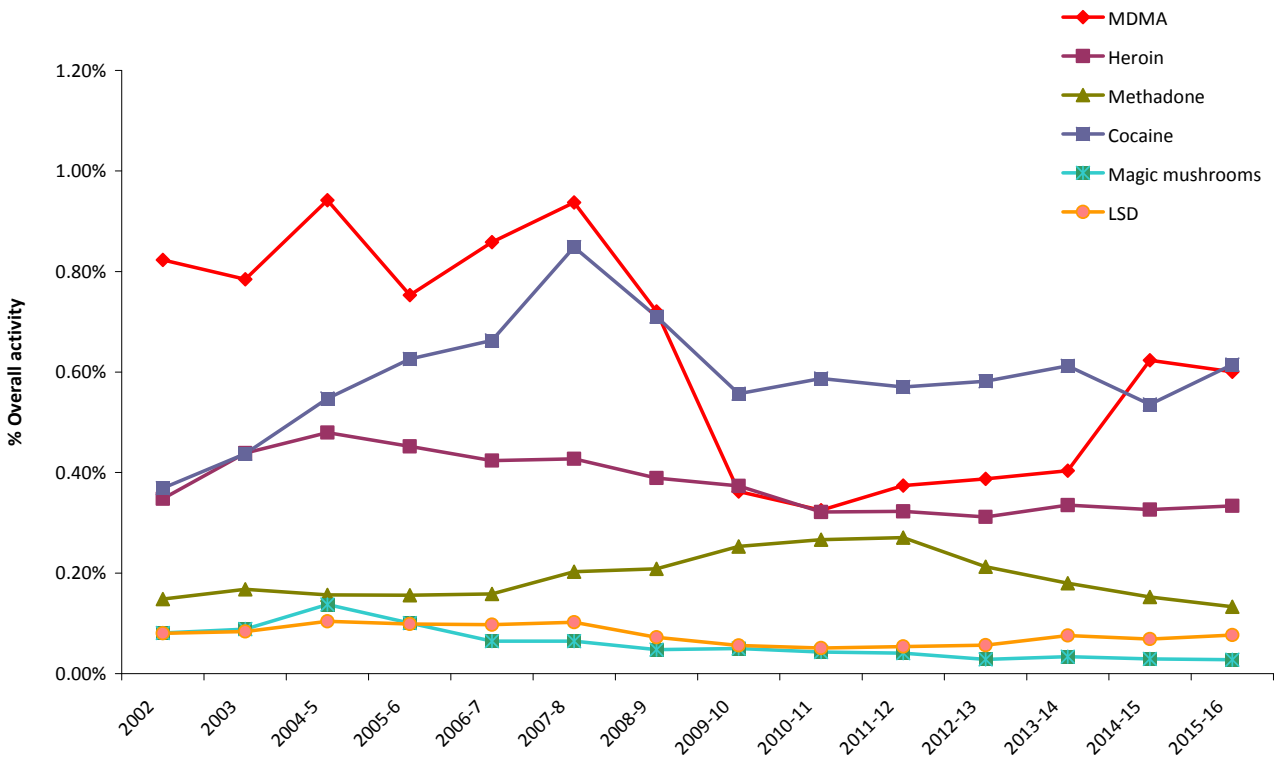

Figure 6.2 Annual TOXBASE accesses regarding selected class A drugs 2002 – 2015/16

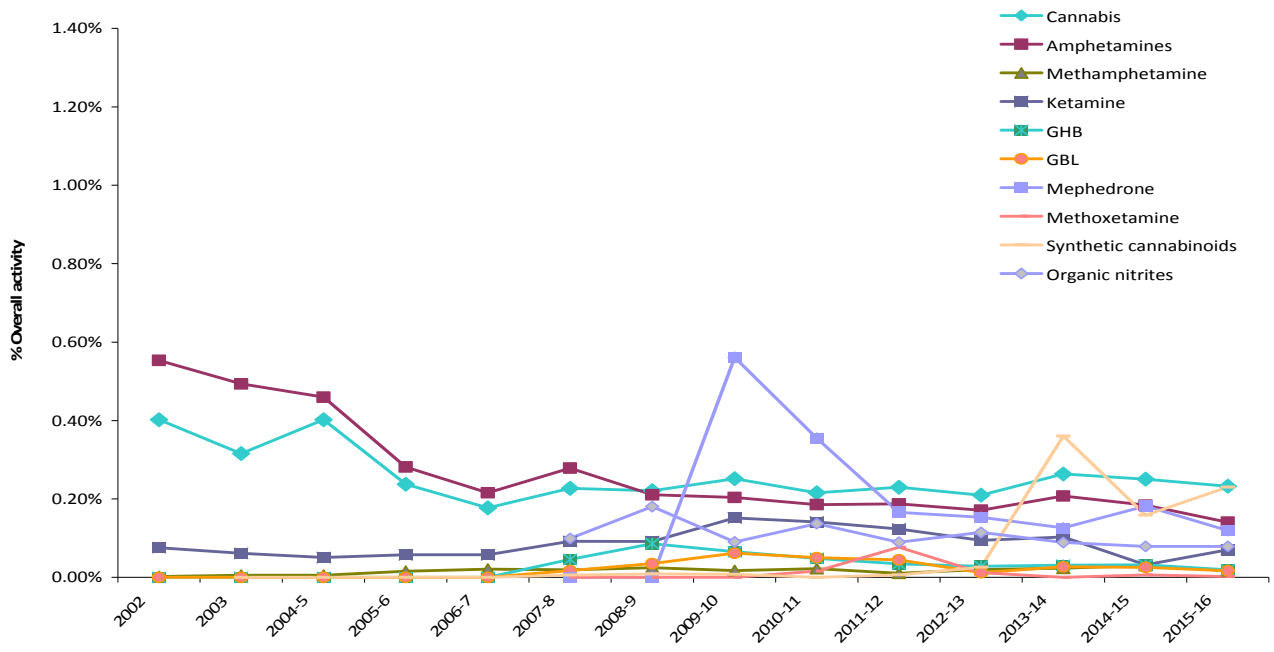

Figure 6.3 Annual telephone enquiries to NPIS regarding other selected drugs of misuse, 2002 – 2015/16

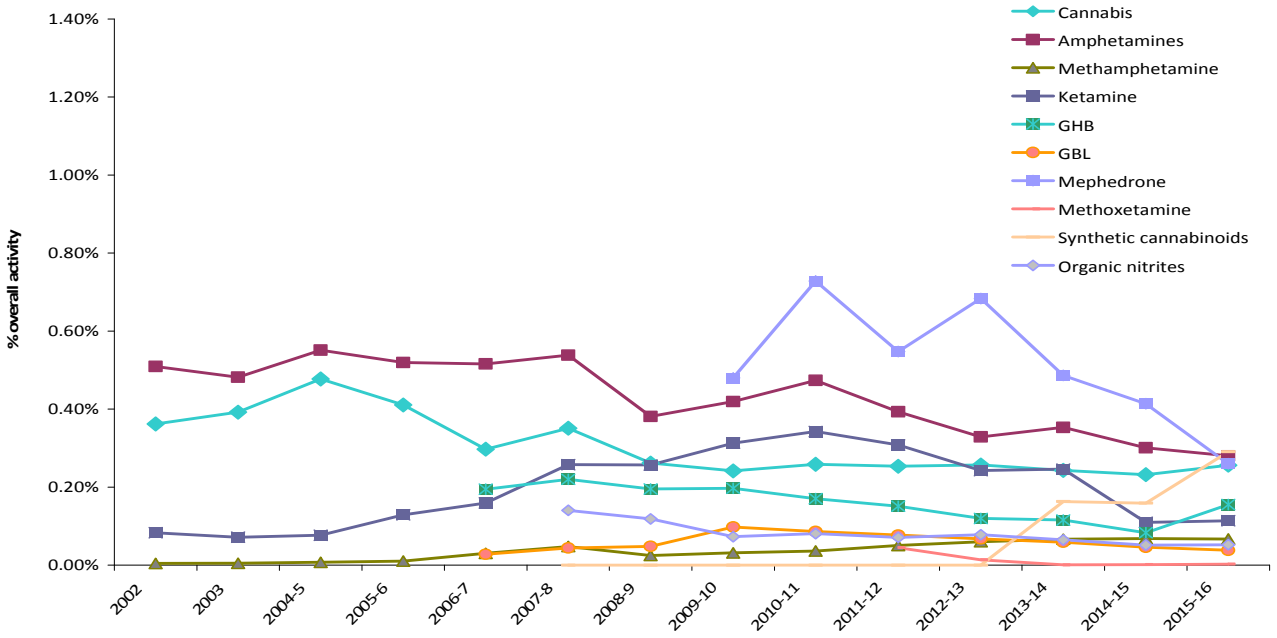

Figure 6.4 Annual TOXBASE accesses regarding other selected drugs of misuse, 2002 – 2015/16

