Public Health England

NPIS
National Poisons Information Service

National Poisons Information Service
Report 2018/19

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

National Poisons Information Service

The 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 United Kingdom. Poisoning is a common cause of hospital admission in the UK, being similar in number to admissions to other common medical emergencies. NPIS advice ensures that healthcare professionals not only have access to up to date information about treating poisoned patients, but also information to safely manage appropriate cases of minor poisoning at home, thus reducing unnecessary use of NHS resources. The major workload of the NPIS is to advise hospital emergency departments, NHS telephone advice services (NHS 111, NHS 24 and NHS Direct) and also primary care services.

NPIS Birmingham unit
City Hospital, Birmingham, hosted by Sandwell and West Birmingham Hospitals NHS Trust
Director: Dr S M Bradberry BSc MD FRCP FAACT FEAPCCT

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 FAACT

NPIS Edinburgh unit
Royal Infirmary of Edinburgh, hosted by NHS Lothian
Director: Dr E A Sandilands BSc MD FRCP Edin

NPIS Newcastle unit
Regional Drug and Therapeutics Centre, Newcastle, hosted by Newcastle upon Tyne Hospitals NHS Foundation Trust
Director: Professor S H L Thomas BSc MD FRCP FRCPE FEAPCCT FAACT

Editors
Ms L Gordon BA
Dr G Jackson BSc DipMedTox PhD
Dr E A Sandilands BSc MD FRCP Edin
NPIS Edinburgh unit, on behalf of the NPIS

Published: October 2019
PHE publications
Gateway number: GW-863

Front cover image: © LD Gordon

Contents

Foreword

Every day in the United Kingdom, many hundreds of people seek advice from a health professional following exposure to a drug or chemical. This may happen by accident (e.g. accidental ingestions of potentially toxic substances, dosing errors in the administration of medicines, environmental exposures or exposures in the workplace) or as a result of drug overdose taken in the context of self-harm or drug misuse. The numbers of substances involved is large meaning health professionals need rapid access to high quality evidence-based and up to date information about the many thousands of different substances that might be involved, the anticipated health effects of exposure and advice on appropriate clinical management.

The NPIS is commissioned to provide this information by Public Health England on behalf of the English Department of Health and Social Care, the Scottish Government, the Welsh Government and the Northern Ireland Department of Health. Information is provided via our internet database TOXBASE, which is available to all UK healthcare professionals, as well as our 24-hour telephone advice line, staffed by specialists in poisons information and supported by an on-call rota of consultant clinical toxicologists for advice on serious or otherwise challenging cases. The NPIS also provides services to the Republic of Ireland and these are commissioned by Beaumont Hospital, Dublin, on behalf of the Irish Government. Services are provided by four NHS hospitals located in Birmingham, Cardiff, Edinburgh and Newcastle; these work together to deliver a fully-integrated service.

The NPIS also incorporates the UK Teratology Information Service (UKTIS), located in Newcastle. This provides advice on potential adverse fetal effects of exposures during pregnancy and this is important because the unborn child is particularly vulnerable to the effects of drugs and chemicals. Information and advice about exposure during pregnancy to hundreds of drugs and chemicals are published openly on the internet, while more detailed and referenced information is available to NHS health professionals via TOXBASE, who can also access detailed specialist advice by telephone during office hours.

The information and advice provided by the NPIS supports the high quality care of patients with suspected poisoning, not only improving the care of those at risk of serious complications, but also avoiding unnecessary referrals, admissions and treatments for those who are not at risk. As a result the services provided by the NPIS are highly cost-effective, as we have demonstrated previously.

This annual report is written as a statement of activity, accountability and governance of the NPIS during the 2018/19 reporting year. The service continues to receive outstanding user feedback, as detailed in this report and it remains our highest priority

to provide services of the highest possible quality and safety within currently available resources. Ongoing funding pressures, however, are increasingly compromising our ability to keep TOXBASE updated and to maintain a robust 24-hour telephone service. Dealing with this remains the key challenge for the forthcoming year.

Simon Thomas
Chair, NPIS Clinical Standards Group

Raquel Duarte-Davidson
Centre for Radiation, Chemical and Environmental Hazards, Public Health England

Executive summary

Background

Poisoning is an important public health issue and a common cause of hospital presentation in the UK. Around 160,000 presentations occur annually as a result of poisoning, which may include self-harm, accidental exposures, medication errors, and drug misuse. Many more patients are managed in the community, including by primary care and NHS advice services such as NHS 111, NHS 24 and NHS Direct. The National Poisons Information Service (NPIS) is commissioned to provide information and advice 24-hours a day to NHS healthcare professionals across the UK to support the management of patients with suspected poisoning.

The NPIS provides this information primarily via TOXBASE, an online database which is also available as an app. This information is freely available to all UK healthcare professionals. There is also a 24-hour telephone advice service, staffed by specialists in poisons information and supported by 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 hosts the UK Teratology Information Service (UKTIS), the national source of information and advice about exposures to drugs and chemicals during pregnancy.

Activity

During 2018/19, there were 733,351 TOXBASE user sessions in the UK. The most frequent users were hospital departments and the NHS telephone advice services NHS 111, NHS 24 and NHS Direct.

After recognising a need to deliver information on poisoning directly to individual healthcare professionals, the TOXBASE app was developed providing users access to TOXBASE on- and offline at the point of care. There are currently 15,390 TOXBASE app subscribers who accessed 152,469 app pages during 2018/19, representing a 24.9% increase from 2018/19.

While use of TOXBASE online and the TOXBASE app has increased, demand on the national telephone enquiry line has fallen, with 40,466 telephone enquiries received during 2018/19. The most frequent users of the telephone service are NHS telephone advice services and primary care professionals. The number of telephone enquiries

referred to the on-call consultant clinical toxicologist increased by 4.6% during 2018/19 compared with the previous year, with 1,994 consultant referrals.

During 2018/19 UKTIS provided information in relation to more than 2.7 million requests. There were 590,805 accesses to scientific information on the UKTIS website during 2018/19 (representing a 9.1% increase on the previous year). In addition, patient information pages on the UKTIS public-facing website ***bumps*** were accessed by the public on 2,134,774 occasions (a 0.2% decrease on 2017/18). This increase in online information provision was accompanied by a 15.2% reduction in telephone enquiries (1,432 calls) to the UKTIS national enquiry line.

The NPIS follows strict clinical governance processes and, as part of this, it is essential that TOXBASE entries are reviewed and edited continually and, where appropriate, new TOXBASE entries are generated. A robust editing process ensures that the advice on TOXBASE remains accurate, up to date and evidenced-based. The NPIS aims to review each of the approximately 17,000 TOXBASE entries every four years. During 2018/19 4,529 TOXBASE entries were created or updated.

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 92.7% for TOXBASE online, and 99.0% for the telephone poisons information service.

Surveillance

The NPIS is uniquely placed to collect clinical information on poisoning from across the UK. This information is of great value in improving our own clinical advice for health professionals and for public health surveillance of poisoning. Examples of work carried out during 2018/19 are summarised within this report. This year topics selected for review include drugs of misuse, pesticides, carbon monoxide, dinitrophenol, supporting ambulance services, electronic cigarettes, global public health activities and antidote availability in the UK. Further details about these can be found in section six of this report.

1. Introduction

Poisoning is an important public health issue in the UK, accounting for around 160,000 NHS emergency department presentations each year. The majority of poisoning in adults is caused by drug overdose in the context of self-harm, while accidental poisoning is most 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. The vast majority of UK hospitals do not have specialist clinical toxicology services, therefore 24-hour access to high quality information and clinical advice about poisoning is essential for the safe and effective management of these patients.

The National Poisons Information Service (NPIS) is a network of dedicated poisons units linked to clinical treatment facilities within UK teaching hospitals commissioned by Public Health England (PHE) on behalf of the UK health departments. Since 1963, poisons information has been provided to healthcare professionals, initially by telephone and then additionally online. The poisons information database TOXBASE®[1] (www.toxbase.org) was developed in 1982 and has since become the first-line poisons information resource for healthcare professionals in the UK. The information and advice on TOXBASE is reviewed critically and updated regularly using published literature, experience from NPIS telephone enquiry data, and direct clinical experience of NPIS-linked clinical departments.

The UK Teratology Information Service (UKTIS), formerly the National Teratology Information Service (NTIS), is hosted by the NPIS. This report demonstrates the importance of UKTIS both for supporting women of child-bearing age and their healthcare providers by provision of information and advice, and also for collecting new information on the potential effects of exposure to drugs and chemicals during pregnancy, including the therapeutic use of medicines.

The NPIS supports the appropriate triage, referral, assessment and treatment of poisoned patients across the NHS. The NPIS provides advice to emergency departments, GPs and NHS public access helplines to aid the decision-making process as to whether patients require hospital admission, or whether they can be safely managed at home, avoiding unnecessary admissions. Hospital emergency department data, illustrated by NHS hospital episode statistics, may not provide an accurate reflection of total workload due to the challenges around accurate hospital coding and lack of detail about substances involved. Furthermore, these data do not reflect the significant number of enquiries regarding poisoning received by primary care and NHS

[1] TOXBASE® is a registered trademark of the UK National Poisons Information Service

telephone advice services (NHS 111 in England, NHS 24 in Scotland and NHS Direct in Wales).

A key component of the service provided by the NPIS is obtaining information from treating clinicians on the effects and outcomes of cases of severe or unusual poisoning. This information assists in providing current and accurate advice and is continually used to refresh and update the information on TOXBASE.

The NPIS is funded primarily through ‘government grant in aid’ from UK health departments but the service also receives some contract income for providing services in other territories, as well as research income for specific projects. Overall funding for the service has reduced in real terms in recent years and there are ongoing threats to the resources available to the service into the future. As a consequence, there has been a reduction in the number of staff employed for NPIS work by the four contributing NHS organisations. This staffing situation is set to worsen, making it increasingly challenging to provide a robust, high quality 24-hour service that can respond rapidly to the needs of the NHS. During the past year PHE started a review of the service and its costs, as well as the opportunity for cost savings and additional income generation. The NPIS has supported this by provision of activity and financial information, including evidence of the cost-effectiveness of the service and the lower costs of the NPIS relative to international comparators. It is expected that PHE will share its final report with the NPIS and their NHS organisations soon.

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) participate in a 24-hour national telephone enquiry rota; the focus of the Edinburgh unit is on the editing and production of TOXBASE and so this unit only receives telephone enquiries during working hours.

The four units also take telephone calls about chemical incidents and liaise with the Centre for Radiation, Chemical and Environmental Hazards (CRCE) of Public Health England (PHE) regarding management of chemical incidents.

Reductions in funding in real terms have resulted in fewer Specialists in Poisons Information (SPIs) being employed for NPIS work. This creates pressure on rotas, reduces the number of telephone lines open and reduces the capacity of the service for other work, including maintaining the high volume of editing work required for TOXBASE.

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 the four NPIS units and colleagues from two other NHS Trusts (Guy's and St Thomas' NHS Foundation Trust and York Hospitals NHS Foundation Trust). These NPIS consultants 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, PHE has commissioned additional support from consultants specialising in paediatrics and emergency medicine.

The primary source of information provided by the NPIS is its online database, TOXBASE (www.toxbase.org), which is available, without charge, to all UK NHS healthcare units, including hospital departments, primary care practices and NHS advice services – NHS 111, NHS 24 and NHS Direct. Ensuring that the information on TOXBASE is current and evidence-based is of paramount importance for patient safety and to maintain the confidence of healthcare professionals. It is essential that the great majority of enquiries are made via TOXBASE as the NPIS does not have the capacity to absorb the substantial increase in telephone enquiries that would result from TOXBASE information becoming unavailable or outdated.

The TOXBASE app for iOS and Android mobile devices is also available without charge to UK NHS healthcare professionals and has the advantage of being available on personal mobile devices both online and offline. While TOXBASE provides a wealth of information required for the safe management of poisoned patients, 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 session data and accesses to individual entries as well as telephone enquiry numbers and consultant referrals.

When first received (Figure 2.1), telephone enquiries are managed by SPIs who may have a scientific, nursing or pharmacy background and are qualified to at least degree level, usually also holding postgraduate qualifications in toxicology. In determining the severity of each clinical case, the SPIs use the WHO/IPCS/EC/EAPCCT poisoning severity score (PSS)[2]. Enquiries about complex or severe cases are referred on to NPIS consultants.

Audio recordings of all NPIS telephone enquiries are retained for governance purposes and clinical data are logged within a specially designed national database, the UK Poisons Information Database (UKPID). Data are 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. Details of all telephone enquiries made since 2007 are held within UKPID, making it an invaluable resource for studying the patterns and clinical features of different types of poisoning in the UK.

This clinical information can help the treatment of subsequent similar cases. Data from UKPID can be used for studying the epidemiology of poisoning as reported to the NPIS and its value is currently being assessed by the Medicines and Healthcare products Regulatory Agency (MHRA) to establish its value for monitoring the safety of licensed pharmaceuticals in overdose.

[2] Persson HE, Sjöberg GK, Haines JA, Pronczuk de Garbino J. Poisoning severity score. Grading of acute poisoning. Clin Toxicol 1998; 36: 205-13.

In Northern Ireland, the Regional Medicines and Poison Information Service in Belfast provides a poisons information service during working hours while out-of-hours enquiries are referred to the NPIS. The NPIS is also contracted to provide poisons information for users in the Republic of Ireland through the provision of TOXBASE to major hospital emergency departments and to the National Poisons Information Centre (NPIC) in Dublin. The NPIS also provides direct out-of-hours telephone support to health professionals and the general public in Ireland.

Box 2.1 Cloud telephone system

Since June 2012, enquiries to the NPIS have been delivered by the BT Cloud telephone system, ensuring that enquiries are routed appropriately to staff, irrespective of location. The system has been designed to accommodate all services provided by the NPIS (i.e. poisons, teratology and chemicals) and has improved functionality with increased resilience and more efficient cooperative working between the UK NPIS units. Enquiries can be transferred, conference calls established and real-time reporting facilities made available. SPIs and consultants can also log in remotely, allowing rapid upscaling of telephone staffing if this is needed.

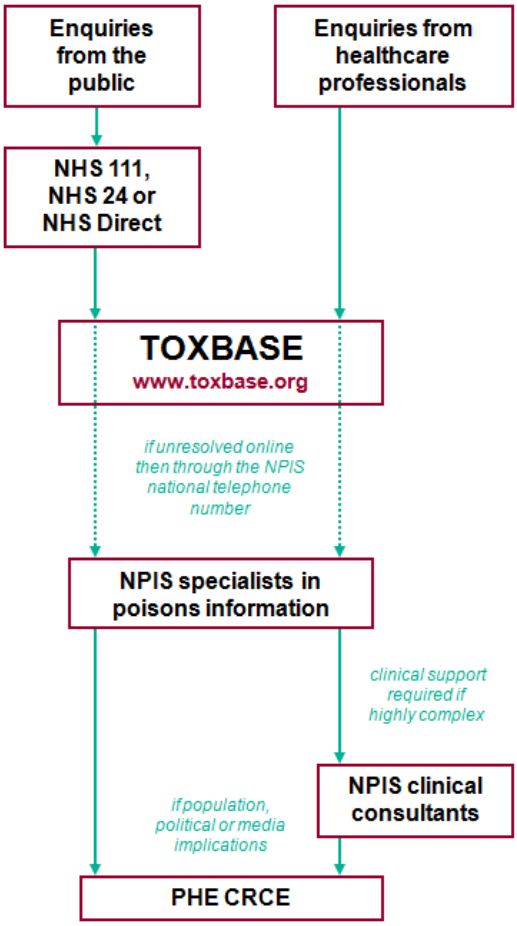

Figure 2.1 How poisons enquiries are answered

Information on the potential toxicity to the unborn child from maternal exposure to drugs and chemicals in pregnancy is provided by UKTIS. Information is provided for healthcare professionals by telephone, TOXBASE and the UKTIS website (www.UKTIS.org), while public advice leaflets are held on the ***bumps*** website (www.medicinesinpregnancy.org).