Reporting of NPIS data on drug misuse 2015/16

During the year, the NPIS provided a number of reports on the UK situation with particular drugs of misuse at the request of the official organisations, including the ACMD and EMCDDA:

Report on enquiries relating to ethylphenidate and similar compounds
2 April 2015, ACMD Secretariat, Home Office

Report on enquiries relating to methiopropamine
2 April 2015, ACMD Secretariat, Home Office

Commissioned report entitled 'The Role of Poisons Centres in the Identification, Reporting, Understanding, Monitoring and Response to Serious Adverse Events Associated With New Psychoactive Substances'
17 April 2015, EMCDDA

Report on enquiries relating to acetylfentanyl
EMCDDA via UK FP, 18 May 2015

Updated report on enquiries relating to acetylfentanyl
EMCDDA via UK FP, 25 September 2015

Updated information on enquiries relating to alpha-PVP
EMCDDA via UK FP, 6 October 2015

Updated report on enquiries relating to methiopropamine
13 November 2015, ACMD Secretariat, Home Office

Response to a questionnaire for the 'EMCDDA publication on 'health responses' to NPS'
January 2016

Report on enquiries relating to alkyl nitrites ('poppers')
8 March 2016, ACMD Secretariat, Home Office

Future developments

On 26 May 2016, the Psychoactive Substances Act was introduced in the UK. As a consequence, the production, supply, possession with intent to supply, import or export of any non-exempted psychoactive substance are offences and carry a custodial sentence of up to seven years[4]. This act aims to reduce the availability of novel psychoactive substances, sometimes previously referred to as 'legal highs'[4]. The impact of the Act on NPIS-activity relating to drugs of misuse and NPS in particular will be monitored and published in the NPIS annual report for 2016/17.

References

1. Office for National Statistics UK. Accessed at: www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsrelatedtodrugpoisoninginenglandandwales/2015-09-03
2. NPIS annual report 2014/15
3. Wedinos. Accessed at: www.wedinos.org/db/samples/
4. www.gov.uk/government/news/trade-in-so-called-legal-highs-now-illegal

6.2 Dinitrophenol (DNP)

2,4 dinitrophenol (DNP) is an industrial chemical with a legitimate use in biomedical research and in the manufacture of other chemicals. Although not licensed as a medicine, DNP is sometimes taken orally by body builders to promote 'fat burning' and may also be used more generally as a weight-reducing agent. This is of great concern because DNP is highly toxic, causing fever which can be severe and lead to multi-organ failure and death in spite of optimum medical treatment.

Because of its severe toxicity, the NPIS has been monitoring enquiries relating to DNP in recent years. Steep increases in the numbers of NPIS telephone enquiries and TOXBASE accesses in late 2012 and early 2013 were reported in our annual report for 2012/13. These prompted warnings to the public from the FSA and actions by the police and local authorities to restrict the illegal sales of DNP. Educational work was also carried out in places where DNP might be promoted, such as gyms. Emergency departments and general practitioners were briefed by a letter from the Chief Medical Officer sent in August 2013.

Following this activity, enquiry numbers about DNP fell during 2014, as reported in our annual report last year. The NPIS has continued to keep cases of DNP exposure under surveillance and increasing numbers of telephone enquiries and TOXBASE accesses were observed in the second quarter of 2015 (Figure 6.5). This prompted a letter from the Medical Director of Public Health England to health professionals, while information and data were also published on the Public Health Matters blog[1].

The FSA's National Food Crime Unit also launched an operation during 2015 to tackle online sales of DNP and closed down several websites. Following that peak in activity in 2015, it is encouraging that the numbers of telephone calls and TOXBASE accesses have again fallen, suggesting that the actions taken have had some impact. The situation needs to be kept under close review because of the severity of toxicity associated with DNP. Of 77 cases discussed in telephone enquiries with NPIS since 2008, 11 (14%, 7 male, 4 female) are known to have died, including six reported to NPIS during 2015.

Reference

1. https://publichealthmatters.blog.gov.uk/2015/10/28/deadly-dnp/

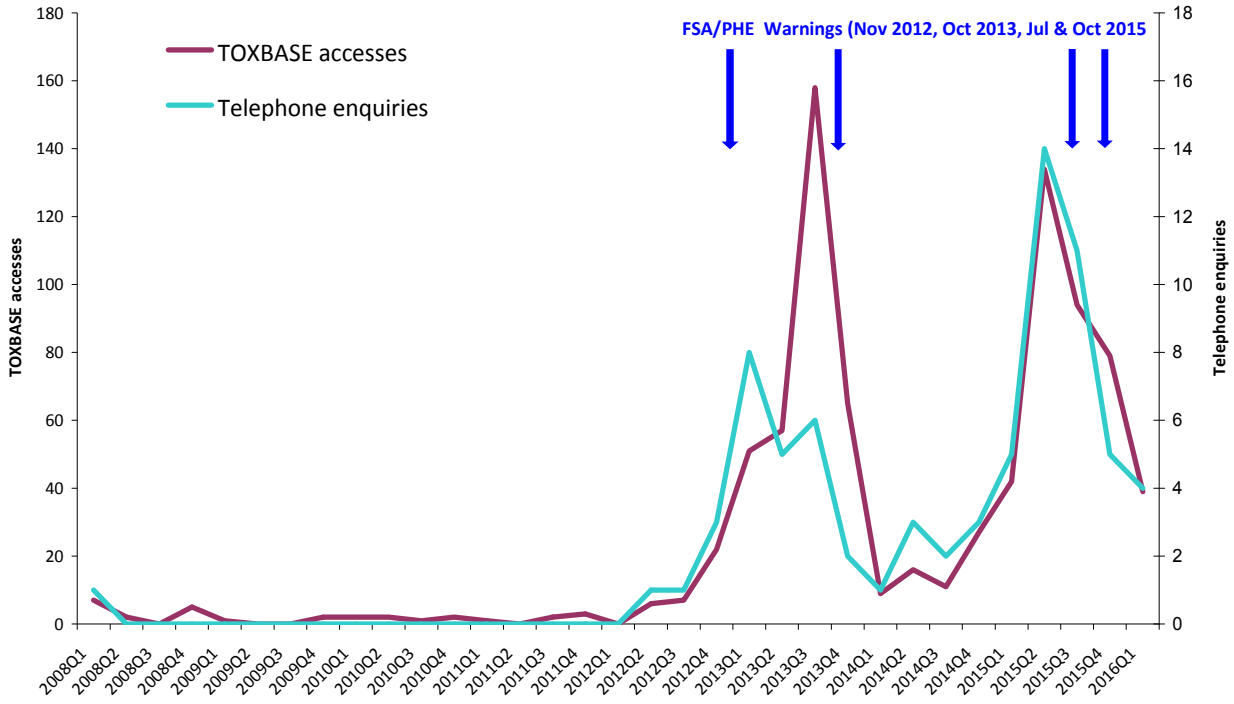

Figure 6.5 Telephone enquiries and TOXBASE accesses relating to DNP 2008-2016

6.3 Carbon monoxide

Carbon monoxide (CO) poisoning is one of the major public health poisoning problems dealt with by the NPIS. During the year 2015/6, in partnership with the Gas Safety Trust (GST), the NPIS collected information on 516 enquiries about CO, involving at least 752 individuals

The NPIS receives clinical information about potential CO exposures from two main sources. Firstly, doctors and other healthcare professionals telephone the NPIS directly for specific advice on patients under their care whom they consider may have been exposed to CO. During 2015/16 there were 300 telephone enquiries made directly to the NPIS regarding suspected or confirmed CO exposures. Secondly, TOXBASE users have the opportunity to provide their contact details when they access the CO entry on TOXBASE. Users will then be asked to complete a questionnaire; if completed and returned, NPIS can obtain patient-specific details. A further 226 enquiries involving individuals potentially exposed to CO resulted from TOXBASE-generated contacts, a 290% increase on the previous year.

Most individuals (537 of 752 or 71.4%) were exposed to CO at home, with 64 (8.5%) exposed in the workplace and five exposed in a public area. The suspected source of CO in the domestic setting was known in 393 (73.2%) enquiries.

A diagnosis of CO poisoning is confirmed by finding a high concentration of carboxyhaemoglobin (COHb) in blood. Data on COHb values were received for 283 (37.6%) of the 752 patients. Doctors and other healthcare workers are encouraged to confirm and report

the diagnosis of CO exposure immediately on the patient's presentation by measuring blood COHb concentrations.

6.4 Electronic nicotine delivery systems

The use of electronic nicotine delivery systems, including electronic cigarettes or e-cigarettes, continues to increase within the UK and elsewhere. These systems deliver a vapour which is then inhaled. This vapour is generated by heating a liquid containing various concentrations of nicotine, with the inhaled vapour typically containing nicotine, propylene glycol and flavourings.

The contents of e-cigarettes and their liquid refills vary, but many contain substantial concentrations of nicotine, a highly toxic compound. Refill solutions contain larger quantities of fluid than individual e-cigarettes, sometimes substantially larger. They are therefore potentially a greater acute hazard due to the larger volume that may be ingested, either accidentally or deliberately. Solutions that require dilution before use are also available and these contain even greater concentrations than those typically found in e-cigarettes themselves.

The NPIS received 272 enquiries concerning e-cigarettes and their refill solutions this year, a 12% increase on the previous year, continuing the recent annual increases in enquiries. Thirty nine per cent of the enquiries originated in hospitals. Children aged less than five years were involved in 37% of the enquiries, a higher proportion than previously. The majority of exposures (228, 83.8%) were accidental. However, 10% of the enquiries concerned intentional overdoses. The remainder of enquiries included adverse reactions to intended use, recreational abuse, and 'therapeutic errors'.

Where the individual route of exposure was specified, ingestion was the commonest, although multiple routes of exposure also occur and in four cases the liquid was injected. Although not specifically asked about, at least 15 enquiries were reported to have been associated with ingestion or inhalation of liquid while trying to inhale vapour from an e-cigarette, sometimes immediately after refilling the device. Eight of the 21 enquiries involving exposure through eyes occurred when the liquid was mistaken for eye drops; in a further five cases, liquid was mistakenly used as ear drops.

Where the clinical features were known at the time of the enquiry, 158 (58.1%) patients had no features and 97 (35.7%) had only minor features of toxicity. Eleven (4.0%) patients had moderate toxicity and three adult exposures were associated with severe features, each experiencing a cardiac arrest. One of these patients died, apparently after accidentally inhaling or ingesting liquid from an e-cigarette after refilling it. In the other two cases, one sustained a cardiac arrest after inhaling from an e-cigarette and the other after ingesting e-cigarette fluid. Other reported features of toxicity included conjunctivitis, irritation of the oral cavity, anxiety, nausea, vomiting, chest pain, dizziness and changes in heart rate.

It is of concern that so many of the exposures were accidental and occurred in young children and that around 5% of enquiries occurred when e-cigarette products were mistaken for medicines: either eye or ear drops. The liquid in e-cigarettes and their refills contains toxic doses of nicotine and there were three reports of adult patients experiencing cardiac arrest. Even small volumes have potential to cause serious harm to a small child. This data emphasises the need for safe storage and packaging of these products, an issue being addressed by the planned implementation of the EU Tobacco Products Directive in 2016. NPIS will continue to monitor cases and enquiries in future years to determine changes following the implementation of this directive.

6.5 Iron poisoning

Iron poisoning is one of the most potentially serious forms of poisoning seen in the UK by the NPIS. There is little data available on the most appropriate dose and duration of treatment with the antidote desferrioxamine (DFO). The NPIS, therefore, set up a prospective study collecting data on iron poisoning cases presenting to hospital between 1 February 2014 and 17 January 2016. Inclusion criteria were: ingestion of a potentially toxic dose of iron (≥20 mg/kg), symptomatic patient, raised serum iron concentration (greater than or ≥55 micromoles/L), or patient being treated with DFO.

Over the period, NPIS received 1,210 calls relating to iron exposures, the majority from hospitals (54.5%). Following exclusions (skin/eye contact; exposure to rust, fertiliser, moss killer, weed killer or slug bait; asymptomatic late presentation; and patients who were followed up but did not meet inclusion criteria), there were 397 patients in hospital who met the criteria for follow-up, including 16 patients aged 15 or younger and four patients under five years.

At the time of the enquiry, most patients were asymptomatic or had minor features (36.0% and 50.4%, respectively). Moderate and severe features were present in only 10.1% and 2.5% of patients, respectively. Features were not known for 1.1% of cases. The maximum poisoning severity score for each patient was recorded as follows: asymptomatic 22.2%; minor features 58.9%; moderate features 13.4% and severe features 2.8%. Features were not known in 1.6% of cases. At follow-up, four deaths were recorded, although none were considered likely to be caused by the iron content of the overdose; three were mixed overdoses which included cardiovascular agents in unknown amounts and the fourth was an elderly patient with pre-existing chronic heart failure.

Forty eight patients received DFO following iron overdose and one patient was discussed with the NPIS following an overdose of DFO in error during the treatment of thalassemia. In 28 of these cases (57.1%), iron was ingested alone. At the time of presentation, the patients were: asymptomatic 12.2%; minor features 49.0%; moderate features: 26.5% and severe features 8.2%. Features were not known for 4.1% of cases.

The total dose/kg of DFO administered was known for 15 (30.6%) patients and could be estimated for a further three patients (80 mg/kg, 80 mg/kg, >75 mg/kg). Median total dose was 70 (IQR 41 to 79) mg/kg, with a maximum dose of 260 mg/kg. Four patients received doses greater than the current recommendation before reassessment (83, 85, 90, and 260 mg/kg), which is 80 mg/kg but no adverse events were recorded. The patient receiving the highest dose was an 18-year-old man with a blood iron concentration of 79 µmol/L at 3.5 h who received 15 mg/kg/h for 17.5 hours.

This study showed that enquiries about iron poisoning are an important part of NPIS's workload but that fewer cases are severe and relatively few patients needed antidotes (compared for example with the 40% to 50% of paracetamol poisoned patients who receive the antidote acetylcysteine).

6.6 Pesticides

The NPIS pesticide surveillance system was established in 2004 under approval of the Pesticides Safety Directorate and funded by the UK Department for Environment, Food and Rural Affairs. The work was implemented to better describe the incidence and character of pesticide exposures in the UK that result in contact with health professionals (thereby selecting for more serious exposures). Surveillance data is collated and both quarterly and annual reports are submitted to the government's Advisory Committee on Pesticides (ACP) via the Health and Safety Executive's Chemicals Regulation Directorate (CRD).

Currently, 1,897 TOXBASE entries for pesticides and biocides are being tracked, an increase from the 1,800 tracked during 2014/15. Incident information is obtained in two ways, from follow-up of TOXBASE enquiries by an online or postal questionnaire or from data collected from during NPIS telephone enquiries.

During the year, there were 3,197 accesses to TOXBASE about pesticides of interest and information on 753 potential exposures was available from the NPIS telephone enquiry service. From TOXBASE sessions, one electronic and 360 follow-up post or email questionnaires were returned. Cases involving animals or head lice treatment products, enquiry sessions from locations in the Republic of Ireland, identifiable duplicate sessions involving the same patient, and sessions that were later reported not to have involved a pesticide, were excluded from the analysis.

Overall, information was gathered on 1,131 potential exposures involving pesticides during 2015/16, an overall return rate of 32.0%. Six exposures involved multiple patients, producing a further six potential exposures and a total of 1,137. This number is almost identical to the number of cases identified in 2014/15 (1,131).

Of the 1,137 potential exposures available for analysis, there were 30 cases where symptoms were not thought on the balance of probabilities by the respondent or by NPIS Edinburgh to be related to the pesticide exposure because of, for example, a pre-existing illness or reasonable grounds to link symptoms to a concomitant infection. These cases were excluded, leaving 1,107 exposures for further analysis. The results presented below include both unintentional

acute (953 cases; 86.2%) or chronic (30; 2.7%) exposures and deliberate self-harm exposures (DSH) (98; 8.9%). The circumstances of exposure in 26 (2.4%) cases were unknown.

Most exposures were graded as PSS 0 (604 cases; 54.7%) or PSS 1 (431; 39.0%) by the NPIS. Smaller proportions were graded moderate (PSS 2; 35; 3.2%), severe (PSS 3; 3; 0.3%) or of uncertain severity (33; 3.0%). One fatality was reported (compared with three in 2014/15), in this case following ingestion of paraquat).

Agents of interest

The agents most commonly involved in exposures are shown in Table 6.3. In addition, there were 124 cases involving unknown rodenticides, 48 cases of unknown herbicides, 22 of unknown ant killers, 21 of unknown insecticides, three of unknown wood preservatives and 21 of unknown pesticides.

Table 6.3 Pesticides most frequently reported by respondents in suspected pesticide exposures during 2015/16 compared with 2014/15, ordered by rank in 2015/16

Ingredient	2014/14	2015/16
	Frequency ≥15	
Glyphosate	113	123
Permethrin	107	100
Metaldehyde	79	56
Difenacoum	47	48
Bromadiolone	67	45
Cypermethrin	22	34
Imidacloprid	23	32
Bendiocarb	44	28
Deltamethrin	20	28
Diquat	34	23
Moxidectin	18	21
Fipronil	27	20
2,4-D	16	18
MCPA	15	17
Ferrous sulphate	15	17
Tetramethrin	35	16
Organophosphate (unspecified)	18	15

In 2015/16, patients potentially exposed to pesticide products comprised 539 adults (13 years or older – 48.7%) and 537 children (12 years or younger – 48.6%), with 29 of unknown age (2.6%). There were 601 (54.3%) male patients and 485 (43.9%) female patients and 19 cases (1.7%) where the gender was not specified.

The classes of product most commonly involved in exposures are shown in Figure 6.6. Multiple/combination products were involved in some incidents.