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 quarterly. Clinical issues, including clinical governance, are discussed by the NPIS Clinical Standards Group, which also meets quarterly. These meetings are attended by a representative of the commissioner, a senior clinician from each of the four units and senior SPIs from the service. Invitations are also sent to representatives of the NPIC in Dublin. Other senior NPIS staff are invited to attend as observers on a rotational basis.

To ensure a consistent 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. These educational meetings provide an opportunity for clinicians and SPIs to present updates on current topics, research and audit projects, and to discuss complex clinical cases and governance issues. These two-day events occur twice a year and are hosted by all NPIS units in turn. Clinicians and SPIs are also encouraged to attend and present at international toxicology conferences such as the annual congress of the European Association of Poisons Centres and Clinical Toxicologists (EAPCCT).

There are regular teleconferences of the TOXBASE Editing Group to ensure consistent and nationally agreed database content (see Box 2.2). The NPIC 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.

Cost benefit of NPIS

Commissioning the NPIS uses significant resource and so it is important to assess whether these costs can be justified through benefits provided by the service, such as avoidance of unnecessary hospital referrals and admissions, reduced lengths of stay, and improvements in the quality of treatment for those patients admitted. Research demonstrating the cost-effectiveness of the service as a result of avoided emergency

department referrals was described in last year's annual report and has now been fully published in the peer-reviewed literature.[3]

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 2018/19 exceeding 730,000). Since 1999, UK health policy has been that TOXBASE should be the first (and often only) point of information for poisons enquiries. It is therefore essential that the information it contains is kept relevant and up to date. This creates a substantial ongoing workload that is shared by the NPIS units and lead by Edinburgh. Revising TOXBASE entries is a complex process involving a comprehensive literature search together with analysis of information from case-based experience to develop the clinical advice.

All TOXBASE entries are peer reviewed before publication and key updates (e.g. highly toxic agents, standardised recommendations or commonly accessed agents) are agreed by the national TOXBASE editing committee prior to publication. 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. The committee convenes four times a year by web/teleconference to agree policy for TOXBASE development, discuss the format of TOXBASE entries 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.

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 2018/19, 4,529 entries were added or edited.

An important component in the review process of TOXBASE entries is user feedback from 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 informal feedback by email, letter or telephone. Users may also raise queries on existing entries or provide additional 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.

[3] Elamin MEMO, James DA, Holmes P, Jackson G, Thompson JP, Sandilands EA, et al. Reductions in emergency department referrals from primary care after use of the UK National Poisons Information Service. Clin Toxicol 2017; 55: 481-2.

3. NPIS activities in 2018/19

3.1 Overall service profile

There are currently 6,328 active user accounts for TOXBASE online with the majority of these (5,379 accounts) belonging to UK healthcare departments, e.g. hospital emergency departments, GP surgeries or NHS telephone advice services. There are an additional 15,390 individual TOXBASE app accounts. These figures combined represent a 16% increase to the TOXBASE user base from 2017/18.

TOXBASE access data is analysed according to user sessions. A TOXBASE user session is defined as one login by a registered user where the user may then go on to access one or more products several times. Therefore the number of products accessed would be expected to be greater than the number of user sessions. In 2018/19, TOXBASE user sessions increased by 5% to 733,351. The total number of products accessed on TOXBASE also increased by 9%, with 2,126,690 products accessed. A 25% increase in the number of accesses (152,496) to the app was also recorded.

While accesses to TOXBASE and the app have increased, telephone enquiries have reduced in the last year with 40,466 enquiries received via the national helpline. There was a 5% increase in the number of more complex referrals made to a consultant toxicologist, with 1,994 referrals recorded. Figure 3.1.1 shows the annual number of TOXBASE user sessions, TOXBASE app accesses, telephone enquiries and consultant referrals from 2000 to 2017/18.

Not all NPIS enquiries are directly patient-related, for example TOXBASE may be accessed for educational purposes. For this report, non-patient related telephone enquiries, together with educational and international TOXBASE user sessions have been excluded from further analysis. In addition, TOXBASE activity arising specifically from the four UK NPIS units, the Northern Ireland Regional Medicines and Poison Information Service, and the NPIC in Dublin, have also been excluded as this often relates to training, educational or operational procedures. In 2018/19 this left a total of 1,804,814 product accesses, 671,851 user sessions and 39,540 patient-related telephone enquiries for further analysis within this report.

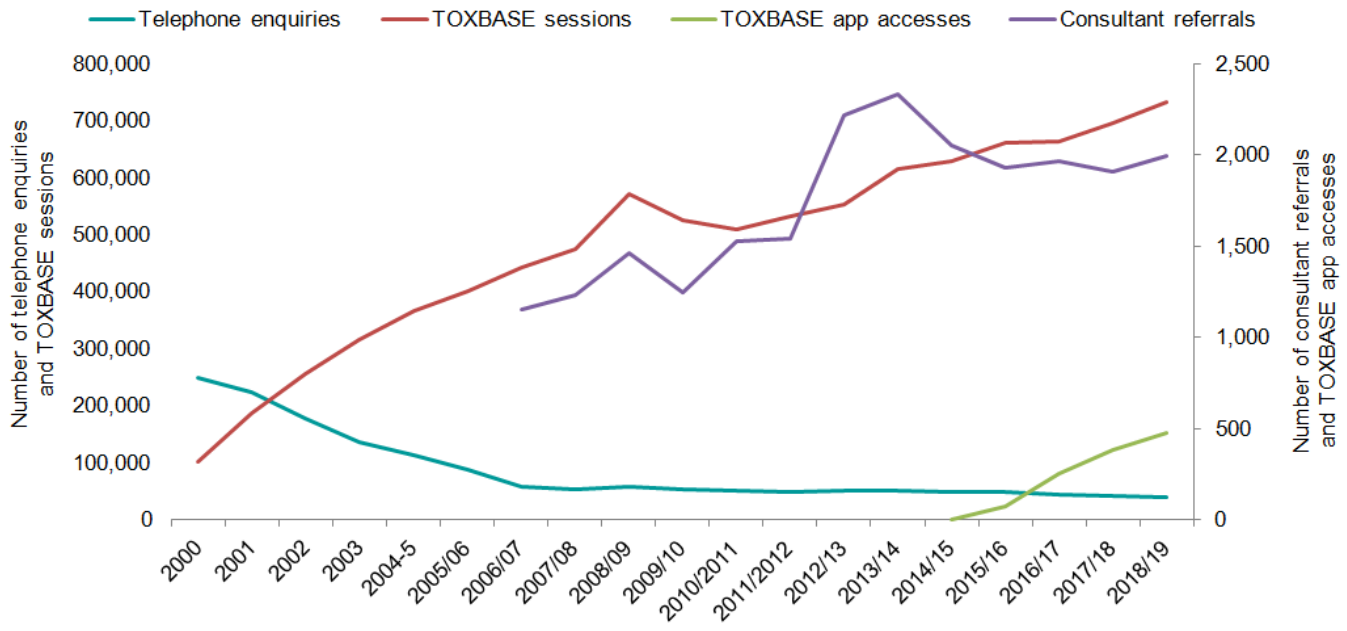

Figure 3.1.1 Number of TOXBASE sessions, TOXBASE app accesses, telephone enquiries and consultant referrals from 2000 to 2018/19

The distribution of TOXBASE product accesses, user sessions and telephone enquiries for the last two years are similar within and between years (Figure 3.1.2). Whilst activity within each month is relatively static, with each month representing between 7.3% and 9.1% of total annual activity, seasonal trends are evident.

As in previous years health professionals working in hospitals are the predominant users of TOXBASE, accounting for 64% of all accesses. However, NHS telephone advice services make the greatest use of the telephone service (37%), closely followed by hospital departments (27%) (Figure 3.1.3).

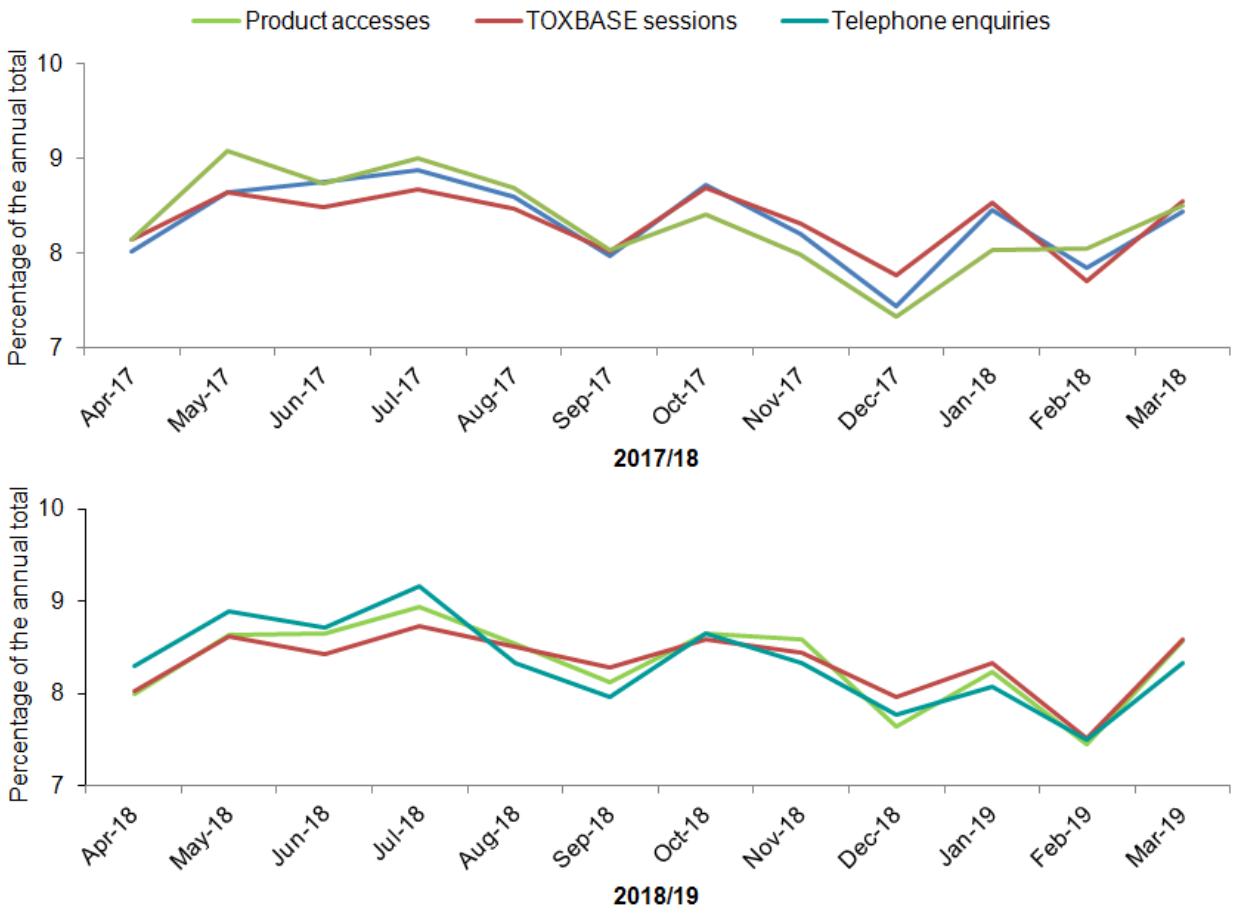

Figure 3.1.2 TOXBASE product accesses, TOXBASE sessions and telephone enquiries received in 2017/18 and 2018/19

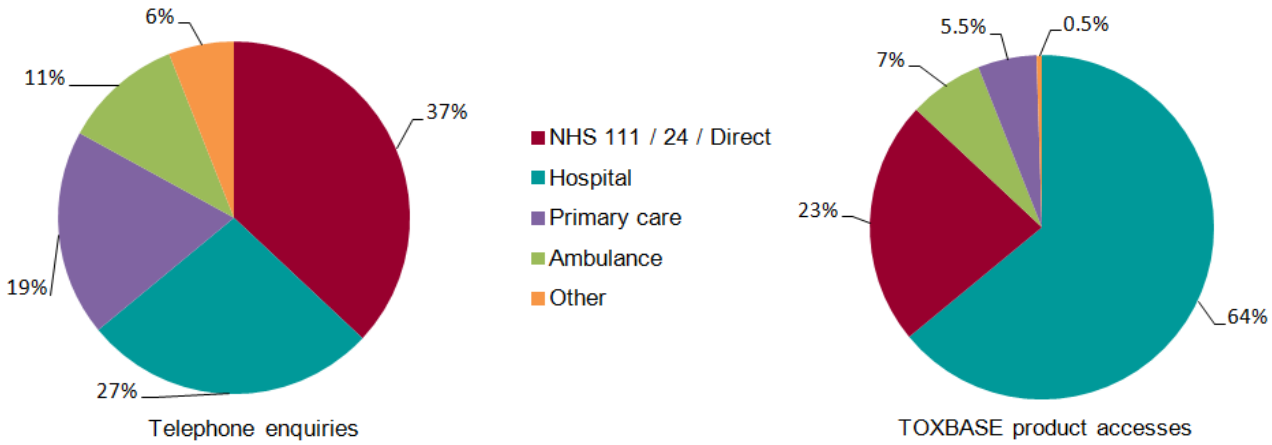

Figure 3.1.3 Telephone enquiries and TOXBASE product accesses by user type in 2018/19 as percentage of total

The substances most frequently involved in TOXBASE accesses and telephone enquiries made by hospital departments and NHS telephone advice services are shown in Table 3.1.1. It is common for hospitals to call the NPIS regarding drugs of misuse, whereas NHS telephone advice services are more likely to call about less toxic substances, such as multivitamins.

Telephone enquiry data also shows that, regardless of user type, the most common exposures are ingestions (87%) occurring at home (86%).

Table 3.1.1 Top 10 products accessed/enquiries by user type in 2018/19 (% of total TOXBASE product accesses / telephone enquiries received)

Hospitals			
Agent	**Product accesses**	**Agent**	**Telephone enquiries**
Paracetamol	8.2	Paracetamol	41.2
Sertraline	2.9	Drugs of misuse	10.9
Ibuprofen	2.4	Ethanol	11.0
Diazepam	2.1	Ibuprofen	8.4
Quetiapine	1.8	Cocodamol	6.8
Pregabalin	1.7	Not known	4.7
Amitriptyline	1.5	Diazepam	4.6
Mirtazapine	1.5	Codeine	4.4
Citalopram	1.5	Sertraline	4.2
Zopiclone	1.4	Cocaine	3.7
NHS telephone advice services			
Agent	**Product accesses**	**Agent**	**Telephone enquiries**
Paracetamol	5.0	Paracetamol	21.3
Ibuprofen	3.0	Ibuprofen	19.8
Olbas oil	1.5	Multivitamins	12.3
Codeine	1.3	Ethanol	7.8
Sertraline	0.8	Surfactant / detergent other	6.9
Fairy liquid	0.7	Aspirin	6.4
Cocodamol	0.6	Toy / novelty	5.8
Toothpaste	0.6	Naproxen	5.7
Anadin Extra	0.6	Descaler	4.8
Household bleach	0.6	Codeine	4.5

Telephone enquiries from NHS telephone advice services more commonly involve children under 5 years and adults over 70 years compared with those received from hospitals (Table 3.1.2) and are more likely to involve accidental exposures (Table 3.1.3).