There were eight enquiries involving pregnant patients reported in 2015/16 (13 in 2014/15). All eight exposures were unintentional and acute. None were severe.

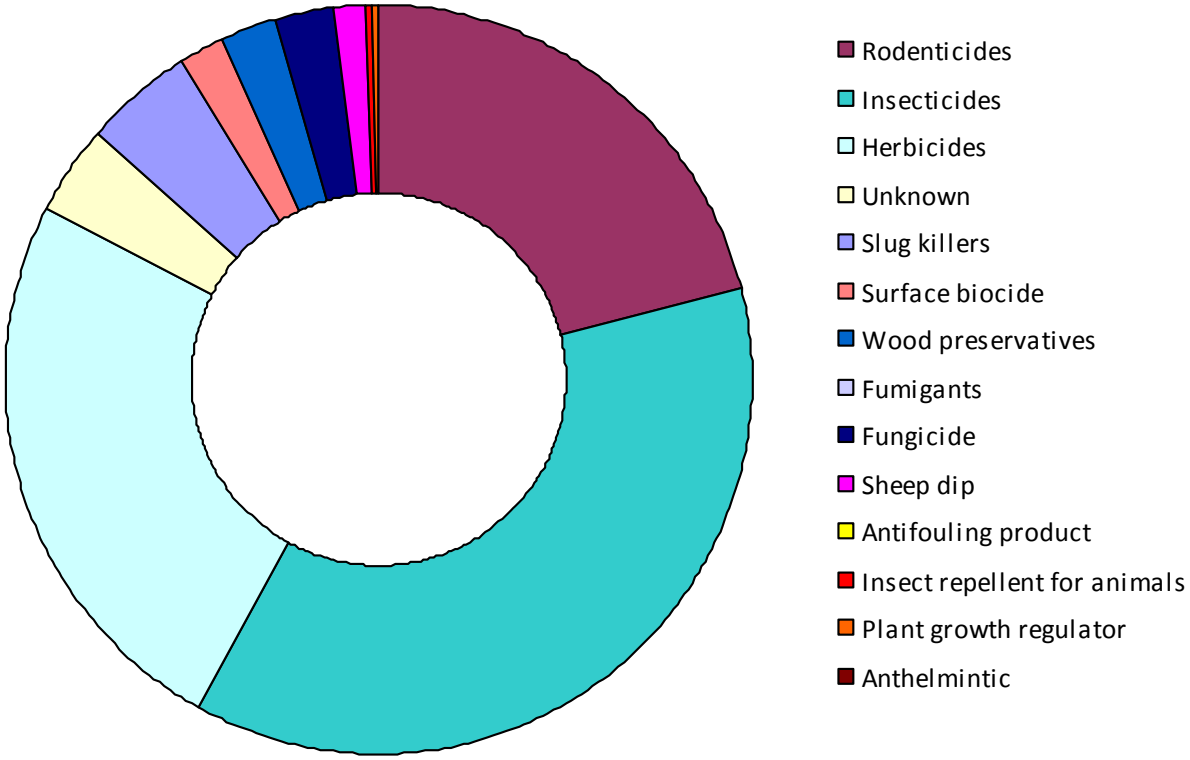

Figure 6.6 Pesticide exposures by class of product (as reported by respondent) in 2015/16 (1,157 agents)

6.7 Household products

The NPIS continues to study exposures to household products. The first study on soluble film automatic dishwashing tablets has been published[1] and the other two studies are nearing completion and will be submitted for publication in the near future.

Soluble film automatic dishwashing tablets
The traditional tablets for automatic dishwashing machines, which are still used widely, are contained within an external wrapper that requires removal prior to loading the enclosed tablet into the machine. Soluble film automatic dishwashing tablets, unlike their traditional counterparts, require no removal from an outer protective wrapper prior to use. Soluble films used in this way have two main advantages. Firstly, the exact amount of chemicals required for the purpose is delivered once the film dissolves completely in water. Secondly, because users have no direct contact with the chemicals, the soluble film products are potentially safer. That being said, the integrity of the soluble film can be compromised and the contents of the tablet can be released prematurely, for example, by contact with moist hands or saliva.

They most commonly contain a source of hydrogen peroxide (often as sodium percarbonate) and non-ionic surfactants. Other constituents in some formulations include sodium carbonate, sodium tripolyphosphate, and sodium silicate, which reduce water hardness. Once dissolved in water the pH is alkaline.

Telephone enquiries to the NPIS regarding these products were analysed retrospectively for the period January 2008 to December 2015. There were 498 enquiries relating to 488 patients. Almost all exposures occurred in the home (98.4%) and involved children aged five years or less (92.8%). Exposure occurred mainly as a result of ingestion alone (470, 96.3%), eye contact alone (9, 1.8%), and exposures involving multiple routes – ingestion with skin or eye contact (9, 1.8%) made up the remaining cases.

The majority of patients were asymptomatic following exposure (325, 67.4%). The most common feature following ingestion was vomiting which occurred in 121 of 474 cases (25.5%) where clinical data were available. Nausea (8, 1.7%) and coughing (6, 1.3%) were also reported; three patients developed stomatitis and another five developed a rash where ingestion alone was considered to be the sole route of exposure. Ocular exposure to the tablet contents resulted in blurred vision, eye pain or conjunctivitis in seven out of 10 patients.

In conclusion, ingestion of a soluble film automatic dishwashing tablet rarely resulted in clinically significant symptoms, which is surprising given the potential hazard of the ingredients. Hence, it seems probable that the amount of material actually ingested was very small or that most was spat out.

Automotive screenwashes
Automotive screenwashes may contain a mixture of ethylene glycol, methanol, isopropanol, and/or ethanol, alone or in combination with the other ingredients. The concentrations and combinations of each constituent can vary considerably between products. Some products are sold 'ready-to-use' off the shelf, while others require dilution in water at various ratios dependent on season. This study investigated the toxicity resulting from exposure as reported to the NPIS.

Enquiries to the NPIS were analysed retrospectively for the four-year period January 2012 to December 2015. There were 295 enquiries involving 255 exposures. The majority of exposures followed ingestion (241, 94.5%), 14 of which also involved skin contact. Most patients who ingested screenwash were asymptomatic (71.4%). Hence, it is likely that the amount actually ingested was very small, although the presence of ethanol in many methanol- and ethylene glycol-containing products could have reduced the likelihood of toxicity developing.

Oven cleaners
Oven cleaning products often contain corrosive substances, typically sodium or potassium hydroxide in concentrations up to 30%; increasingly these cleaners are available as aerosols or trigger sprays. Enquiries to the NPIS regarding oven cleaning products were analysed for the period January 2009 to December 2015. There were 796 enquiries relating to 780 patients. Ingestion alone (285) or skin contact alone (208) accounted for the majority of cases. Less than half of patients (41%) ingesting oven cleaner reported symptoms, which is surprising as most of the products involved contained sodium hydroxide and/or potassium hydroxide.

Reference
1. Day R, Eddleston M, Thomas SHL, Thompson J, Vale A. Toxicity of soluble film automatic dishwashing products as reported to the United Kingdom National Poisons Information Service 2008-2015. Clin Toxicol 2016; online early: doi: 10.1080/15563650.2016.1209762.

6.8 Poisoning in children

Over a quarter of telephone enquiries to the NPIS relate to exposures in children under five years of age. Most of these are exploratory ingestions, as young children are naturally inquisitive and lack a sense of danger. Fortunately, few of these ingestions result in harm and the frequency of admission due to unintentional poisoning in children in the UK has been declining over the last 10 years. It is likely that this is, in part, due to the availability of more reliable toxicology advice, resulting in fewer admissions for observation of children who have ingested substances of low toxicity.

Unfortunately, severe and fatal outcomes from unintentional poisoning in young children do still occur. A number of medications are considered high risk, where ingestion of one or two adult

doses could be fatal for a 10 kg toddler. Examples are tricyclic antidepressants, antipsychotic agents, quinine preparations, calcium channel blockers, opioid analgesics and oral hypoglycaemic drugs.

There is little published epidemiological information about the frequency of severe and fatal pharmaceutical poisoning in young children in the UK. Therefore, NPIS staff retrospectively analysed several national databases to try further to characterise those substances most commonly involved. Data, with identification of causative agent where possible, were obtained from the Office of National Statistics (ONS) for fatal poisoning in England and Wales; the Paediatric Intensive Care Audit Network (PICANet) for severe non-fatal poisoning; NPIS clinical enquiries for severe non-fatal and fatal poisoning; and Hospital Episode Statistics (HES) for data on admissions to English hospitals.

Between 2001 and 2013, 28 children aged four years and under were registered to have died due to accidental poisoning by a pharmaceutical product in England and Wales. Methadone was the responsible drug in 16 (57%) cases. In the UK, 201 children aged four years and under were admitted to paediatric intensive care with pharmaceutical poisoning between 2002 and 2012. The agent(s) responsible was identified in 115 cases, most commonly benzodiazepines (22/115, 19%) and methadone (20/115, 17%). Methadone was also common amongst clinical enquiries to NPIS for children with severe poisoning (Figure 6.7).

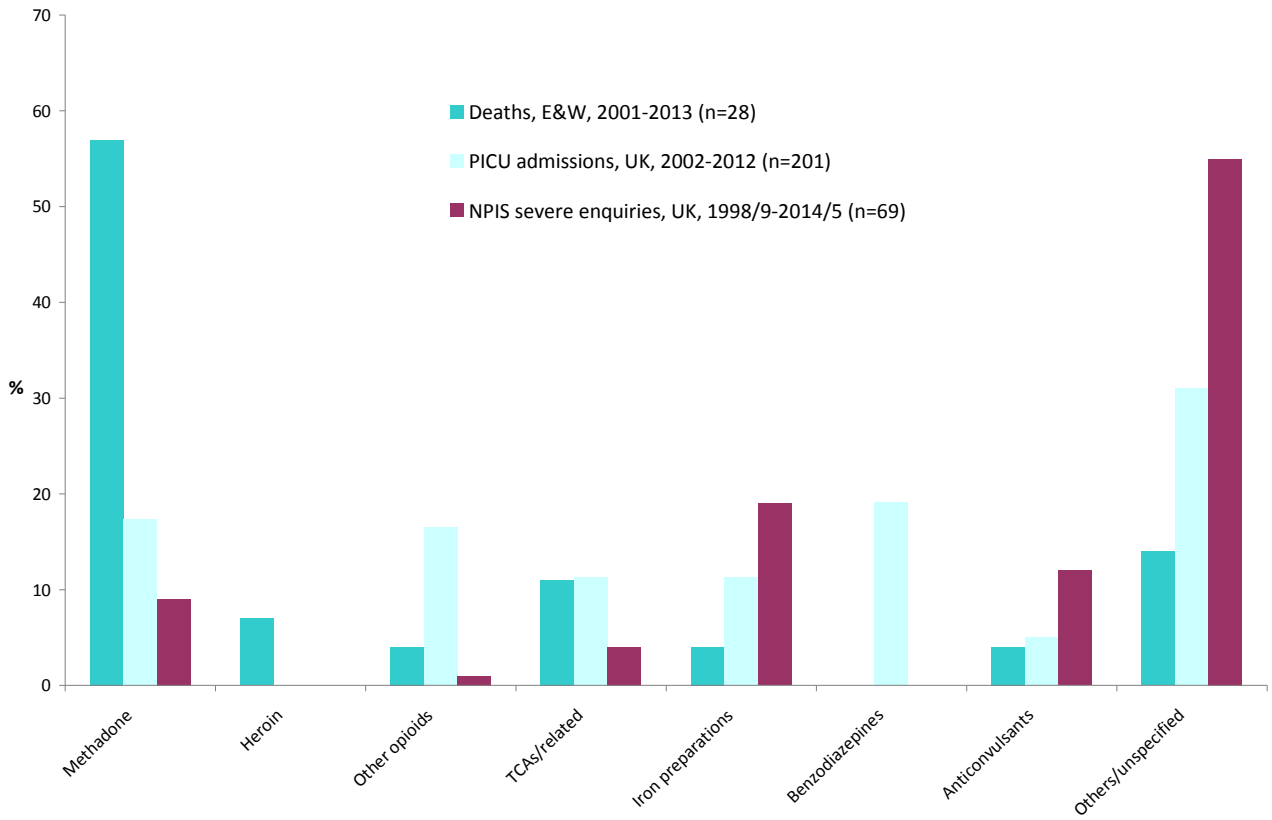

Figure 6.7 Proportion of all recorded episodes of fatal or severe poisoning contributed to by specific drugs or groups in children <five years of age

This data highlights the significant risk to young children associated with exploratory ingestion of methadone. Unfortunately, the existing databases provide little detail concerning the circumstances of these tragic events and it will be important for NPIS to be involved in future prospective studies to provide better guidance to healthcare staff prescribing potentially high-risk medications and to inform wider poisoning prevention strategies.

6.9 Education and training for NPIS users

Emergency medicine training

The NPIS and the Royal College of Emergency Medicine (RCEM) have held joint CPD days providing a comprehensive update on the presentation and management of poisoned patients for consultants and trainees in emergency medicine since 2010. In 2015/16 sessions were again held in London and Newcastle covering topics including toxicity from classic and new recreational drugs, calcium channel blockers, paracetamol, toxic alcohols and glycols, the management of poisoning-related arrhythmias and poisoning in children. These study days were well attended and feedback from delegates was excellent. The programme will continue in 2016/17 with an update to the topics covered.

TOXlearning – a clinical toxicology e-learning resource

A clinical toxicology e-learning resource was first developed by NPIS Edinburgh in 2005. It has been available to NHS healthcare professionals across the UK in its current form (Figure 6.8) since December 2013 at www.toxlearning.co.uk.

The resource was initially created to train new NHS 24 centre staff in Scotland but has been developed over time to deliver a series of modules designed to improve knowledge of the clinical management of poisoned patients for doctors, nurses and pharmacists in hospitals and general practice, ambulance personnel, staff of NHS 111, NHS 24 and NHS Direct and other healthcare professionals. NPIS recommends that TOXBASE users of all types and grades should complete the ‘Using TOXBASE’ module (see Box 6.1).

The number of registered users has risen from 1,997 at 31 March 2015 to 2,878, an increase of 44% from 2014/15 and a remarkable 450% from 2013/14; 92% of current users come from the UK. The top user types are ambulance/paramedical staff (28%) and nurses (28%), doctors (18%) and medical/nursing students (10%). The top workplaces are NHS 111, NHS 24 and NHS Direct (25%), ambulance services (20%), and hospital emergency departments (11%). The resource is used by an average of 75 users per month (range 58-106 unique logins).

Registration and access are free; users can work through courses at their own pace, save their work, obtain their scores and print off their results for continuing professional development files.

NHS 111 training activities

During 2015/16, of the 47,873 telephone enquiries answered by the NPIS, 16,702 (34.9%) originated from NHS 111 (15,829 - 33.1%), NHS 24 and NHS Direct sites (873 - 1.8%). Due to this high demand, TOXBASE is constantly reviewed and revised with NHS 111 users in mind. However, audit of NHS 111 enquiries shows that telephone enquiries are still increasing in number. NPIS is working with NHS 111 to explore ways of providing CPD to their staff on poisoning and TOXBASE.

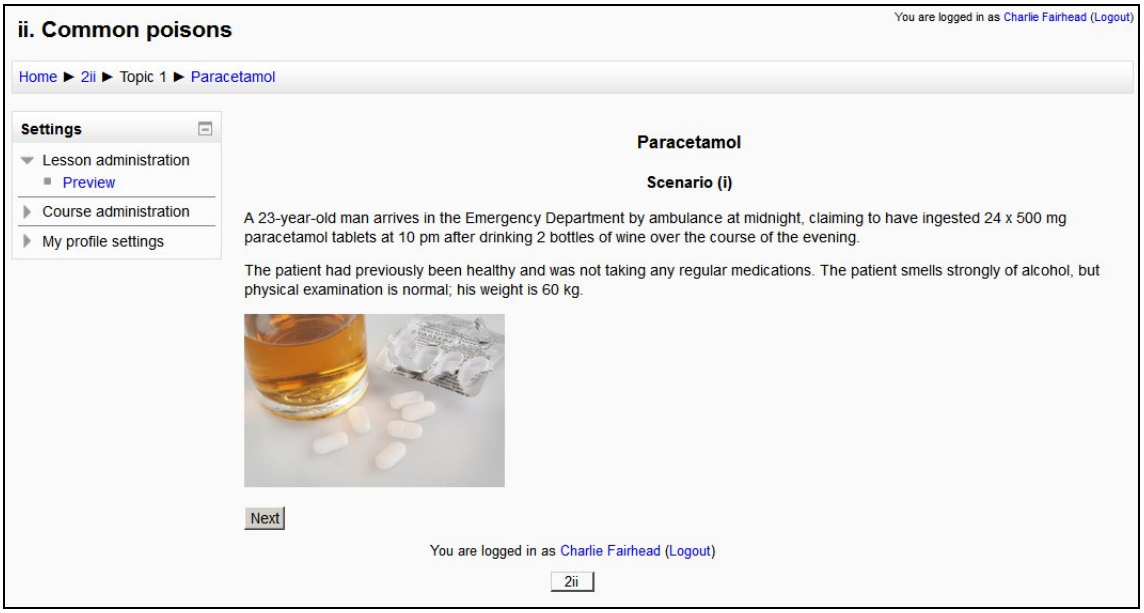

Figure 6.8 Common poisons screenshot from www.toxlearning.co.uk

BOX 6.1 TOXlearning module details

Module 1 – Using TOXBASE
This module, which represents 75 minutes of learning, is designed to assist new and existing TOXBASE users to use the database more effectively

Module 2 – Clinical management of the poisoned patient
This module, which represents 180 minutes of learning, includes units on:
- general aspects of poisoning
- problematic poisons
- common poisons
- drugs of misuse

Module 3 – Management of patients involved in chemical incidents
This module, which represents 210 minutes of learning, includes units on:
- decontamination and incident management
- factory and motor vehicle accidents
- leaks and contamination
- riots and potential deliberate release

7. Conclusions

This annual report demonstrates that during 2015/16 the NPIS has continued to be a heavily used frontline clinical service that is highly valued by the healthcare professionals managing patients with suspected poisoning. Access to our online poisons information on TOXBASE has continued to increase, while the growing use of the TOXBASE app further improves the ability of healthcare staff to obtain essential management information when they need it, even when they do not have access to the internet.