Table 3.1.2 Telephone enquiries by age of patient (% of total enquiries received)

Patient age	Hospital	NHS 111 / 24 / Direct
< 5 years	5.4	16.2
5-9	0.9	1.8
10-19	5.2	2.0
20-29	4.3	3.9
30-39	3.5	3.4
40-49	2.6	2.0
50-59	2.1	2.0
60-69	1.0	1.5
70+	1.5	3.6
Unknown	0.8	0.4

Table 3.1.3 Telephone enquiries by circumstance of poisoning (% of total enquiries received)

Circumstance	Hospital	NHS 111 / 24 / Direct	GP	Ambulance
Accidental	11.5	27.5	8.0	2.7
Adverse reaction	0.4	0.2	0.1	0.1
General information	0.1	0.1	0.0	0.0
Intentional	10.2	0.6	3.1	5.5
Other	0.6	0.6	0.4	0.2
Recreational abuse	1.3	0.3	0.2	0.2
Therapeutic error	2.7	8.2	7.1	1.9
Unknown	1.4	0.3	0.4	0.3

3.2 TOXBASE app for iOS and Android mobile devices

In response to advancing technology and user feedback the NPIS developed the TOXBASE app for iOS and Android devices to deliver information directly to individual healthcare professionals. The app offers convenient mobile access for users at the point of care. The app is synchronised with online TOXBASE content and provides offline access when no internet connection is available, making it an invaluable resource for emergency responders.

First made available in 2012/13, the current version of the TOXBASE app was released in late 2015. The app provides NHS, PHE and Ministry of Defence (MOD) users with full and free TOXBASE access on validation of accounts using NHS / PHE / MOD email addresses. For other users, a paid version of the app is available which contains 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 contribute towards development and hosting costs.

The number of subscribers changes on a daily basis as accounts are created, lapse and are renewed; on 31 March 2019 there were 15,390 current subscribers (14,803; 96.2% NHS / PHE / MOD and 587; 3.8% other). The number of subscribers and the number of pages accessed continues to rise (Figure 3.2.1). Examples of screenshots from the app are shown in Figure 3.2.2. NPIS clinicians and SPIs have access to the app to support their NPIS duties and to increase service resilience in case of local or national failures of internet access. Only 6.7% of subscribers were located outside the UK. The top workplace and user types are shown in Table 3.2.1; ambulance personnel were the most common.

Between 1 April 2018 and 31 March 2019, app subscribers (excluding NPIS users) accessed 152,469 pages including 123,285 product entries, 3,064 antidote entries, and 26,120 information entries. This represents a 24.9% increase from 2018/19. Table 3.2.2 shows the top product pages accessed on the app. Examples of feedback from TOXBASE app subscribers are provided in Box 3.2.1.

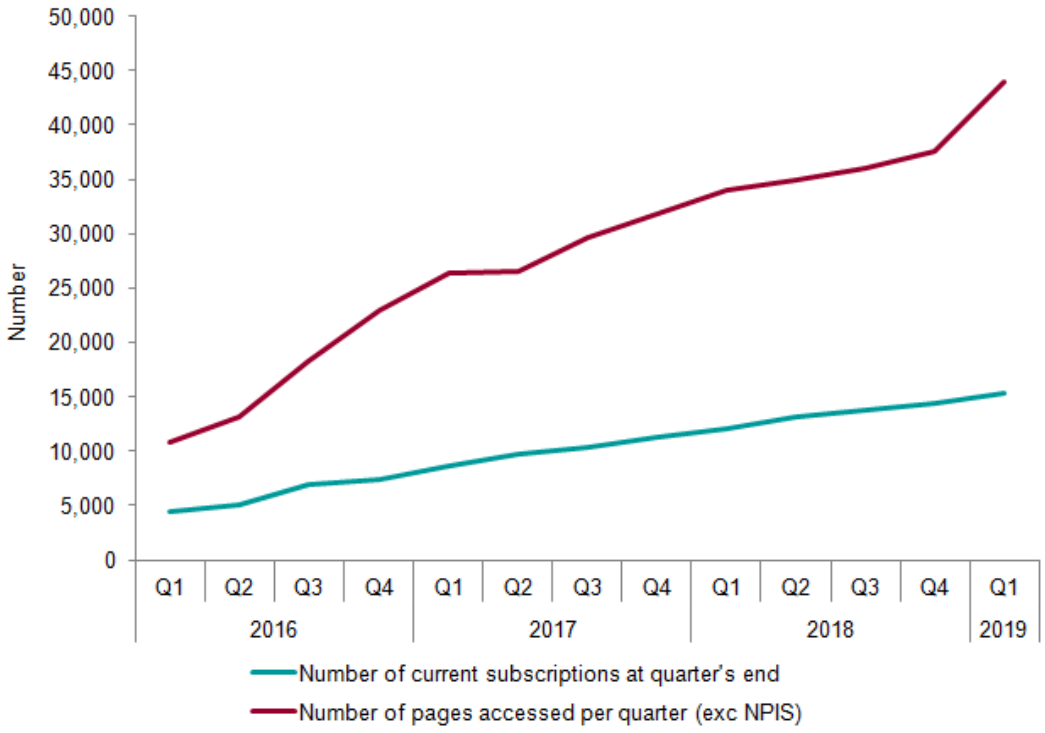

Figure 3.2.1 TOXBASE app subscriptions and pages accessed per quarter from Q1 2016 to Q1 2019

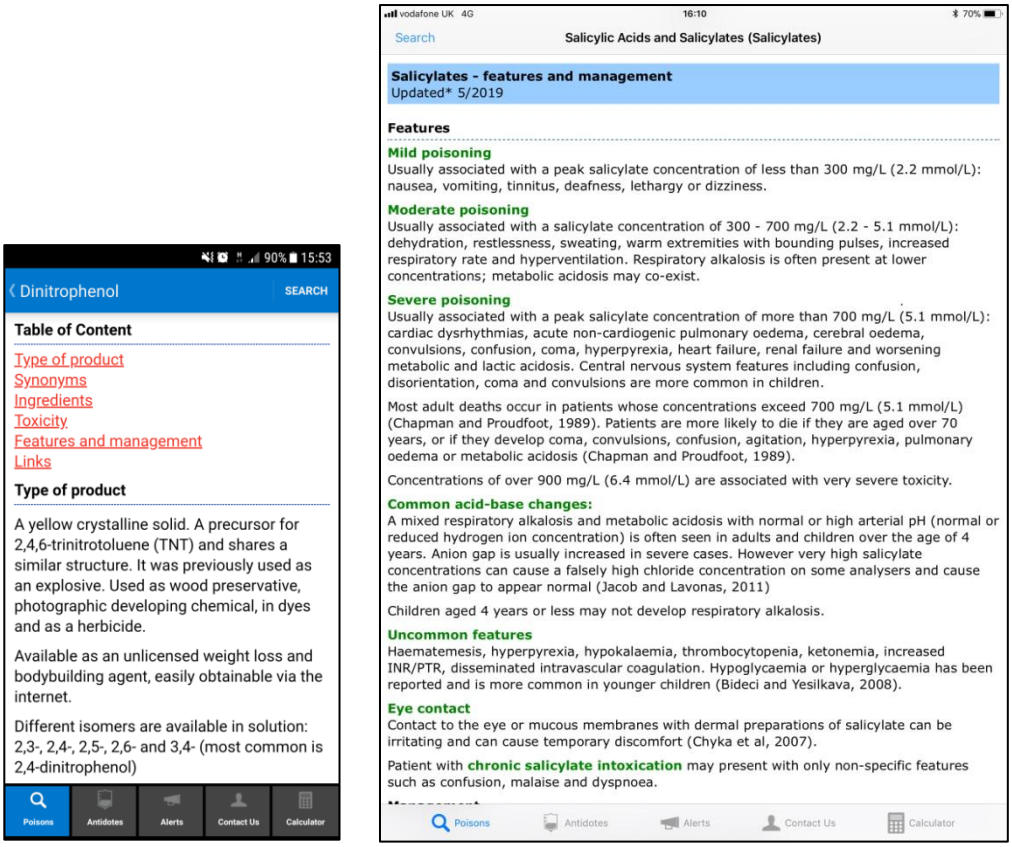

Figure 3.2.2 TOXBASE app screenshots (Android and iOS)

Table 3.2.1 Top workplace and user type of current TOXBASE app subscribers at 31 March 2019*

Workplace type	NHS / PHE / MOD	Non-NHS	All
Ambulance	7,411 (48.2%)	123 (0.8%)	7,534 (49.0%)
Emergency department	2,182 (14.2%)	242 (1.6%)	2,424 (15.8%)
General practice	1,385 (9.0%)	28 (0.2%)	1,413 (9.2%)
Admissions / assessment	1,015 (6.6%)	12 (0.1%)	1,027 (6.7%)
ITU/HDU	674 (4.4%)	19 (0.1%)	693 (4.5%)
Psychiatry	415 (2.7%)	5 (0.1%)	420 (2.7%)
Pharmacy	336 (2.2%)	35 (0.2%)	371 (2.4%)
User type	**NHS / PHE / MOD**	**Non-NHS**	**All**
Ambulance	7,410 (48.1%)	123 (0.8%)	7,533 (48.9%)
Doctor	5,041 (32.8%)	337 (2.2%)	5,378 (34.9%)
Nurse	952 (6.2%)	21 (0.1%)	973 (6.3%)
Pharmacist	385 (2.5%)	42 (0.3%)	427 (2.8%)

* categories are input by users during registration

Table 3.2.2 Top product pages accessed on the TOXBASE app in 2018/19

	Product pages	No. accesses
1	Paracetamol	11,439
2	Sertraline	3,160
3	Amitriptyline	2,852
4	Ibuprofen	2,845
5	Quetiapine	2,282
6	Diazepam	2,095
7	Mirtazapine	2,067
8	Citalopram	1,861
9	Pregabalin	1,852
10	Codeine	1,752

Box 3.2.1 Feedback from TOXBASE app subscribers

“A fantastic resource in my frontline work”
Paramedic

“I think this is a great medium and is hugely valuable on the road with no/limited access to technology”
Paramedic

“A big thank you to you and everyone responsible for the app. It's a fantastic resource and really does make a difference when we get poisoned patients into the Emergency Department”
ED doctor

“Very useful for my role as paramedic... updated frequently.
Highly, highly recommended”
Paramedic

3.3 Telephone answering

The NPIS uses a bespoke BT Cloud Contact™ system to deliver telephone enquiries received from healthcare professionals via a single number to SPIs across the four units. Enquirers are greeted by a recorded message that offers several options including direction to TOXBASE, a reminder that the telephone line is for registered healthcare professionals only and a request to remain on the line if specific advice from a SPI is required. Enquiries are then placed in a queue for presentation to the next available SPI.

This system has several benefits: it allows remote working so increasing service resilience, has conference call functionality and a comprehensive report function capability. The latter enables close monitoring of call workload, wait times, dropped (abandoned) calls and call duration at national, individual unit and individual scientist level. It also allows assessment of compliance with the PHE stipulated key performance indicator (KPI) that 95% of telephone requests will be answered within five minutes of the call being made.

Telephone enquiry data were assessed retrospectively for the period 1 August 2018 to 31 January 2019 using the BT Cloud data reporting tool and analysed using Microsoft Excel and MiniTab statistical software.

During this period 25,032 enquirers dialled into the NPIS with 22,367 (89.4%) progressing through the welcome message stage and being presented to a SPI. Service load ranged from one enquiry per agent (SPI available to receive a call) per hour (between 02:00 and 08:00) to three enquiries per agent per hour (between 10:00 and 23:00).

Over the six month review period, the median wait time before a presented call (either answered by a SPI or abandoned by the enquirer) was 18 seconds (IQR, 11-35 seconds). Of presented calls, 96.2% (21,520) were answered, 92.5% (20,698) within five minutes of presentation. Less than 1% (95) of enquirers waited longer than 10 minutes for their call to be answered.

Of the 21,520 enquiries that were answered, the median talk time was 270 seconds (IQR, 182-406 seconds) with 9.7% of answered enquiries lasting 10 minutes or more (2,090). The longest enquiry lasted over 52 minutes.

The rate of abandoned enquiries was low at 3.8% (847), the median wait time before abandonment was 82 seconds (IQR, 15-201 seconds). Forty-six enquirers (5.4%) waited more than 10 minutes before abandoning their call.

The NPIS provides service users with a robust service, answering 96.2% of all enquiries and the large majority (92.5%) with a wait time of five minutes or less. However, the KPI to answer more than 95% of enquiries within five minutes is not being met with current resources.

3.4 Consultant referrals

Background

The NPIS operates a national consultant clinical toxicology on-call rota for the UK and the Republic of Ireland (out-of-hours). 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). A nationally agreed protocol is used to determine when SPIs should refer enquiries to a consultant.

All staff on the rota are involved in the care of poisoned patients in their own local NHS hospitals. 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; all enquiries are answered under the supervision of NPIS consultants.

Units provide cross-cover in emergencies and occasionally support colleagues in other units. NPIS Edinburgh also provides consultant support for enquiries from Northern Ireland during the working week. Details of all telephone calls to the NPIS are stored on the UKPID central servers 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 1,994 daytime and out-of-hours referrals made to NPIS consultants in 2018/19, an increase of 4.6% on 2017/18. Figure 3.4.1 shows the number of referrals by month over the past four years and their distribution by day of the week is shown in Figure 3.4.2. The median number of referrals per day was five (IQR, 3-7), with fewer daily referrals made during weekends. Referrals by country are shown in Table 3.4.1. 1,869 (93.7%) consultant referrals came from calls originating in hospitals; Table 3.4.2), with calls from GPs / primary care being the next most common source (74; 3.7%). The proportion of consultant referrals following calls from telephone advice services remained low at 1.1% of referrals.

Substances involved

Table 3.4.3 shows the most common types of agents involved in referrals to consultants. Heading the list are products containing paracetamol, drugs of misuse, bites and stings and toxic alcohols or glycols, e.g. ethylene glycol, methanol and antifreeze. For 218 referrals, the product taken (if any) was unknown and help with diagnosis was required.

Feedback into NPIS services

Analysis of 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 cla rity of TOXBASE entries and informing the need for research in a number of areas.