In spite of this increasing availability and use of high-quality, evidence-based poisons information, overall telephone enquiry workload has not changed substantially in recent years. The quality of these services is evidenced by the outstanding user feedback received for all our information platforms and the low numbers of critical incidents recorded and complaints received.

For UKTIS, large increases in accesses to our online information on drugs and other chemical exposures in pregnancy have offset small reductions in telephone enquiry numbers. The five-fold increase observed this year in accesses to information designed for the public testifies to the success of this approach in delivering information to pregnant women and their families to help them make decisions about their own health, in consultation with their own healthcare team.

Adding further value, data collected routinely by NPIS has continued to be of great value for health surveillance, highlighting and monitoring important clinical toxicology issues across the UK and allowing evaluation of public health measures taken in relation to these. Similarly, the information collected by UKTIS on pregnancy outcomes after maternal exposures to medicines and other substances is of great value in determining foetal risks and for counselling women who have been or may become exposed to substances of concern.

Our staff can be very proud of the successes described in this annual report, which have been achieved in spite of growing financial and staffing pressures. In view of the frequency of suspected poisoning as a presentation to acute medical services, it remains essential that the service continues to have the capacity to provide high quality, evidence-based and up-to-date information, as it has done for over 50 years.

8. Recommendations

Outcome of Recommendations for NPIS in 2015/16

To review the consultant support required by the NPIS to maintain a safe and effective clinical service
Outcome: Review completed and information provided to PHE

To re-launch the TOXBASE app as a free service for NHS and PHE staff, allowing rapid and convenient access to information about poisoning
Outcome: TOXBASE app re-launched in September 2015 (see section 3.6)

To launch and evaluate the UKTIS online reporting tool for pregnant women now available on the ***bumps*** website
*Outcome: Online reporting tool launched. Evaluation of **bumps** website completed (see section 5.2)*

To continue to monitor clinical enquiries related to dinitrophenol and electronic nicotine delivery systems and to support the responsible government agencies in planning the actions they need to take
Outcome: Data for 2015/16 provided to responsible agencies and published in this annual report (See sections 6.2 and 6.4)

Recommendations for NPIS in 2016/17

Re-evaluate best use of staff for maintaining key NPIS functions including the 24/7 telephone rota and the TOXBASE database in the light of reducing funding and staff numbers

Deliver current surveillance projects that are externally funded and continue to seek further external income to support the integrity of the current service

Evaluate the impact of the Psychoactive Substances Act 2016 on NPIS activity relating to drugs of misuse

Continue to monitor NPIS data related to poisons of current importance including dinitrophenol, electronic nicotine delivery systems, carbon monoxide and pesticides and to report data to appropriate government agencies as appropriate

APPENDIX A: Senior NPIS staff

NPIS Consultants and Senior Staff

NPIS Birmingham

Dr S M Bradberry BSc MD FRCP FAACT FEAPCCT
Director, West Midlands Poisons Unit and Deputy Director, NPIS Birmingham, City Hospital, Birmingham

Mr A Campbell BSc MSc DipMedTox FEAPCCT FAACT
Manager, NPIS Birmingham

Professor J A Vale MD FRCP FRCPE FRCPG FFOM FAACT FBTS FBPhS FEAPCCT Hon FRCPSG
Director, NPIS Birmingham, City Hospital, Birmingham; School of Biosciences, University of Birmingham

NPIS Cardiff

Mrs G L Alldridge MBE
Senior Information Services Manager, NPIS Cardiff

Dr J Coulson BSc MBBCh LLM MD MRCP DipMedTox DipTher GCGI FRCPE ERT
Senior Lecturer in Clinical Pharmacology, Centre for Medical Education, Cardiff University and Honorary Consultant, Cardiff and Vale University Health Board

Dr C V Krishna MD FRCP DipMedTox DipTher
Deputy Director, NPIS Cardiff; Consultant Physician, Clinical Pharmacologist, Toxicologist Cardiff and Vale University Health Board and Honorary Senior Clinical Lecturer, Cardiff University

Dr A Thomas MBChB MRCP
Senior Lecturer in Clinical Pharmacology, Centre for Medical Education, Cardiff University and Honorary Consultant, Cardiff and Vale University Health Board

Dr J P Thompson BMedSci MBChB FRCP FBTS FEAPCCT FBPhS
Director, NPIS Cardiff; Senior Lecturer in Clinical Pharmacology, Centre for Medical Education, Cardiff University and Honorary Consultant, Cardiff and Vale University Health Board

NPIS Edinburgh

Dr J W Dear PhD FRCPE
Reader in Clinical Pharmacology and Honorary Consultant Clinical Toxicologist, University of Edinburgh and NHS Lothian

Professor M Eddleston ScD FRCPE FEAPCCT
Director, NPIS Edinburgh; Professor of Clinical Toxicology and Lister Prize Fellow, University of Edinburgh; Consultant Clinical Toxicologist, Royal Infirmary of Edinburgh

Dr G Jackson BSc DipMedTox PhD
Information Services Manager, NPIS Edinburgh

Dr E A Sandilands MD FRCPE PGCertMedEd
Consultant Physician and Clinical Toxicologist, Royal Infirmary of Edinburgh; Honorary Senior Clinical Lecturer, University of Edinburgh

Dr A Veiraiah MB BS MRCP
Consultant in Acute Medicine and Toxicology, Royal Infirmary of Edinburgh

NPIS Newcastle (including UKTIS)

Mrs S Bradley BSc MSc MSc
Information Services Manager, NPIS Newcastle

Dr S L Hill BSc MBBS MRCP
Consultant Physician and Clinical Toxicologist, Newcastle upon Tyne Hospitals NHS Foundation Trust; Honorary Senior Clinical Lecturer, Institute of Cellular Medicine, Newcastle University

Dr S Stephens BSc PhD
Assistant Head of Teratology, UK Teratology Information Service, Newcastle upon Tyne Hospitals NHS Foundation Trust; Honorary Associate Fellow, Institute of Cellular Medicine, Newcastle University

Dr H K R Thanacoody MD FRCP FRCPE
Consultant Physician and Clinical Toxicologist, Newcastle upon Tyne Hospitals NHS Foundation Trust; Honorary Senior Clinical Lecturer, Institute of Cellular Medicine, Newcastle University

Professor S H L Thomas BSc MD FRCP FRCPE FEAPCCT
Director, NPIS Newcastle and UKTIS; Consultant Physician, Newcastle upon Tyne Hospitals NHS Foundation Trust; Professor of Clinical Pharmacology and Therapeutics, Newcastle University

Dr L M Yates MBChB PhD DRCOG MRCPCH
Head of Teratology, UKTIS; Consultant in Clinical Genetics, Institute of Genetic Medicine, Newcastle upon Tyne Hospitals NHS Foundation Trust; Honorary Senior Clinical Lecturer, Institute of Genetic Medicine, Newcastle University

Consultants providing on-call support for the NPIS

Professor P I Dargan FRCPE FACMT FRCP FAACT FEAPCCT FBPhS
Consultant Physician and Clinical Toxicologist, Clinical Director, Guy's and St Thomas' NHS Foundation Trust, and King's Health Partners, London; Professor of Clinical Toxicology, King's College London, London

Dr W S Waring BMedSci MB PhD FRCPE FRCP FBPhS
Consultant Physician in Acute Medicine and Clinical Toxicology, York Teaching Hospitals NHS Foundation Trust; Honorary Senior Lecturer in Medicine, Hull York Medical School, York

Dr D M Wood MD FRCP FEAPCCT FACMT FBPhS
Consultant Physician and Clinical Toxicologist and Service (clinical) Lead for Medicine, Guy's and St Thomas' NHS Foundation Trust and King's Health Partners, London; Honorary Senior Lecturer, King's College London, London

Consultants providing specialist support for the NPIS

Dr M Anderson BSc BMedSci BMBS MRCPCH
Consultant Paediatrician, Great North Children's Hospital, Newcastle upon Tyne Hospitals NHS Foundation Trust

Dr J M Wraight MBChB MSc FCEM Dip Med Tox
Consultant Emergency Physician with Toxicology, St John's Hospital, Livingston and the Royal Infirmary of Edinburgh.

National and international appointments of NPIS senior staff

NPIS staff have roles in supporting many important aspects of toxicology, both nationally and internationally. These include advisory roles to international and national bodies, including government, as well as academic activities. The range of their roles presented below provides a flavour of these activities and indicates the wider 'added value' of the NPIS.

NPIS Birmingham

Dr S M Bradberry
INTERNATIONAL ACTIVITIES
Scientific Committee Member: European Association of Poison Centres and Clinical Toxicologists
UK ADVISORY COMMITTEES
Member: Health and Safety Executive Pesticide Incident Appraisal Panel
ACADEMIC ACTIVITIES
Honorary Senior Lecturer: School of Biosciences, University of Birmingham
Joint Course Organiser: MSc (Toxicology), University of Birmingham
Educational Supervisor: Sandwell and West Birmingham Hospitals NHS Trust
Member: Drugs and Therapeutics Committee, Sandwell and West Birmingham Hospitals NHS Trust

Mr A Campbell
INTERNATIONAL ACTIVITIES
President: European Association of Poisons Centres and Clinical Toxicologists (EAPCCT)
Member: Scientific and Meetings Committee (EAPCCT)
Member: Finance Committee (EAPCCT)
Member: Communications Committee (EAPCCT)
Member: Nomination Committee (EAPCCT)
Chair: Education Committee (EAPCCT)
Member: Contracts Working Group (EAPCCT)
UK ADVISORY COMMITTEES
Member: British Small Animal Veterinary Association (BSAVA) Petsavers Grants Award Committee

Professor J A Vale
INTERNATIONAL ACTIVITIES
Member: Advisory Board Hong Kong Poisons Centre
INTERNATIONAL SOCIETIES
Past President: Clinical and Translational Specialty Section, Society of Toxicology
INTERNATIONAL JOURNALS
Reviews Editor: Clinical Toxicology
UK ADVISORY COMMITTEES
Chairman: Ministry of Defence Research Ethics Committee
Consultant: Dstl Porton Down
Member: Expert Advisory Group on Management of Casualties Caused by Chemical Terrorism (Blain II)
ACADEMIC ACTIVITIES
Joint Course Organiser: MSc (Toxicology), University of Birmingham
Examiner: MRCP(UK) Part 2 Clinical Examination (PACES)

NPIS Cardiff

Dr J Coulson
UK ADVISORY COMMITTEES
Member: Committee on Toxicity
Co-opted member: Tramadol subcommittee to the Advisory Panel on Substance Misuse
NHS NATIONAL AND REGIONAL COMMITTEES
Member: All Wales Medicines Strategy Group
ACADEMIC ACTIVITIES
Clinical Senior Lecturer: Cardiff University
Visiting Lecturer: Birmingham University

Dr C V Krishna
INTERNATIONAL ACTIVITIES
International PACES examiner: Royal College of Physicians, UK
UK ADVISORY COMMITTEES
Member: Specialist Advisory Committee, Clinical Pharmacology and Therapeutics
Workforce Lead: Clinical Pharmacology in the UK
NHS NATIONAL AND REGIONAL COMMITTEES
Chairman and Training Programme Director: Clinical Pharmacology Training in Wales
Member: New Medicines Group, All-Wales Medicines Strategy Committee
Member: Joint Specialty Committee, Clinical Pharmacology and Therapeutics
Member: All-Wales Specialist Training Committee in Clinical Pharmacology
ACADEMIC ACTIVITIES
Course Director: Medical Toxicology Courses, Cardiff University
Member: SAC, Clinical Pharmacology and Therapeutics, UK
Member: Steering Committee, Diploma in Therapeutics, Cardiff University
PACES Examiner: Royal College of Physicians, UK

Dr A Thomas
NHS NATIONAL AND REGIONAL COMMITTEES
Medical Director: Yellow Card Centre Wales
Member: New Medicines Group, All-Wales Medicines Strategy Committee
Member: All-Wales Specialist Training Committee in Clinical Pharmacology

ACADEMIC ACTIVITIES
Theme Lead: BDS Human Disease Course, Cardiff University
Member: Steering Committee, Diploma/MSc in Medical Toxicology, Cardiff University
Member: Steering Committee, Diploma in Therapeutics, Cardiff University
Member: Final Year Exam Executive, Cardiff University

Dr J P Thompson
INTERNATIONAL ACTIVITIES
Member: Advisory Board Hong Kong Poisons Centre
Consultant: WHO Collaborating Centre for Chemical Incidents
INTERNATIONAL SOCIETIES
Chair: EAPCCT Working Group on International Poisons Centre Activities and Regulatory Affairs
Member: EAPCCT Board
UK ADVISORY COMMITTEES
Member: Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT)
Senior Medical Officer: Yellow Card Centre (Wales)
NHS NATIONAL AND REGIONAL COMMITTEES
Chair: Human Toxicology Section, British Toxicology Society
Member: Joint Specialty Committee, Clinical Pharmacology and Therapeutics
Member: New Medicines Group, All-Wales Medicines Strategy Committee
Member: All-Wales Specialist Training Committee in Clinical Pharmacology
Member: New Medicines Group for All Wales Medicines Strategy Group
ACADEMIC ACTIVITIES
Associate Course Director: Certificate/Diploma/MSc in Medical Toxicology; Therapeutics; and Occupational Health, Policy and Practice, Cardiff University
Theme Lead: Prescribing and Therapeutics Education, School of Medicine, Cardiff University

NPIS Edinburgh

Dr J Dear
NHS NATIONAL AND REGIONAL COMMITTEES
Deputy Director: Yellow Card Centre, Scotland
Member: Lothian Formulary Committee
ACADEMIC ACTIVITIES
External Examiner: BSc Clinical Pharmacology, Kings College, London
External Examiner: MSc/Diploma in Medical Toxicology, Cardiff University
Member: British Pharmacological Society Clinical Section Committee
Chair: Toxicology Affinity Group for British Pharmacological Society

Professor M Eddleston
INTERNATIONAL ACTIVITIES
Member: WHO Expert Advisory Group for the FAO and WHO Joint Meeting on Pesticide Management.
Advisor: World Health Organization/Department of Mental Health and Evidence and Policy on Environmental Health
INTERNATIONAL JOURNALS
Editorial Board Member: Clinical Toxicology

UK ADVISORY COMMITTEES
Member: UK Department of Health Committee on Antivenoms

Dr E A Sandilands
UK ADVISORY COMMITTEES
Advisor: Consortium of Local Education Authorities for the Provision of Science in Schools (CLEAPSS)
Advisor: Scottish Schools Education and Research Centre (SSERC)
NHS NATIONAL AND REGIONAL COMMITTEES
Member: Lothian Drug and Therapeutics Committee
ACADEMIC ACTIVITIES
CPD Lead: National Poisons Information Service
Undergraduate Educational Lead: Royal Infirmary of Edinburgh

Dr A Veiraiah
NHS NATIONAL AND REGIONAL COMMITTEES
Medical Lead: SPSP Medicines
ACADEMIC ACTIVITIES
Lothian QI Academy Coach
NPIS Newcastle (including UKTIS)

NPIS Newcastle

Dr S Hill
NHS NATIONAL AND REGIONAL COMMITTEES
Member: UK Focal Point Early Warning System on New Psychoactive Substances
Member and Curriculum Lead: Specialist Advisory Committee, Clinical Pharmacology and Therapeutics, Northern Deanery Representative
Member: MRCP Part 1 and 2 Specialty Question Writing Group
ACADEMIC ACTIVITIES
Strand Lead: Masters in Clinical and Health Sciences with Therapeutics, Newcastle University
Module Lead: Masters in Clinical and Health Sciences with Therapeutics – Drug Discovery and Pre-clinical Development, Newcastle University
Module Lead: Drug Discovery and Development, Masters by Research in Translational Medicine, Newcastle University
Training Programme Director and SAC Representative: Clinical Pharmacology and Therapeutics, HEE North East
Member: Clinical Pharmacology and Therapeutics STC (HEE North East)
Member: Acute Medicine STC/DWDN Lead (HEE North East)
Educational Supervisor: PHE Funded Advanced Fellowship in Clinical Toxicology
Site Lead: Foundations of Clinical Practice, MBBS stage 3, Tyne base unit, Newcastle University

Dr H K R Thanacoody
UK ADVISORY COMMITTEES
Member: Pharmacovigilance Expert Advisory Group, Medicines and Healthcare Products Regulatory Agency
ACADEMIC ACTIVITIES
Member: Joint Royal Colleges MRCP (Part 1) Examining Board
Module Leader: Experimental Medicine and Therapeutics, MRes in Translational Medicine, Newcastle University
Module Leader: Drug Development from First-in-Man to Bedside, Masters in Clinical and Health Sciences, Newcastle University

Professor S H L Thomas
INTERNATIONAL ACTIVITIES
Member (previous President): European Association of Poisons Centres and Clinical Toxicologists
Expert Panel Member: European Medicines Agency