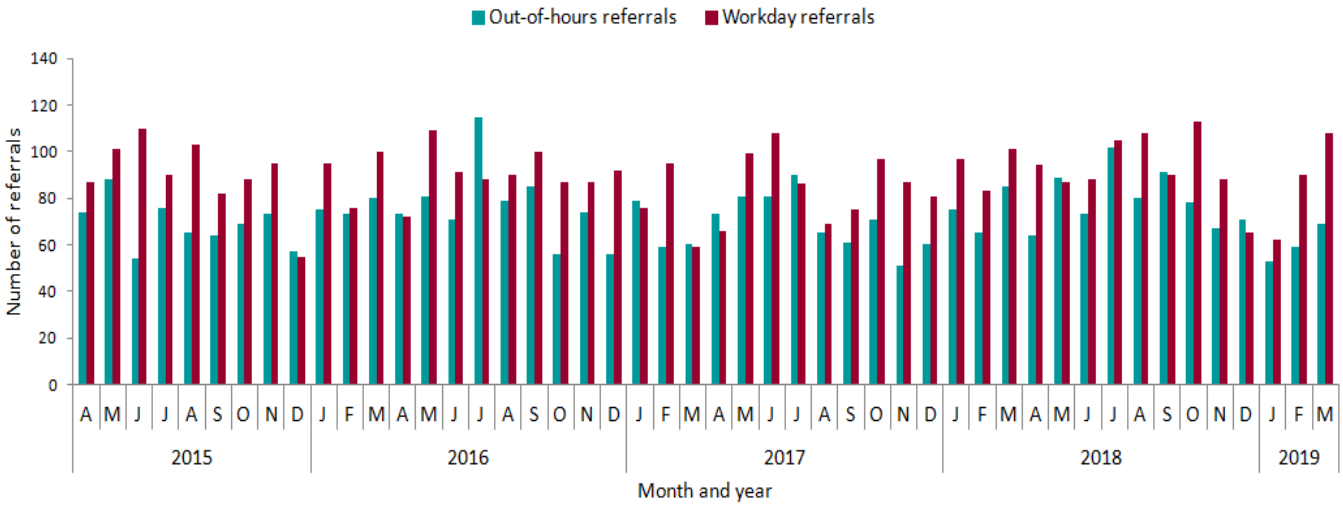

Figure 3.4.1 Monthly consultant referrals (given as out-of-hours and workday referrals) 2005 to 2018/19

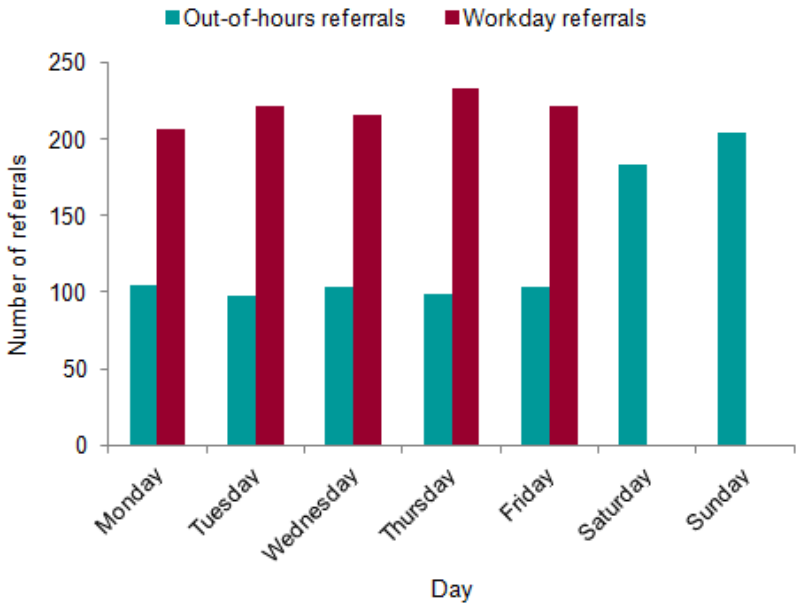

Figure 3.4.2 NPIS consultant referrals by day of the week (given as out-of-hours and workday referrals) in 2018/19

Table 3.4.1 NPIS consultant referrals by country in 2018/19, with 2017/18 percentage values for comparison

	2018/19			
Country	**Number of referrals**	**Rates per 100,000 population***	**% in 2018/19**	**% in 2017/18**
England	1,538	2.7	77.1	77.6
Northern Ireland**	45	2.4	2.3	1.7
Scotland	251	4.6	12.6	13.5
Wales	118	3.8	5.9	5.8
Republic of Ireland**	30	-	1.5	1.4
Other & unknown	12	-	0.6	0.1
Total	**1,994**			

* Based on mid 2018 population estimates viewed June 2019 (UK total = 66,435,550) https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

** overnight cover only

Table 3.4.2 NPIS consultant referrals from hospital by department in 2018/19

Source	**Number of referrals from hospital (1,757)**	**% of total referrals (1,907)**
Emergency departments	868	43.5
Intensive care units	398	20.0
Paediatrics	190	9.5
Other hospital units	143	7.2
Admission / assessment units	107	4.7
General medicine	94	5.4
Unspecified hospital units	28	1.4
Medicines information & pharmacy	16	0.8
Surgical	15	0.8
Psychiatric units	7	0.4
Minor injuries units	3	0.2

Table 3.4.3 Agents commonly involved in NPIS consultant referrals in 2018/19

Rank	Agent	Number of referrals	% of total referrals (1,994)
1	Paracetamol (including 68 co-codamol)	404	20.3
2	Drugs of misuse	226	11.3
3	Drug / substance unknown	218	10.9
4	Bites and stings	98	4.9
5	Ethylene glycol / methanol / antifreeze	85	4.3
6	Digoxin	78	3.9
7	Ibuprofen	66	3.3
8	Iron	56	2.8
8	Venlafaxine	56	2.8
9	Quetiapine	54	2.7
10	Sertraline	53	2.7

3.5 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' product safety datasheets (SDS) also provide information for updating TOXBASE, enabling users to obtain specific advice on many common products. All NPIS staff have 24-hour access to the NPIS Product Data Centre (PDC).

NPIS Birmingham has the responsibility for the NPIS PDC and for liaising with manufacturers to ensure that the data held are comprehensive and up to date. In 2018/19 there were 29,000 SDS added to the NPIS PDC which now holds more than 250,000 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, e.g. active ingredients or use.

3.6 NPIS website

This website 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 with collaboration from the other units. The website is updated continuously, particularly with the data in each new annual report.

During 2018/19 the site had 152,000 visitors, there were 121,400 page views and 3,700 documents were downloaded, the most popular were the NPIS annual reports. Visitors came predominantly from the UK, the US, Australia, Ireland, India and Germany.

4. UKTIS activities in 2018/19

4.1 Overview of the service

The UK Teratology Information Service (UKTIS) is commissioned by PHE to provide evidence-based information and advice on drug and chemical exposures during pregnancy and to guide the optimum use of medicines for women who are pregnant. UKTIS also undertakes teratogen surveillance by systematic follow-up of selected pregnancies reported to the service. These data are used to inform advice for subsequent enquiries and may be published in the scientific literature, sometimes in collaboration with other teratology information services around the world.

UKTIS is the only teratology service in the UK. It works in partnership with the MHRA, the British National Formulary, the Royal College of Obstetricians and Gynaecologists, the National Institute for Health and Care Excellence, the NHS maternity transformation programme within PHE, the European Network of Teratology Information Services, the European Medicines Agency, and other organisations to improve the provision of information available to healthcare professionals and patients regarding pregnancy and breastfeeding.

4.2 Service activity

New head of teratology

Dr Kenneth Hodson, Consultant Obstetrician and Subspecialist in Maternal and Fetal Medicine, was appointed as the new head of UKTIS in the autumn of 2018.

Information sources

The great majority of information provision by UKTIS is currently via the internet. This is available on a 24-hour basis allowing access at the convenience of users. It is produced and maintained by a small team of experienced scientists and its value and relevance to users is continually assessed by reviewing traffic to these documents on our online platforms.

Detailed and fully referenced systematic reviews are available for registered health professionals via TOXBASE. Currently, UKTIS maintain 300 of these, providing information for over 400 medications and chemicals. These documents are updated on a five yearly cycle or when substantial new evidence becomes available. In 2018/19 UKTIS produced three new systematic reviews and updated 60. Abstracts of these documents are also openly available on the UKTIS website. The service also provides information for the general public via its ***bumps*** website (medicinesinpregnancy.org).

UKTIS also provides advice for health professionals via a dedicated phone line, where pregnancy related enquiries can be discussed with a scientific expert in teratology or for more complex cases, a consultant teratologist. This phone line is available during office hours only.

The increasing availability of online information has resulted in a substantial growth in use of our internet resources in recent years; their availability allows health professionals to manage many cases without the need to make a telephone enquiry and, as a result, telephone enquiry numbers have been falling. This is a more efficient and cost-effective model for provision of information.

Annual trends in enquiry numbers are shown in Table 4.2.1 which shows the clear trend towards preferential use of openly available online information over the past nine years. There has been a year on year increase in the total number of contacts with the service across all platforms, driven in particular by increasing use of information on the publically accessible ***bumps*** website since its launch in 2014. In October 2018, however, daily hits to the ***bumps*** website fell abruptly from approximately 7,500 to 4,500 hits per day. This was due to a new Google algorithm that was released in the autumn of 2018 and significantly affected traffic to a large number of health related websites. Information from Google analytics reports that the ***bumps*** website receives 80% of traffic through Google which made the ***bumps*** website particularly vulnerable to the algorithm update.

Other updates carried out by Google at a similar time affected accesses by geographical area; algorithms prioritised search hits for businesses and organisations local to the searcher. This has had a direct effect on the geographical reach for the ***bumps*** and uktis.org websites, with a loss of international visitors. UK users now comprise 46% of all traffic to the site compared to 26% before October 2018. UKTIS will work on the optimisation of both the UKTIS and ***bumps*** websites in 2019/20, in order to improve hit rates and international promotion.

Despite the loss of international users to our websites, UKTIS responded to over 2.7 million information requests during 2018/19 when considering telephone enquiries and online accesses together.

Table 4.2.1 Telephone enquiries, full monograph (www.toxbase.org), monograph summary (www.uktis.org) and *bumps* leaflets downloads (www.medicinesinpregnancy.org) as absolute figures and as the percentage of enquiries for each year

	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
2016/17	1,876	0.10	43,584	2.4	300,412	16.8	1,445,045	80.7	1,790,917
2017/18	1,689	0.06	38,461	1.4	541,476	20.0	2,138,290	79.0	2,719,916
2018/19	1,432	0.05	34,729	1.3	590,805	21.4	2,134,774	77.3	2,761,740

Dr Laura Yates

Laura Yates, Head of Teratology for UKTIS since 2009, left her role to return home to South Africa with her family in September 2018. There she will continue her career as a Consultant in Clinical Genetics, and plans to use her experience and knowledge to enhance Teratology Services across Africa.

In the nine years since her appointment, Laura's substantial impact on UKTIS has included development and modernisation of the service, successful applications for and delivery of national and international research grants and development of a major local and national teaching role. A particular achievement has been the development of the ***bumps*** patient record and dedicated patient information website. As detailed in this report, this is widely used in the UK and internationally as a source of reliable, evidence-based and balanced information about medicines use during pregnancy.

Her rapidly growing international standing is evidenced by her recent election as President of the European Network of Teratology Information Services. She has also served as chair of Working Group 2 (Independence and Transparency) of the European Medicines Agency, chair of the European Network of Centres for

Pharmacoepidemiology and Pharmacovigilance and chair of their Pregnancy Special Interest Group. Laura was also a member of the MHRA Expert Advisory Committees and their Valproate Stakeholders Network.

Laura continues to be very much a part of the international teratology community. She remains the President of ENTIS and is leading a major component of the ConcePTION study, a major research programme funded by the European Union Innovative Medicines Initiative. UKTIS looks forward to continuing working collaborations on this project and others for many years to come.

4.3 Surveillance and research

In 2018/19, UKTIS was awarded funding of £456,000 for participation in the ConcePTION project. This is a five-year research study supported by the Innovative Medicines Initiative (IMI), a public-private partnership between the EU and the European pharmaceutical industry. UKTIS will work on this with 87 other organisations from 22 countries, including the European Medicines Agency, drug manufacturers, academia, public health organizations, and teratology networks to tackle research gaps related to medications used by pregnant and breastfeeding women. UKTIS are specifically involved with research relating to enhanced methods of data collection and dissemination of information. It is anticipated that the research will influence and enhance our clinical service platform. The project is due to start in the spring of 2019.

UKTIS continue to publish results of routine surveillance of pregnancy outcomes collected by UKTIS when appropriate. By contributing expertise in the collection of pregnancy outcome data and analysis UKTIS also supports the EMPOWER study (EMesis in Pregnancy – Ondansetron With mEtoclopRamide), a randomised controlled trial of treatments for hyperemesis gravidarum, funded by the National Institute for Health Research.

Future collaboration is planned between UKTIS and the National Congenital Anomalies and Rare Diseases Registration Service (NCARDRS) to improve teratogen surveillance within England. PHE’s NCARDRS provides continuous epidemiological monitoring of the frequency, nature, cause and outcomes of congenital anomalies and rare diseases for the population of England. The collaboration will involve linkage of the NHSBA, a national primary care prescribing database, with data from NCARDRS to identify medications which were prescribed to the mothers of patients with congenital anomalies. UKTIS will provide the expertise in order for this work to be done in collaboration with the team at NCARDRS.

4.4 Education and training

In September 2018 UKTIS hosted the 3rd International Joint Meeting of the European Network of Teratology Information Services (ENTIS) and Organization of Teratology Information Specialists (OTIS) in Newcastle upon Tyne and also organized the first UK Teratology Education Course which preceded the meeting. These two events bought together international expertise in teratology, obstetrics, birth defects and neurodevelopment, with speakers from Brazil, Australia, North America, Canada and Europe as well as local experts in reproductive toxicology.

UKTIS continue to provide lectures on prescribing in pregnancy at established training courses, including the Drug Safety and Research Unit, the Royal College of Obstetrics and Gynaecology and the Royal College of Physicians, London.

5. Clinical governance

The NPIS places the strongest emphasis on the quality of the clinical services it provides, with patient safety being our highest priority. To achieve excellent clinical outcomes, rigorous clinical governance standards are maintained. Key features of our approach are detailed in Box 5.1 and an important component of this is reporting and learning lessons from critical events.

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

5.1 Analysis of critical events

During the 2018/19 reporting year there were 13 critical events reported and discussed nationally. Of these, six concerned the information and management advice provided on TOXBASE and in five cases this resulted in modifications to the advice being made.

There were three episodes during the year where there was temporary loss of one or more TOXBASE or TOXBASE app functions. Normal functionality was restored rapidly in all these cases. A report was also made about an apparently malicious attempt to download TOXBASE content which prompted a further review of security arrangements. A further critical event report related to delays in accessing a specific laboratory assay needed for the management of an uncommon type of poisoning. The assay is poorly available, especially in England, because it is infrequently used and requires resource to be maintained. This makes the assay financially non-viable for most hospitals. The NPIS is currently in discussion with NHS England to try to resolve this.

Finally, following a case of unusual poisoning that presented diagnostic difficulties, the NPIS has instituted a procedure for staff to be able to access advice from colleagues

with particular expertise, who volunteer to provide advice and support, including outside normal working hours.

5.2 Quality assurance exercises

Telephone information service user satisfaction

NPIS units have collected information on user satisfaction with their telephone enquiry service since 2002, aiming to establish overall service performance, user requirements / expectations and identify areas for improvement.

A random sample of telephone enquiries was selected using the same methodology for each unit. The sample size is intended to be at least 5% of telephone enquiries in each unit, with the exception of Edinburgh. The Edinburgh unit is required to survey a larger proportion (10%) to obtain an adequate sample size because it is not open 24-hours and takes fewer telephone enquiries.

Survey results

During the 2018/19 reporting year 2,703 questionnaires were sent out and 511 responses received, giving a response rate of 18.9%. The most common responder groups were GPs (31.1% of all responses). NHS 111 operatives (14.3%) and junior hospital doctors (10.6%).

A large proportion of those responding to the survey (61.3%) had checked TOXBASE prior to making their enquiry. The telephone enquiry had been made because of special circumstances or other reasons (46.9%), inadequate information on TOXBASE (36.5%), inability to interpret the information on TOXBASE (9.4%), local protocol to contact NPIS (5.5%) or the information on TOXBASE contradicted other information they had (1.6%).