INTERNATIONAL JOURNALS
Senior Editorial Board Member: Clinical Toxicology
UK ADVISORY COMMITTEES
Co-opted Member: Technical Committee, Advisory Council on Misuse of Drugs
Member: Ministry of Defence Advisory Committee on Military Medicine
NHS NATIONAL AND REGIONAL COMMITTEES
Director: Yellow Card Centre (Northern and Yorkshire)
Medical Director: Regional Drug and Therapeutics Centre, Newcastle
Member: Northern Treatment Advisory Group
Member: North of Tyne Area Prescribing Committee
Chair: North of Tyne Area Prescribing Committee, Formulary Subcommittee
ACADEMIC ACTIVITIES
Strand Leader: MRes in Translational Medicine and Therapeutics, Newcastle University

Dr L Yates
INTERNATIONAL ACTIVITIES
Chair: Working Group 2: Independence and Transparency, European Medicines Agency (EMA) – European Network of Centres for Pharmacoepidemiology and Pharmacovigilance (ENCePP)
Board Member: European Network of Teratology Information Services (ENTIS)
Chair: Pregnancy Special Interest Group, (EMA-ENCePP)
UK ADVISORY COMMITTEES
Member: Expert Advisory Committee, Medicines and Healthcare Products Regulatory Agency (MHRA)
NHS NATIONAL AND REGIONAL COMMITTEES
Member: Northern Congenital Abnormality Survey (NorCAS) Steering Committee November 2012 – present
ACADEMIC ACTIVITIES
Steering Committee Member: Neurodevelopment of Babies born to Mother's with Epilepsy (NaME) Study, Hyperemesis Gravidarum Interventions Evidence Synthesis Study

Consultants providing on-call support for the NPIS

Professor P I Dargan

INTERNATIONAL ACTIVITIES

Member: European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) Scientific Committee
Board Member: European Association of Poison Centres and Clinical Toxicologists
Scientific Committee Member: European Association of Poison Centres and Clinical Toxicologists
Board Member: Asia Pacific Association of Medical Toxicology
Scientific Committee Member: Asia Pacific Association of Medical Toxicology
Member: American College of Medical Toxicology International Committee
International Advisory Board: Indian Society of Toxicology
Abstract Reviewer: American Academy of Clinical Toxicology
Expert Adviser: World Health Organization
Member: WHO/UN Global Alliance to Eliminate Lead from Paint
Member: WHO Global Burden of Disease Expert Panel
Delegate to the Council: European Association of Clinical Pharmacology

INTERNATIONAL JOURNALS

Editorial Board Member: Clinical Toxicology
Editorial Board Member: Quarterly Journal of Medicine
Editorial Board Member: Case Reports in Medicine
Editorial Board Member: Journal of Addiction Therapy and Research
Editorial Board Member: Toxicologie Analytique et Clinique
Editorial Board Member: Journal of Addiction

UK ADVISORY COMMITTEES

Member: Advisory Council on Misuse of Drugs
Member: Technical Committee, Advisory Council on Misuse of Drugs
Co-chair: College of Emergency Medicine Antidote Guideline Group
Member: London Drug and Alcohol Policy Forum
Steering Group Member: National Programme on Substance Abuse Deaths
Invited Expert: Commission on Human Medicines Expert Working Group (Paracetamol 2016)

ACADEMIC ACTIVITIES

Member: King's College London Phase 5 Examination Board Member
Member: Faculty of Translational Medicine, Biomedical Research Centre (BRC) at Guy's and St Thomas' NHS Foundation Trust and King's College London
Member: London Ambulance Service Clinical Audit and Research Steering Group
Examiner: MRCP (UK) Part 2 Clinical Examination (PACES)
External Examiner: University College London PhD, University of Sydney PhD
Member: WHO Global Burden of Disease Expert Panel

Dr W S Waring

INTERNATIONAL JOURNALS

Associate Editor: Therapeutic Advances in Drug Safety
Editorial Board Member: European Journal of Clinical Pharmacology
Editorial Board Member: Expert Review of Clinical Pharmacology
Editorial Board Member: Recent Patents on Cardiovascular Drug Discovery

UK ADVISORY COMMITTEES

Member: Independent Review Panel for Borderline Products,
Medicines and Healthcare Products Regulatory Agency

NHS NATIONAL AND REGIONAL COMMITTEES
Regional Specialty Advisor: Clinical Pharmacology and Therapeutics
Member: Regional RCP Advisory Appointments Committee
CPT Representative: RCP Revalidation Specialty Advisory Group
Clinical Examiner: PACES, Royal College of Physicians of Edinburgh
Member: Regional Training Committee for Acute Medicine
ACADEMIC ACTIVITIES
Honorary Senior Lecturer: Hull York Medical School

Dr D M Wood
INTERNATIONAL ACTIVITIES
Expert Advisor: European Monitoring Centre for Drugs and Drug Addiction
Member: American Academy of Clinical Toxicology Scientific Review Committee
INTERNATIONAL SOCIETIES
British Pharmacological Society Clinical Section representative: Council of the European Association of Clinical Pharmacology and Therapeutics
INTERNATIONAL JOURNALS
Editorial Board Member: Journal of Medical Toxicology
International Scientific Committee Member: Toxicologie Analytique et Clinique
UK ADVISORY COMMITTEES
Co-opted Member: UK Advisory Council on the Misuse of Drugs Technical and Novel Psychoactive Committees
Member: Scientific advisory group on the Health Foundation Funded ‘Project Neptune’
Member: Advisory Board of the Angelus Foundation
NHS NATIONAL AND REGIONAL COMMITTEES
Member: Department of Health Early Warning System
Member: Public Health England National Drugs Intelligence Network
ACADEMIC ACTIVITIES
Joint Project Co-ordinator: European Drug Emergencies Network (Euro-DEN) Plus
Lecturer: NPIS/CEM Clinical Toxicology Training Days

APPENDIX B NPIS publications in 2015/16

94 contributions to the scientific literature were published in 2015/16 by NPIS staff*

** NPIS staff are given in **bold** type*
[#] early online publication details for this paper were previously listed in the 2014/15 NPIS report

Peer-reviewed papers

Antoine DJ, **Dear JW**. How to treat paracetamol overdose and when to do it. Expert Rev Clin Pharmacol 2016. Published online 2/3/16.

Antoine DJ, Sabbisetti VS, Francis B, Jorgensen AL, Craig DG, Simpson KJ, Bonventre JV, Park BK, **Dear JW**. Circulating kidney injury molecule 1 predicts prognosis and poor outcome in patients with acetaminophen-induced liver injury. Hepatol 2015; 62: 591-9.

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Thanacoody RHK, **Gilfillan C**, **Bradberry SM**, **Davies J**, **Jackson G**, **Vale JA**, **Thompson JP**, **Eddleston M**, **Thomas SHL**. Management of poisoning with ethylene glycol and methanol in the UK: a prospective study conducted by the National Poisons Information Service (NPIS). Clin Toxicol 2016; 54: 134-40.

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Vale A. Alcohols and glycols. Medicine 2016; 44: 128-32.

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Vale A, **Bradberry S**. Poisoning: introduction. Medicine 2016; 44: 75.

Vale A, **Bradberry S**. Assessment and diagnosis of the poisoned patient. Medicine 2016; 44: 82-6.

Vale A, **Bradberry S**. Management of poisoning: initial management. Medicine GBR 2016; 44: 97-8.

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Vliegenthart AD, Shaffer JM, Clarke JI, Peeters LE, Caporali A, Bateman DN, Wood DM, Dargan PI, Craig DG, Moore JK, Thompson AI, Henderson NC, Webb DJ, Sharkey J, Antoine DJ, Park BK, Bailey MA, Lader E, Simpson KJ, **Dear JW**. Comprehensive microRNA profiling in acetaminophen toxicity identifies novel circulating biomarkers for human liver and kidney injury. Sci Rep 2015; 5: 15501.

Weber-Schoendorfer C, Oppermann M, Wacker E, Bernard N; network of French pharmacovigilance centres, Beghin D, Cuppers-Maarschalkerweerd B, **Richardson JL**, Rothuizen LE, Pistelli A, Malm H, Eleftheriou G, Kennedy D, Kadioglu Duman M, Meister R, Schaefer C. Pregnancy outcome after TNF-α inhibitor therapy during the first trimester: a prospective multicentre cohort study. Br J Clin Pharmacol 2015; 80: 727-39.[#]

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Published congress abstracts

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Alldridge G, **Jones S**, **Vale JA**, **Eddleston M**, **Thomas SHL**, **Thompson JP**. Kettle descalers: A brewing issue. Clin Toxicol 2015; 53: 319.

Bartelson BB, Desel H, Schaper A, Davanzo F, Sesana F, **Cooper G**, **Thompson JP**, Johnson DJG, Green JL. Trends over time in population rates of intentional misuse and self-harm mentions with buprenorphine, methadone, and oxycodone as reported to poison centres in Germany, Italy and the UK. Clin Toxicol 2015; 53: 374.

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