Reasons given for not accessing TOXBASE before telephoning the NPIS are shown in Table 5.2.1.

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 reflect a very high level of satisfaction with the way the enquiry was dealt with, with the majority of areas scoring higher than the previous year (Table 5.2.2).

Users were asked to indicate their overall satisfaction with the service they received from NPIS using a scale of one to six, with one indicating a very poor service and six an excellent service. The overall satisfaction with the telephone enquiry answering service

remains excellent, at 99.0% grading the service a five or a six (excluding non-respondents), which is an improvement on the previous year (98.7%). Figure 5.2.1 shows the overall quality scores for the individual units.

Table 5.2.1 Reason why TOXBASE was not consulted first

Reason	% of respondents	
	2017/18	2018/19
"I don't know what TOXBASE is"	13.1	9.4
"We don't have it in our department"	22.5	28.6
"It was in a part of the department that we didn't have access to"	4.5	2.8
"We couldn't get logged on / the connection wasn't working"	22.1	20.2
"We've not been trained to use it yet"	11.2	11.3
Other	26.6	27.7

Table 5.2.2 Satisfaction scores 2017/18 vs 2018/19

Question	Satisfaction score %*	
	2017/18	2018/19
"The person I spoke to was polite and pleasant"	98.0	99.2
"Once my call was answered by a specialist in poisons information the enquiry was dealt with promptly"	98.0	98.8
"The information was given to me at an appropriate speed"	98.2	99.4
"I had confidence in the reply I was given"	98.0	99.2
"The reply from NPIS was relevant and useful"	96.9	98.0
"I was given an appropriate amount of information for my needs"	97.4	99.0
"My telephone call was answered without delay by a specialist in poisons information"	94.5	94.2

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

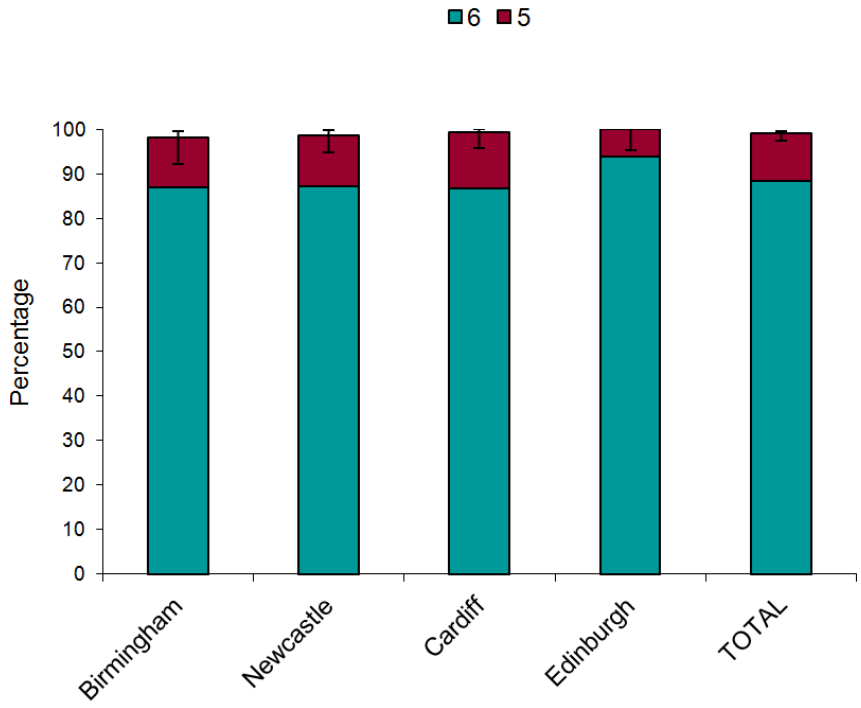

Figure 5.2.1 Overall quality scores for 2018/19 for the four NPIS units expressed as a proportion of respondents scoring five or six (non-respondents excluded from the denominator)

Summary

The response rate this year was the lowest to date at 18.9%. This may introduce bias, which could be in either direction. Respondents continue to have an excellent level of satisfaction with the service overall and for individual elements of the survey. User satisfaction remains high for calls dealt with by all the NPIS units.

TOXBASE

Formal quality assurance is obtained from TOXBASE users 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 1,458 returns were received during the 2018/19 reporting year. Users were asked to grade a series of statements on a Likert scale of one to six where one = disagree completely, and six = agree completely. Satisfaction scores are shown in Table 5.2.3.

Overall satisfaction with TOXBASE on a scale of one to six was indicated on 1,408 returns; 92.8% scored either five (good) or 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

186 returns (12.8%) included free text comments which can be grouped as shown in Table 5.2.4. The TOXBASE website underwent a significant redesign in September 2018 to improve usability and to update the appearance of the database. Some negative comments (10) were received in the period shortly after the redesign went live, however during the same period 12 users took the time to specifically feed back their satisfaction with the new look. Box 5.2.1 gives examples of comments about TOXBASE from returned forms, including examples of comments related to the website redesign.

Table 5.2.3 Summary of user satisfaction scores

Rank	No. of responses	Question	Satisfaction score (%)*
1	441	“I had confidence in the information for my query”	95.5
2	573	“Finding the information I required was easy”	91.7
3	441	“Logging on to the database was easy”	90.4
4	445	“The information was sufficient for managing this case”	88.3

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

Table 5.2.4 Summary of free text comments on TOXBASE from quality assurance returns

Type of comment	Number (% value) *
Positive comments and thanks	120 (65.5%)
Suggestions	30 (16.1%)
Specific issues	12 (6.5%)
Negative comments	15 (8.1%)
Comment related to other NPIS services	9 (4.8%)
Information technology	3 (2.1%)

* users often offered multiple comment types within one response

Box 5.2.1

Examples of comments about TOXBASE from quality assurance returns

“My go to resource for all things overdose/toxic ingestion“

“Your website ensures I can manage patients safely in the general practice setting rather than referring patients to A+E”

“Very dependable source of info”

“It allowed me to make the decision to leave the patient at home and not put pressure on A&E services unnecessarily”

Examples of comments specifically regarding website redesign

“Redesign is a significant improvement in information access and ease of use”

“I don't really like this new look website”

”The updated site is easy to navigate with clear advice and alerts”

UKTIS quality assurance

Formal feedback on the UKTIS is sought continuously from a random sample of telephone enquirers, with questionnaires sent out between one and four weeks after the enquiry. However, due to poor response rates previously, an online questionnaire was developed to provide quality assurance and request for specific feedback on the ***bumps*** patient information leaflets, which is the source where most users obtain pregnancy information from the service. The questionnaire was piloted from October 2018 for four months and received 318 responses. Responders were mainly women (92.5%) who were collecting information for themselves (79.2%); most were currently pregnant (61.9%) or planning a pregnancy (14.9%), rather than post-partum (2.9%). Overall, users indicated (agreement scale of one to five) that the leaflets were useful (mean rating 4.2/5) and easy to read (4.4/5) and understand (4.4/5). Most thought they provided the right amount of information (80.1%), and answered all of their questions (73.2%). Almost all (93.4%) would recommend the site to a friend or colleague.

Examples of informal feedback received via Twitter regarding the ***bumps*** website (which provides openly accessible patient information sheets) is presented in Box 5.2.2.

Box 5.2.2 *bumps* end-user feedback via Twitter

"I find providing medications for pregnancy patients challenging at times and was delighted to discover medicinesinpregnancy.org by @medsinpregnancy It's clear, simple and an invaluable resource to have in your work browser"

"UKTIS/@medsinpregnancy provide really good info and the helpline is even more useful than the website"

"Incredibly useful resource. Standard 'go to' for our service to help women make informed decisions about their care"

"Just looked up @medsinpregnancy, fantastic resource for drug information and leaflets in pregnancy"

"The Bumps website provides women and their partners with the facts to make informed decisions about use of medicines in pregnancy in conjunction with their healthcare provider http://www.medicinesinpregnancy.org/ A good site for all pharmacists to bookmark! @medsinpregnancy #pharmacists"

5.3 Education and training

5.3.1 NPIS

CPD for NPIS staff is an essential component of the clinical governance structure of the service. A national CPD programme equips both clinicians and scientific staff with the necessary knowledge and expertise to provide up to date, accurate, evidence-based and consistent advice on all aspects of poisoning.

Training for SPIs

Each NPIS unit provides structured in-house training and assessment in both clinical and non-clinical (e.g. communication) skills to prepare SPIs for dealing with healthcare professionals who contact our service for advice. Training is structured towards learning objectives covering all aspects of clinical toxicology, from the mechanisms of toxicity to the management of poisoned patients. These are clearly set out in a national training curriculum. Additionally, SPIs may wish to undertake a postgraduate qualification in toxicology to further enhance their knowledge and expertise.

Continuing professional development

The format of the NPIS annual CPD programme changed in 2017 from four meetings annually to two-day meetings held twice each year, with all NPIS units hosting in turn. This new format has allowed staff greater opportunity for CPD along with the benefit of networking during an evening social event. It is the responsibility of the CPD lead, an

NPIS consultant appointed by the unit directors every three years, to organise the rolling programme of meetings. A SPI 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, antidotes and other emerging treatment modalities. Additionally, the meetings provide an ideal forum to educate staff about strategic developments within the service, discuss challenging clinical cases and debate new research proposals. The meetings also offer the chance for face-to-face contact and social networking between clinical and scientific staff who may previously have only had contact via the phone.

A typical programme for the CPD event is shown in Box 5.3.1.

CPD events have been well attended with good participation from NPIS and PHE staff as well as external speakers (Table 5.3.1).

Table 5.3.1 Participation and feedback from NPIS CPD events 2018/19

CPD event	Number of attendees	Number of presentations	Feedback (good or excellent)
Newcastle, October 2017	44	17	96%
Birmingham, March 2018	47	19	96%
Edinburgh, September 2018	37	18	94%
Cardiff, March 2019	36	18	87%

A survey of NPIS staff was conducted to seek feedback about the effectiveness of the two-day CPD format. Seventy per cent of respondents preferred the two-day format, 80% agreed that the two-day event has improved the relationship between the consultants and SPIs and 90% agreed that the social event is beneficial. Seventy-five per cent of respondents would be willing to present at future events and 97% thought that the CPD programme met their educational needs.

To facilitate access of NPIS staff to educational resources, audio and video recordings of presentations from the last two CPD meetings in Edinburgh and Cardiff were uploaded on the NPIS-only space on TOXBASE for staff who have been unable to attend the CPD days.
All NPIS staff 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 EAPCCT.

Box 5.3.1 NPIS CPD meeting, NPIS Cardiff

Venue: Postgraduate Centre, University Hospital Llandough

Day 1: Thursday 21 March 2019

IHR strengthening Ethiopia project *Eirian Thomas, PHE*

Epidemiology of poisoning in Ethiopia *Pardeep Jagpal, NPIS Birmingham*

Perspectives on Ethiopia *Gill Carter, NPIS Cardiff & Dr Ruben Thanacoody, NPIS Newcastle*

Reporting Illicit Drug Reactions (RIDR) *Laura Pechey, PHE*

History of nerve agent releases *Prof Allister Vale, University of Birmingham*

Oximes: old and new *Prof Michael Eddleston, NPIS Edinburgh*

Novichok: lessons from Salisbury *Dr James Haslam, Salisbury NHS Foundation Trust & Dr Steve Emmett, DSTL*

Day 2: Friday 22 March 2019

Gadolinium: Should we be worried about gadolinium deposition disease? *Dr Kerry Layne, St Thomas Hospital, London*

Radiation poisoning *Dr John Thompson, NPIS Cardiff*

Public health response to chemical incidents *Prof David Russell, CRCE Wales*

What will really happen in a mass casualty chemical incident and how should we prepare? *Dr Mark Byers, Sutton House*

Clinical features in sarin exposure: an open source systematic review *Mike Beddard, NPIS Cardiff*

Enhanced monitoring of glyphosate exposure by TOXBASE. The NPIS pesticide surveillance project 2004-2018 *Richard Adams, NPIS Edinburgh*

Vaginal button battery insertion in an adult *Alex Capleton, NPIS Cardiff*

Geographical toxicological dilemma *Dr Alison Thomas, NPIS Cardiff*

Cold water extraction: getting high avoiding the toxicity *Dr David Wood, St Thomas Hospital, London*

Wedinos *Dean Acreman, Wedinos Project, Cardiff*

Use of simulation training in toxicology training *Dr Laurence Gray, NPIS Cardiff*

5.3.2 NPIS / Emergency medicine training

As in previous years, the NPIS and the Royal College of Emergency Medicine (RCEM) organised joint CPD days which were held in London in June and Newcastle in November 2018. These covered important topics in clinical toxicology using case-based presentations and gave delegates the opportunity to discuss specific issues with experts

from the NPIS. The CPD days were well attended by consultants and trainees in Emergency Medicine from across the UK who provided excellent formal feedback about the teaching provided.

5.3.3 TOXlearning – a clinical toxicology e-learning resource

A clinical toxicology e-learning resource has been provided to NHS healthcare professionals across the UK by NPIS Edinburgh since 2005. This resource was upgraded and re-launched in August 2018 (Figure 5.3.1) at www.toxlearning.co.uk.

The resource provides a useful and accessible training resource for those wishing to learn how to use TOXBASE effectively when handling enquiries about poisoning, and also learn more about the management of common overdoses.

The NPIS recommends that TOXBASE users of all types and grades complete the 'Using TOXBASE' module (see Box 5.3.2). 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.

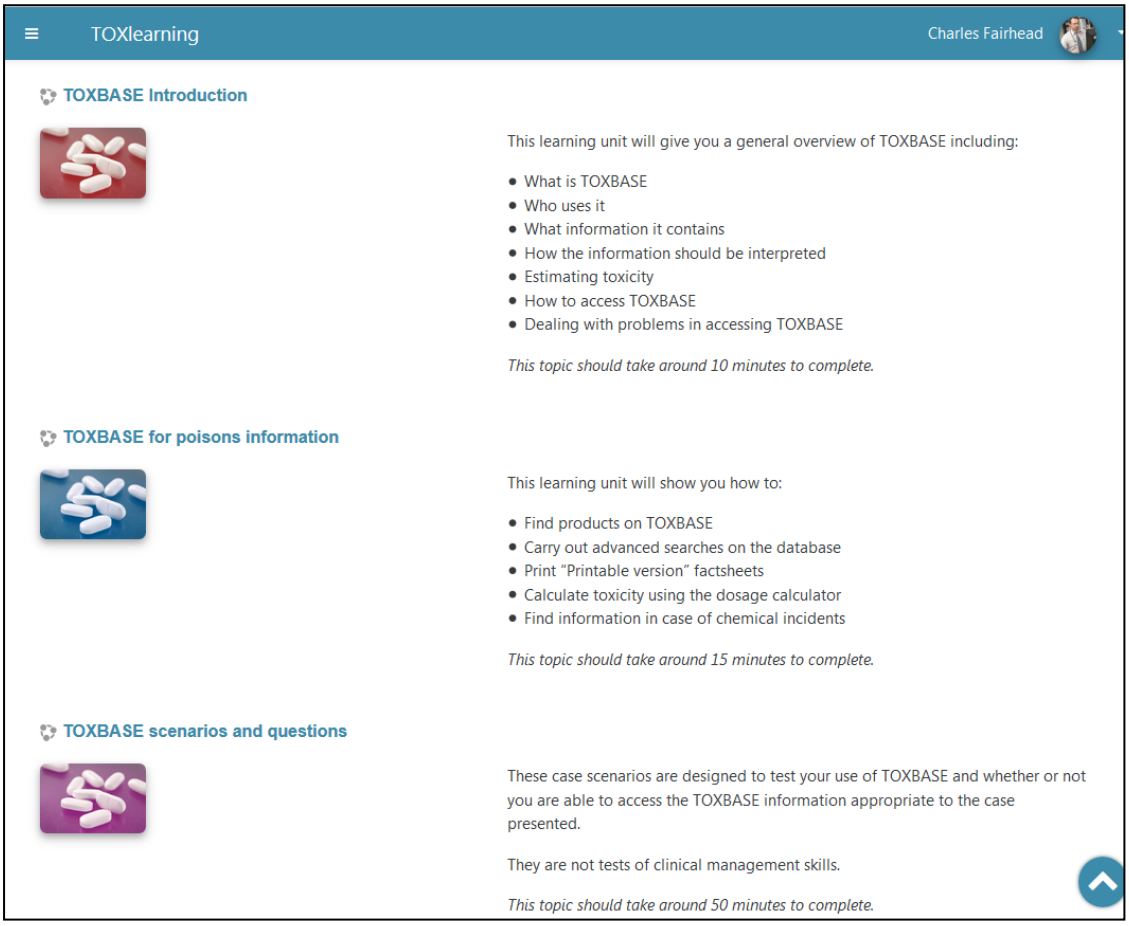

Figure 5.3.1 Screenshot from www.toxlearning.co.uk

Box 5.3.2 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

6. Areas of interest in 2018/19

6.1 Drugs of misuse

Introduction

NPIS telephone enquiry numbers and the volume of TOXBASE accesses (including those made via the TOXBASE app) give an indirect indication of the drugs of misuse most commonly encountered by health professionals. The data can be used to follow trends with time, including the emergence of new substances, and to characterise features of toxicity reported for different substances. These data can be of value in assessing toxicity relating to drugs of misuse and are shared periodically with responsible agencies including PHE, the Advisory Council on the Misuse of Drugs (ACMD), the UK Focal Point (UK FP) and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA).

Methods

Telephone enquiries are included in this analysis if the exposure is to a substance with no other purpose than drug misuse, or when the exposure has been classified as ‘recreational’ by the SPI receiving the call, irrespective of the substance involved and including medicinal drugs. This has the advantage that substances not previously recognised as being involved in misuse can be identified.

The intent of the exposure is not available when using TOXBASE access data. For example, looking at TOXBASE access data relating to diazepam would not allow insight into whether the access related to an exposure that was for recreational drug misuse, self-harm or therapeutic error. For this reason accesses to TOXBASE pages that relate to licensed medications are omitted from cumulative data. There are two exceptions, methylphenidate and methadone, which are included because these are under specific surveillance.

Overall activity

During the 2018/19 reporting year there were 1,220 telephone enquiries meeting the misuse criteria described above, a 2.0% decrease compared to 2017/18. These enquiries related to 396 different substances or products and accounted for 3.0% of all telephone enquiries. There were also 66,227 TOXBASE accesses relating to 1,055 different substances or products, accounting for 3.1% of all TOXBASE online accesses; similar numbers to last year. There were also 9,818 accesses to the TOXBASE app, an

11.4% increase compared to 2017/18, relating to 682 different products and substances.

Substances involved

The top 10 substances of misuse involved in telephone enquiries, TOXBASE online accesses and TOXBASE app accesses are shown in Table 6.1.1. As in previous years, cocaine, cannabis and MDMA were most commonly involved in telephone enquiries and cocaine, MDMA and heroin in TOXBASE online accesses.

Table 6.1.1 Top 10 drugs/substances of misuse involved in telephone enquiries, TOXBASE online accesses and TOXBASE app accesses

	Telephone enquiries	Number 2018/19	% change from 2017/18
1	Cocaine (inc crack)	287	12.1
2	Cannabis	164	21.5
3	MDMA (inc ecstasy)	153	-6.7
4	Heroin	117	21.9
5	Unknown drug of misuse	100	16.3
6	Diazepam	85	18.1
7	Pregabalin	69	11.3
8	Alprazolam	60	15.4
9	Amfetamine	54	31.7
10	Methadone	51	-17.7

	TOXBASE online accesses	Number 2018/19	% change from 2017/18	TOXBASE app accesses	Number 2018/19	% change from 2017/18
1	Cocaine (inc crack)	13,634	13.9	Cocaine (inc crack)	991	23.8
2	MDMA (inc ecstasy)	9,542	-5.1	MDMA (inc ecstasy)	819	3.1
3	Heroin	5,189	7.9	SCRA	451	18.1
4	Cannabis	4,987	15.2	Cannabis	426	43.9
5	Methylphenidate	4,410	11.8	Ketamine	420	49.4
6	Amfetamine	3,664	-10.8	Heroin	393	26.8
7	Ketamine	3,592	28.9	GHB	391	-28.9
8	SCRA	3,325	-5.8	NEiH	342	350.0
9	Branded products	2,449	32.7	Methylphenidate	333	49.3
10	GHB	2,138	-20.6	N-propylnorpentedrone	255	672.7

Compared with last year, ketamine activity increased via TOXBASE online (28.9 %), via the app (by 49.4%) and by telephone enquiries (34.3%). Ketamine was the 12th most common drug of misuse for telephone enquiries in 2018/19.

TOXBASE app use data identified two cathinones whose activity has increased substantially in this period, specifically NEiH or 2-(ethylamino-4-methyl-1-phenyl-pentan-1-one) increased by 350.0% and N-propylnorpentedrone or 1-phenyl-2-(propylamino)pentan-1-one increased by 672.7%. Each was first identified in the EU by the EMCDDA in 2018. There were, however, no telephone enquiries received involving either substance.

The emergence of novel fentanyl derivatives has been an important public health concern in recent years. This year there were no telephone enquiries about novel fentanyls to NPIS but 71 TOXBASE accesses to 16 different fentanyl derivatives. However it may be difficult for clinicians to identify these substances clinically from other opiate toxicity presentations and under-recognition is likely, especially if users are unaware of their presence in drug products they have purchased, e.g. heroin powder or counterfeit pharmaceuticals.

Synthetic cannabinoid receptor agonists (SCRA), and products likely to contain SCRA, continue to be the commonest new psychoactive substance group for which the NPIS has provided advice.

Trends with time

In our previous annual report we compared NPIS telephone enquiry numbers and TOXBASE accesses for four consecutive financial years to assess the impact of the Psychoactive Substances Act (PSA), enacted in May 2016. The first two years were before the enactment of the PSA, while the second two years included enquiries and accesses that were almost all made after the PSA came into force. These data were used by the Home Office in their evaluation of the PSA. Reductions in telephone enquiry activity for common New Psychoactive Substances (NPS) in the first two years after the PSA came into force have continued in 2018/19, including for mephedrone, synthetic cannabinoid receptor agonists and branded NPS products. A similar pattern is seen for TOXBASE accesses, the exception being an increase in accesses about NPS products. The trend of increases in telephone and TOXBASE activity relating to some common conventional drugs of misuse including cocaine, heroin and cannabis have also continued this year, although there have been modest reductions for MDMA (Table 6.1.2).

Table 6.1.2 Overall NPIS drug of misuse activity and for selected drugs 2014/15 to 2018/19

Telephone enquiries	2014/15	2015/16	2016/17	2017/18	2018/19
New Psychoactive Substances					
Mephedrone	85	55	14	13	10
SCRA	74	108	52	59	47
Branded products	391	276	74	36	31
Traditional drugs					
Cocaine	164	172	163	256	287
Heroin	118	124	68	96	117
MDMA	122	131	140	164	153
Cannabis	117	109	116	135	164
Total	1,722	1,613	1,210	1,245	1,220
TOXBASE online accesses	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
New Psychoactive Substances					
Mephedrone	6,622	4,385	1,454	785	562
SCRA	2,544	4,770	3,343	3,528	3,325
Branded products	3,699	5,703	2,062	1,845	2,449
Traditional drugs					
Cocaine	8,564	9,492	11,499	11,971	13,364
Heroin	5,221	5,626	5,201	4,810	5,189
MDMA	9,972	10,128	10,281	10,057	9,542
Cannabis	3,707	4,319	3,887	4,328	4,987
Total	69,537	67,228	64,015	63,373	66,287

Ten year trends in activity for Class A, B and C drugs of misuse are shown in Figures 6.1.3 to 6.1.6. These are expressed as a percentage of total activity, because there have been changes in overall telephone and TOXBASE activity relating to all substances over this period, with increasing use of TOXBASE and declining frequency of telephone enquiries. These data show recent increases in the proportion of overall telephone enquiry activity relating to cocaine, heroin and cannabis, but these are not accompanied by substantial increases in TOXBASE activity for these substances when measured in this way. There have been substantial reductions in telephone and TOXBASE activity relating to mephedrone over several years and more recent reductions for synthetic cannabinoid receptor agonists. There have been modest year on year increases in the proportion of telephone and TOXBASE activity related to ketamine.

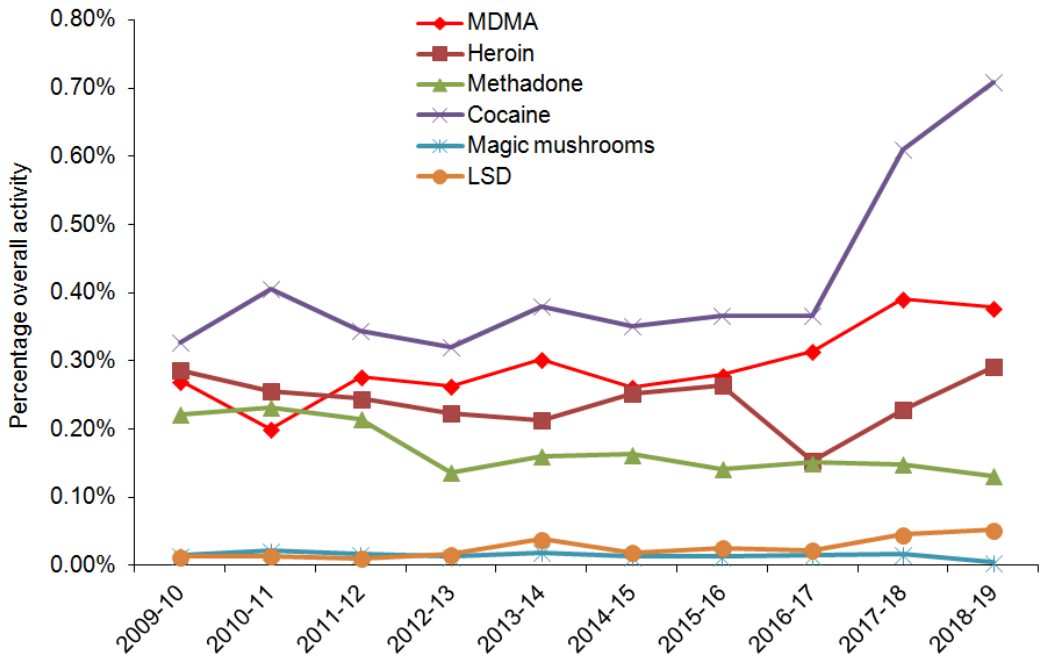

Figure 6.1.3 Telephone enquiries for legal class A by year

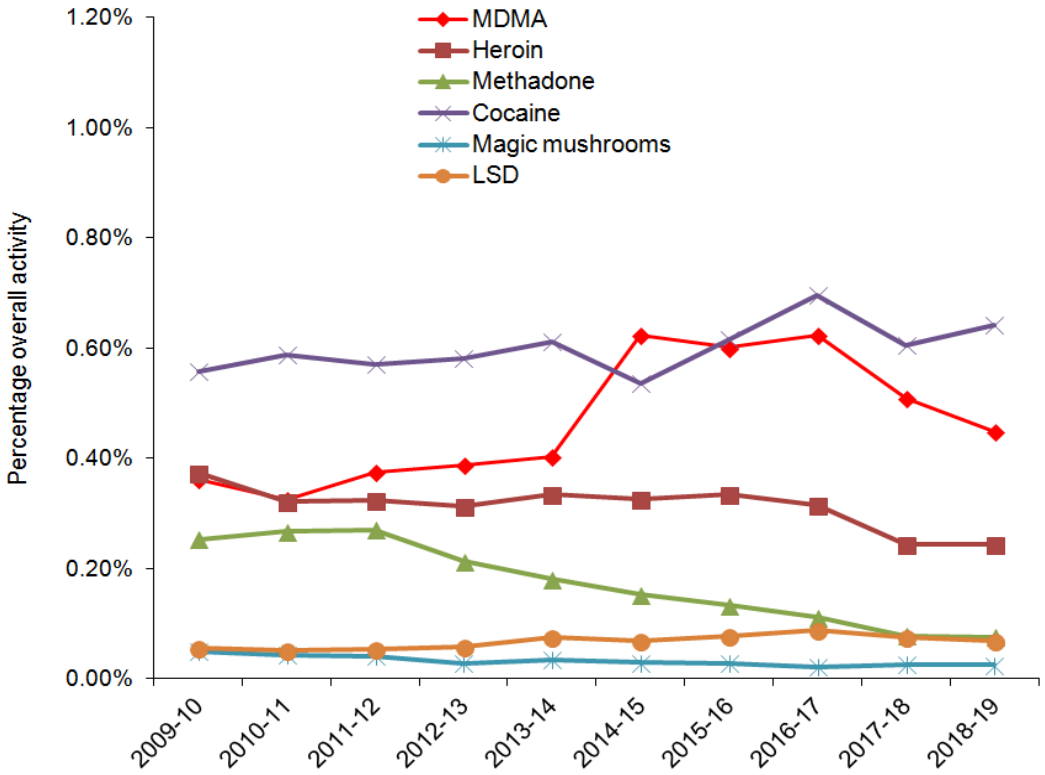

Figure 6.1.4 TOXBASE accesses for legal class A by year

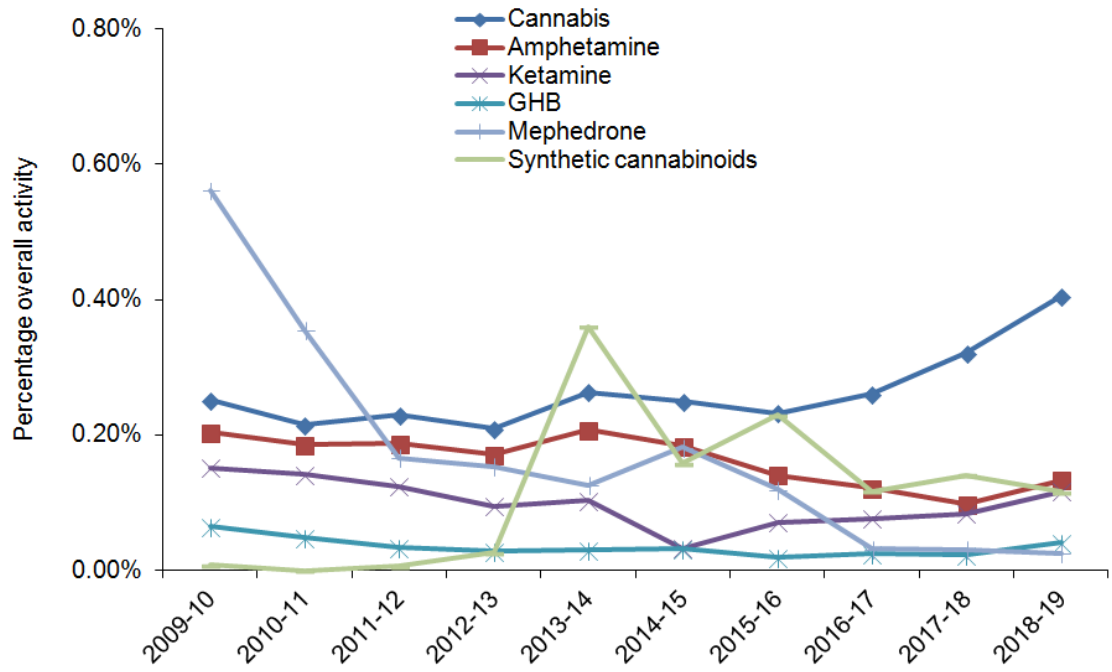

Figure 6.1.5 Telephone enquiries for legal class B and C by year

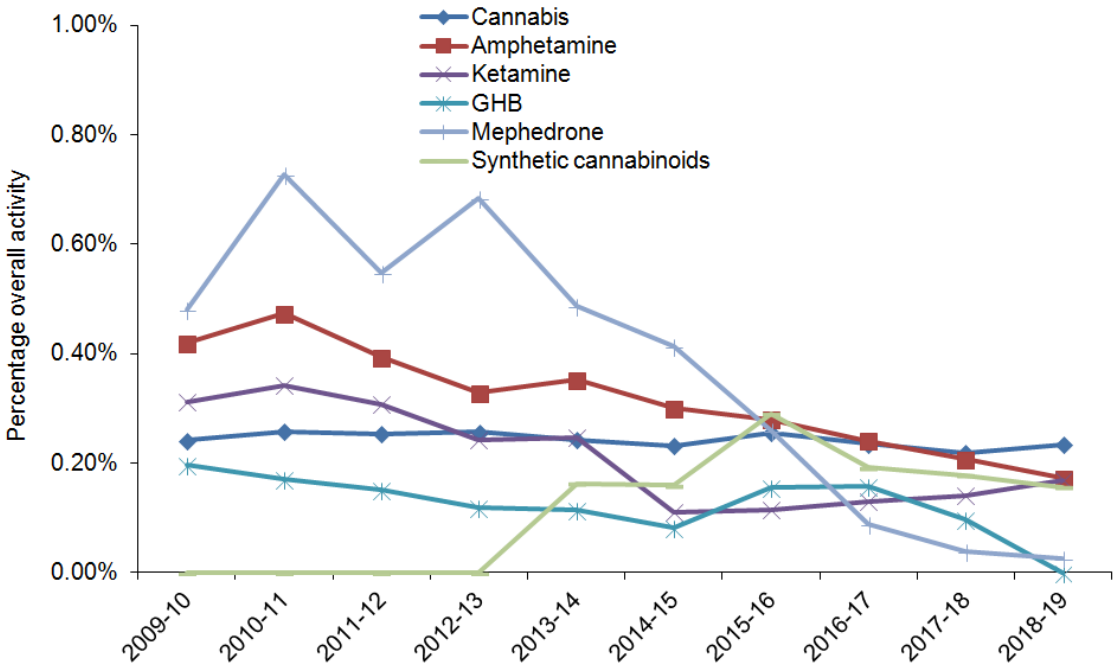

Figure 6.1.6 TOXBASE accesses for legal class B and C by year

6.2 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 1,579 TOXBASE entries for pesticides and biocides are being tracked, an increase from the 1,563 tracked during 2017/18. Incident information is obtained in two ways, from follow-up of TOXBASE enquiries by an online or postal questionnaire or from data collected during NPIS telephone enquiries.

During the year, there were 4,254 accesses to TOXBASE about pesticides of interest and information on 641 potential exposures was collected via the NPIS telephone enquiry service. From the TOXBASE accesses, 355 follow-up postal or email questionnaires were completed and 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. Of note, TOXBASE is often used for educational purposes but it is unclear how many of the total accesses were for this use.

Overall, information was gathered on 1,056 potential exposures involving pesticides during 2018/19, giving an overall return rate from follow-up requests of 20.7% which is similar to previous years. Twenty-two exposures involved multiple patients.

Of the 1,056 potential exposures available for analysis, there were 30 cases where symptoms were not thought to be related to the pesticide exposure, e.g. where a pre-existing illness or concomitant infection was present. These cases were excluded, leaving 1,026 exposures for further analysis. Due to the use of combination products or multiple products, these exposures involved 1,031 agents. The results presented below include both unintentional acute (873 cases; 85.1%) and chronic (49; 4.8%) exposures and deliberate self-harm exposures (DSH) (82; 8.0%). The circumstances of exposure in 22 (2.1%) cases were unknown.

Most unintentional acute exposures were graded as PSS 0 (495 cases; 48.2%) or PSS 1 (303; 29.5%). Smaller proportions were graded moderate (PSS 2: 5; 0.5%), severe (PSS 3: 2; 0.3%) or of uncertain severity (34; 3.3%). One fatality was reported

(compared with three in 2017/18). This case involved intentional ingestion of 20% paraquat.

Agents of interest

The agents most frequently involved in exposures are shown in Table 6.2.1. In addition, there were 130 cases involving unknown rodenticides, 30 cases of unknown herbicides, 26 of unknown ant killers, 22 of unknown insecticides and 5 of unknown pesticides.

Table 6.2.1 Pesticides most frequently reported by respondents in suspected pesticide exposures during 2018/19 compared with 2017/18, ordered by rank in 2018/19

Ingredient	2017/18	2018/19
Permethrin	127	130
Glyphosate	125	100
Difenacoum	72	65
Bromadiolone	44	54
Phenols / cresols	30	48
Metaldehyde	56	45
Tetramethrin	30	42
Bendiocarb	18	41
Cypermethrin	34	30
Imidacloprid	47	29
Deltamethrin	15	21
Moxidectin	28	20

In 2018/19, patients potentially exposed to pesticide products comprised 517 adults (13 years or older; 50.4%) and 460 children (12 years or younger; 44.8%), with 49 of unknown age (4.8%). There were 547 (53.8%) male patients and 448 (43.7%) female patients and 31 cases (3.0%) where the gender was not specified. 12 enquiries involving pregnant patients were reported (15 in 2017/18). All 12 exposures were unintentional and acute. Poisoning severity was graded as PSS 0 or PSS 1 in all cases.

The classes of product most commonly involved in exposures are shown in Figure 6.2.1.

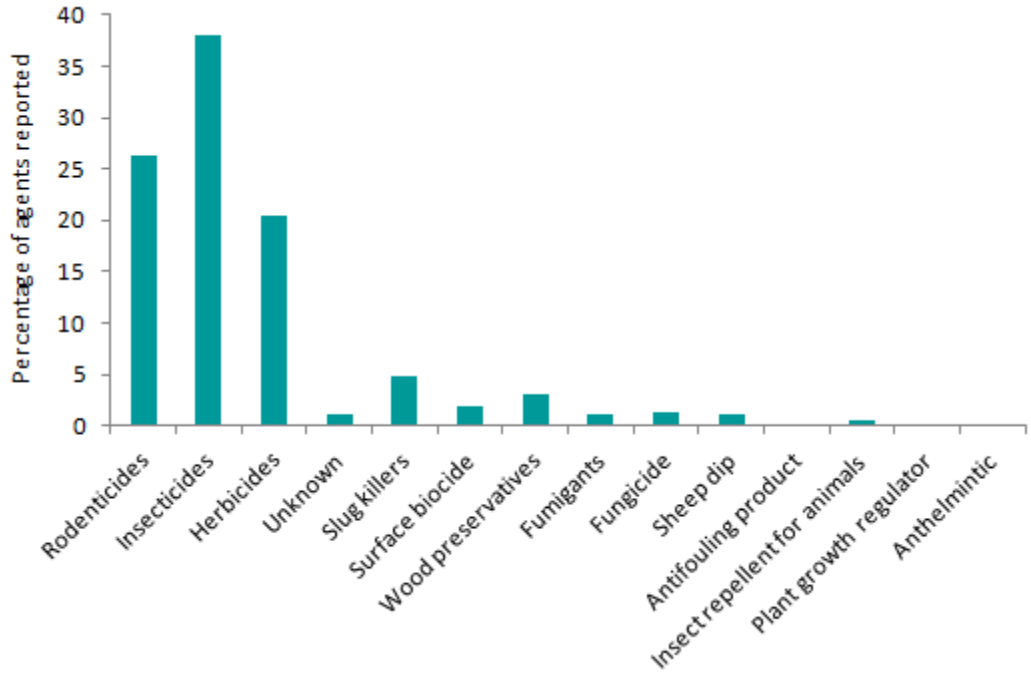

Figure 6.2.1 Pesticide exposures by class of product (as reported by respondent) in 2018/19 (1,031 agents)

6.3 Carbon monoxide

Since June 2015, the NPIS has received funding from the Gas Safety Trust (GST) to examine the epidemiology and outcome of carbon monoxide (CO) exposures in the UK. During the period January 2018 to December 2018 (inclusive), data were available for 914 patient-related CO exposures. Of these, 231 (25.3%) were male and 290 (31.7%) were female, with sex not specified for 393 (43.0%) patients. Exposures comprised 632 adults (13 years or older, 69.1%) and 155 children (12 years or younger, 17.0%). Age was not specified in 127 exposures (13.9%). Sixteen exposures involved pregnant women (1.8%).

Exposures in 846 patients (92.6%) were unintentional, while 68 patients (7.4%) were exposed in the context of self-harm.

When smoke or fire were excluded as the source of CO (81, 9.6%), the highest proportion of unintentional exposures (765) were caused by domestic boiler issues (229; 29.9%), cookers, (54; 7.1%), vehicle exhaust fumes (42; 5.5%) and domestic wood/coal fire burners (31; 4.1%). These CO exposures were mosty of low severity (538; 70.3%), associated with no symptoms or mild symptoms only). Moderate severity was recorded in 29 (3.8%) cases and severe symptoms in eight (1.0%). There were three fatalities (0.4%), however in one of these cases CO exposure was not definite. Of the exposures in pregnant women, three remained asymptomatic and 13 had symptoms

of minor severity. Activation of a CO alarm prompted the patients to seek medical attention in 190 (22.5%) cases.

Central nervous system symptoms were most prominent (253; 33.1%), followed by effects on gastrointestinal system (108; 14.1%), respiratory effects (35; 4.6%) and cardiovascular effects (31; 4.1%).

Measurement of CO or carboxyhaemoglobin (COHb%) was reported for 439 patients. This comprised 260 blood tests, 32 breath tests and 53 pulse CO-oximeter measurements, with the test type not reported for 94 patients. COHb% values were reported for 239 patients ranging from 0% to 45.5% (median = 4.5%). A positive correlation was observed between symptom severity and blood COHb concentration.

The data presented here demonstrate the ability of the NPIS to collect valuable data on all aspects of CO poisoning from across the UK. With ongoing funding from GST, the NPIS will continue to collect data to improve our understanding of the incidence and characteristics of CO poisoning in the UK. Additionally, the NPIS, in conjunction with Scotia Gas Networks (SGN) and the electronic Data Research and Innovation Service (eDRIS), plan to perform a data linkage study in Scotland using information from gas engineer-confirmed CO leaks/exposures and health outcome for individuals in the properties concerned. This study will be initiated during 2019.

6.4 Dinitrophenol

2,4-Dinitrophenol (DNP) is a highly toxic industrial chemical which, if ingested, can cause serious health effects including high fever, rapid heart rate, agitation, headache, diarrhoea, vomiting, convulsions, acidosis, muscular rigidity and multi-organ failure. These features are all too frequently fatal in spite of intensive medical treatment. Despite these risks associated with DNP use it is still sometimes taken as a ‘fat burner’ to promote weight reduction or for ‘body sculpting’.

The NPIS has been tracking episodes of poisoning relating to DNP since the service first reported an increase in enquiry numbers and deaths in 2013. This information has been shared on a quarterly basis with the Food Standards Agency (FSA) and PHE to support actions to protect public health. Data on DNP enquiries has also been published in our annual reports.

In last year’s annual report we described an increase in enquiries relating to DNP in late 2017 and early 2018. This had occurred in spite of earlier public health measures including warnings to the public, focussed educational activity (e.g. in gyms) and law enforcement action targeting illegal internet sales. Further details of these actions are provided in previous annual reports.

During 2018/19 there was some reduction in telephone enquiries and TOXBASE accesses relating to DNP since the most recent peak in the first quarter of 2018 (Figure 6.4.1). During the 2018 calendar year there were 20 cases (18 males and two females) discussed by phone with the NPIS; six of these are known to have died, emphasising the very high toxicity of DNP. There were two further non-fatal cases in the first quarter of 2019.

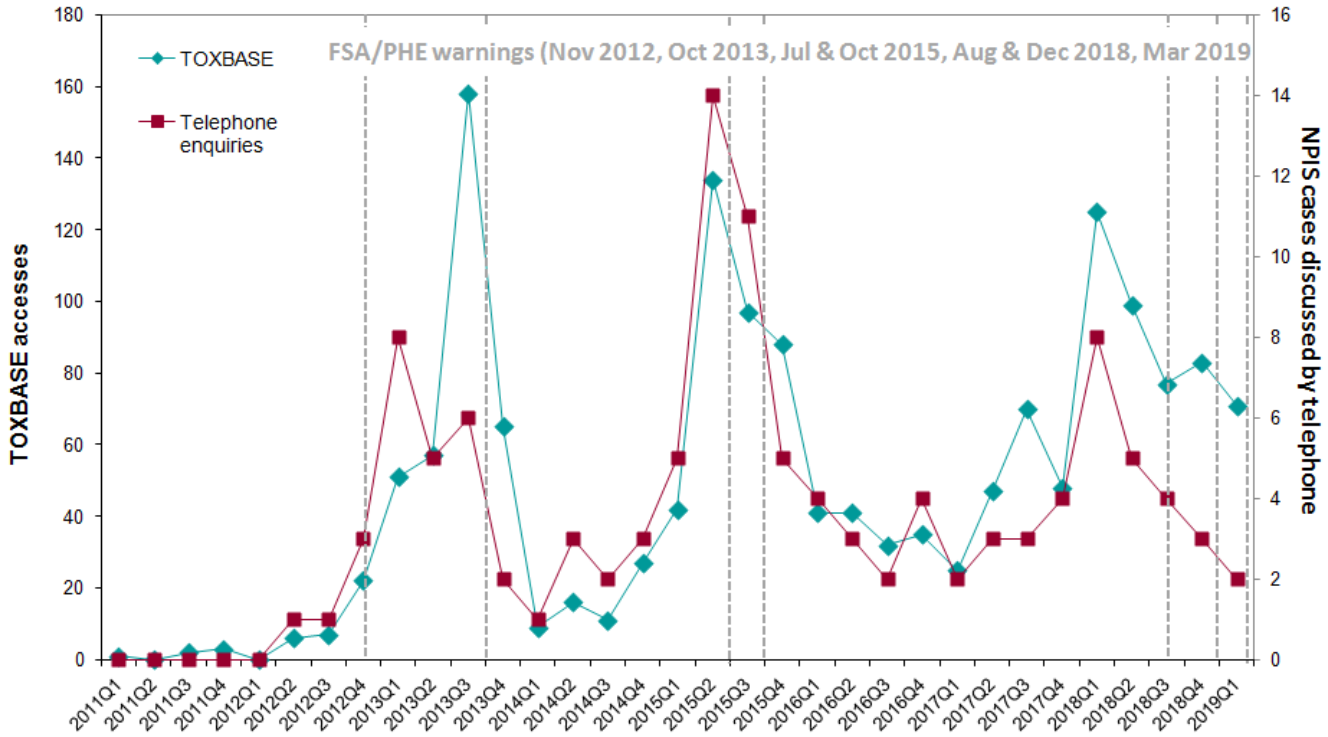

Figure 6.4.1 Quarterly numbers of NPIS cases referred by telephone and TOXBASE accesses relating to systemic DNP exposure, January 2011 - March 2019

In total there have been 120 cases of systemic DNP exposure discussed by phone with the NPIS since 2007. Of these, 20 (17%) are known to have died. The NPIS is aware of at least six further fatal cases that were not discussed with the service at any stage. This means that there have been at least 26 DNP-related deaths in the UK since 2007, 18 since January 2015.

In response to this recent information provided by the NPIS, PHE issued updated advice to the public via its Public Health Matters blog in August 2018 and the FSA issued a further warning in December 2018. Subsequently information and advice was provided about DNP to healthcare professionals via PHE (May 2019) and the Chief Medical Officer for Scotland (March 2019).

The NPIS will continue to monitor and report on enquiries relating to DNP and encourage the responsible government agencies to take the necessary actions to restrict the use of this highly toxic chemical.

6.5 Supporting ambulance services

Ambulance services have become an increasingly important user group for the NPIS, and the development of the TOXBASE app has improved access to poisons information for ambulance paramedics. NPIS staff have noted many examples where ambulance crews have attended patients with non-intentional poisoning, where the risk to the patient was low and where there was no need for transport to hospital.

A project was conducted by NPIS Newcastle to assess whether provision of pre-dispatch advice to the ambulance service by the NPIS might prevent unnecessary emergency vehicle and crew callouts in cases of suspected non-intentional poisoning. The project examined first point of contact, crew on-scene, non-intentional poisoning enquiries and also established if the crew were attending solely due to the potential poisoning. Enquiries in which NPIS advised home care were assessed and a judgement made by two observers as to whether the assessment by an on-scene crew may have reassured NPIS staff and influenced this decision.

During the six months of study (October 2017 to March 2018) NPIS Newcastle answered 628 ambulance enquiries. Of these, 274 (44%) concerned non-intentional poisoning and the crew were on-scene in 193 cases. After discussion, the NPIS advised home care or no action for 105 cases; these included seven cases where there was at least one other reason for attendance which was unrelated to poisoning, and seven further cases where it was judged that the crew on-scene assessment may have influenced the home care decision. Therefore, advance consultation with the NPIS may have avoided an emergency vehicle and crew call-out in 91 cases, or 47% (95% CI 40-54%) of all non-intentional poisoning cases. Extrapolating from national ambulance enquiry data, this study suggests the potential of NPIS advice to avoid 668 ambulance dispatches annually. However, there was a substantial variation in use of the NPIS between ambulance services and this figure would be increased if all ambulance services discussed non-intentional exposure cases with the NPIS more consistently.

6.6 Electronic cigarettes

The use of electronic nicotine delivery systems, including electronic cigarettes or e-cigarettes, has become commonplace within the UK and elsewhere. These delivery systems deliver a vapour which is then inhaled. This is generally achieved by the device heating liquid to produce a vapour containing various concentrations of nicotine, propylene glycol and flavourings, which is then inhaled.

The contents of e-cigarettes and their liquid refills vary but may contain substantial concentrations of nicotine, which could lead to highly toxic exposures if swallowed or used in other unintended ways. Refill solutions contain larger quantities of fluid than individual e-cigarettes, sometimes substantially larger. They are potentially a greater acute hazard due to the larger volume that may be ingested, either accidentally or intentionally.

The NPIS received 262 telephone enquiries concerning e-cigarettes and their refill solutions in 2018/19. This is similar to the number of enquiries received in each of the previous four years (min 225, max 272 enquiries per annum). Thirty-nine per cent of enquiries this year originated from hospitals (all departments). Children aged less than five years were involved in 40% of enquiries. The majority of exposures (184 of 262) were accidental; however, 56 (21%) concerned intentional exposures. The remainder of enquiries included adverse reactions to intended use, recreational misuse and ‘therapeutic errors’. Where the individual route of exposure was specified, ingestion was the most common (223), although multiple routes of exposure also occurred and in one case the liquid was injected. Twenty-seven exposures involved eye contact and eight of these occurred when the liquid was mistaken for eye drops. In another case liquid was mistakenly used as ear drops.

Where the clinical features were known at the time of the enquiry, 177 enquiries concerned patients who had no features of toxicity and 75 features of only minor toxicity. Four enquiries concerned patients with moderate toxicity. One patient had severe features. Features of toxicity included eye pain and conjunctivitis, irritation of the oral cavity, haemoptysis, nausea, vomiting, palpitations and dizziness.

It is of concern that so many of the exposures were accidental and occurred in young children and that nine enquiries occurred when e-cigarette products were mistaken for medicines: either eye or ear drops. In two cases these were administered to someone else by a parent or carer. Conversely, it is also of concern that the number of enquiries concerning deliberate exposure has increased, both in absolute numbers and as a percentage of enquiries. The nicotine liquid in e-cigarettes and their refills contains doses of nicotine that are toxic when swallowed. Even small volumes have the potential to cause serious harm to a small child when swallowed or used as eye drops or ear drops. These products need careful storage to lessen the chance of accidental exposure and consideration should be given to how the products are presented, to minimise the risk of them being confused with eye and ear drops.

6.7 Global public health activities

The NPIS in conjunction with PHE CRCE have been supporting global public health activities and capacity building as part of its commitment to the International Health Regulations (IHR 2005).[4] The NPIS contributes to several countries and region-specific programmes in Africa and South East Asia as well as activities to support UK overseas territories (UKOTs). The NPIS can offer specialist knowledge, advice and training to countries looking to set up or strengthen their existing poisons information service. This can include developing and delivering a specific tailored programme of work over several years, for example current projects in Ethiopia and Myanmar, to workshops aimed at signposting public health practitioners and clinicians to available resources though training and exercises, e.g. UKOTs.

Staff from NPIS and PHE have undertaken missions jointly in Ethiopia and Myanmar to build relationships with stakeholders and identify how best to support the country and region develop its poisons information service. In Ethiopia, clinical toxicology training is being provided to St Peter's Hospital in Addis Ababa, and in Myanmar the main stakeholder is the National Poisons Control Centre in Yangon. Training missions that have been delivered in Ethiopia and are scheduled for Myanmar include: introduction to toxicology, pesticides, household products, pharmaceuticals and the role of poisons centres in chemical incident response and surveillance. Classroom-based teaching sessions and case studies have been combined with practical training sessions in using TOXBASE and answering poisons information telephone enquiries with "mock" phone calls and technical support such as assisting with development of associated standard operating procedures. Feedback on the training delivered to date has been very positive and has shown that NPIS skills are transferable to developing countries. The projects have led to numerous collaborations, e.g. locally with the Ethiopian Public Health Institute to develop mechanisms for chemical incident surveillance and on the international level with the WHO to update numerous chapters in the WHO Poisons Centre Guidelines.[5] The projects have further developed important collaborations with established poisons centres in Tanzania and Thailand, and also with Zambian experts with the view of developing a poisons centre. Some additional key achievements to date have included:

- provision of learning materials (toxicological textbooks) and access to TOXBASE
- NPIS consultant toxicologists have successfully undertaken clinical assessments of healthcare facilities both in Myanmar and Ethiopia
- supporting attendance for Ethiopian trainees at the 2018 EAPCCT congress in Bucharest
- literature reviews have been drafted for both Ethiopia and Myanmar to better understand the epidemiology of poisoning and are due to be published in the peer reviewed literature over the coming year

[4] International Health Regulations (2005), 3rd edition. Geneva: World Health Organization; 2016 www.who.int/ihr/publications/9789241580496/en/
[5] Guidelines for Poison Control. Geneva: World Health Organization; 1997.

- development of a database for recording and reporting call enquiry data to establish the collection and reporting of poisoning data suitable for chemical incident surveillance
- provision of technical expertise to prioritise supply and provision of antidotes and in improving laboratory analysis capabilities

6.8 Antidote availability in the UK

Antidotes are an essential and potentially lifesaving component of management for patients with some specific types of poisoning. Maintaining adequate stocks of appropriate antidotes is the responsibility of NHS Trusts, but to support decision making, the NPIS, together with the Royal College of Emergency Medicine (CEM), has published guidance since 2006. This guidance, most recently updated in 2017, classifies antidotes that should be available into three groups: category A antidotes should be immediately available in the emergency department, category B antidotes should be available in hospitals and available for use within one hour. Category C antidotes are rarely used, suitable for supra-regional stocking.

Compliance with this guidance has been audited on three previous occasions and a further audit was conducted between October 2018 and February 2019. A questionnaire were sent by email to chief pharmacists, procurement leads and/or medicines information teams at 233 hospitals in the UK with an emergency department. Monthly follow-up reminders were sent via email. By 7 February 2019 178 replies had been received (76% response). Full compliance with the guidance was reported by 73 hospitals (41.7%) for category A antidotes, 34 hospitals (19.1%) for category B antidotes and 18 hospitals (10.1%) for both category A and B antidotes. Selected category A and B antidotes of particular concern or where earlier audits had demonstrated poor compliance with guidance are summarised in Table 6.8.1. For most of these the situation had improved, although there was a reduction in the proportion of hospitals stocking adder antivenom.

Of concern, an appropriate range of cyanide antidotes was only held by 118 (66%) hospitals and three hospitals (1.7%) held no cyanide antidotes at all. Stocking of fomepizole, the preferred antidote for ethylene glycol or methanol poisoning, has increased since previous audits. While some hospitals that did not stock fomepizole held an alternative (ethanol) 11 hospitals (6.2%) held no antidote for these poisons.

Table 6.8.1 Selected category A and B antidotes of particular concern or where earlier audits had demonstrated poor compliance with guidance

Category and Antidote		Poison / toxidrome treated	Hospitals stocking the antidote as recommended (n=178)	Absolute change since 2014 audit (%)
A	Calcium gluconate gel	Hydrogen fluoride	150 (84.3%)	+3.2%
A	Hydroxocobalamin	Cyanide including by smoke inhalation	128 (71.9%)	+16.3%
A	Intralipid 20%	Multiple	149 (83.7%)	Not previously recommended
A	Adder antivenom	Adder envenomation	120 (70.6%)	-4.1
B	Cyproheptadine	Serotonin syndrome	153 (86.0%)	+8.5
B	Phentolamine*	Adrenaline injection	129 (72.5%)	+22.8
B	Pyridoxine	Isoniazid	132 (74.2%)	+5.0
B	Fomepizole	Ethylene glycol and methanol	151 (84.8%)	+11.4

* supply problems may have prevented stocking by some hospitals

Stocking of category C antidotes remained poor, ranging from two hospitals (1.1%) stocking glucarpidase to 62 hospitals (34.8%) stocking pralidoxime. Depending on the specific antidote, between 58% and 71% of hospitals not stocking a particular category C antidote were able to provide information on the nearest source. Knowledge of arrangements for obtaining category C antidotes was stronger in areas with more formalised regional holding arrangements, e.g. Yorkshire & Humber, Scotland and Northern Ireland.

One limitation of the audit is the incomplete response rate and it remains possible that non-responding hospitals had worse antidote stocking arrangements than those that did respond. Overall there have been important improvements in the stocking of antidotes by acute hospitals since the RCEM and NPIS guidelines were first published, although there remain some issues of concern. In particular, stocking of rarely used category C antidotes remains patchy and there is a lack of information where these might be sourced. This is an issue that has been under review by NHS England for several years and is currently being considered by the Regional Medicines Optimisation Committee (London). It is hoped that more consistent arrangements can be organised in the future to ensure that poisoned patients can access the medicines that they need in an appropriate and clinically-relevant time frame.

7. Conclusions

As in previous years, the NPIS and UKTIS have continued to provide information and advice to NHS health professionals about the management of patients with suspected poisoning and about drug and chemical exposures in women who are pregnant. Our services continue to attract excellent user feedback that reflects the continuing commitment and hard work of all our staff.

The longer term trend for information to be provided via our online platforms rather than by telephone has been maintained. This is important as it is essential for telephone enquiry numbers to be managed so that the service is not overwhelmed, whilst ensuring health professionals can still get timely advice when they are managing complex or severe cases. This is an increasing challenge as a result of reductions in real-term funding and NPIS staff numbers.

In spite of funding challenges, the increasing focus on online activity has allowed the amount and impact of advice provided by the NPIS and UKTIS to increase, assisted by new developments such as the TOXBASE app and the openly accessible information about drug exposures in pregnancy on the UKTIS and ***bumps*** websites. Maintaining these online resources as accurate and up to date within available resources will remain a key challenge into the future.

8. Recommendations

Outcome of Recommendations for NPIS in 2018/19

Continue to re-evaluate service priorities for short and longer-term allocation of increasingly limited resources.

Outcome: The NPIS has provided data to PHE on the structure, costs and cost-effectiveness of the service, as well as options for cost savings and income generation. This information is being considered by PHE for their review of the service, expected to be published during 2019/20.

Update NPIS protocols for managing cases of unusual poisoning, especially those where there may be a wider public health risk, with the aim of improving response and fostering better collaborative working with other agencies.

Outcome: Arrangements have been developed to allow on-call staff to access consultant support from those with additional expertise or experience in the management of unusual poisonings or those of particular public health importance.

Maintain current externally-funded surveillance projects and continue to seek further external income to support the integrity of the current service.

Outcome: These projects have been maintained and funding for further studies secured.

Continue to monitor episodes of poisoning of public health importance, reporting to responsible government agencies as appropriate.

Outcome: The NPIS has continued its surveillance work as demonstrated in this annual report.

Recommendations for NPIS in 2019/20

Consider and, where feasible, implement recommendations arising from the PHE review of the service when this is shared with the NPIS, with the aim of developing a service that can meet the needs of the NHS within the resources that are available.

Continue support of PHE in delivery of global public health initiatives relating to poisons centres.

Continue to monitor episodes of poisoning of public health importance, reporting to responsible 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, NPIS Birmingham and West Midlands Poisons Unit, City Hospital, Birmingham and Alcohol Lead, Sandwell and West Birmingham NHS Trust, Birmingham

Dr MEMO Elamin MBBS, DTM&H, MRCP, PgCert ClinEd, MSc(Med Tox)
Consultant Clinical Toxicologist, NPIS Birmingham and West Midlands Poisons Unit, Birmingham City Hospital

NPIS Cardiff

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

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

Dr L A Gray MBBCh MRCP
Consultant Physician in Clinical Pharmacology and Therapeutics, Cardiff and Vale University Health Board

Dr A Thomas MBChB FRCP DipMedTox, DipTher
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 FAACT
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 FBPhS
Professor of Clinical Toxicology, University of Edinburgh; Consultant Clinical Toxicologist, NPIS Edinburgh and Royal Infirmary of Edinburgh

Dr G Jackson BSc DipMedTox PhD
TOXBASE Lead Manager, NPIS Edinburgh

Dr E A Sandilands BSc MD FRCP Edin
Director, NPIS Edinburgh; 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
Information Services Manager, NPIS Newcastle

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

Dr K K Hodson MD MRCP(UK) MRCOG DipTher
Head of Teratology, UKTIS; Consultant in Obstetrics and Maternal Medicine, Newcastle upon Tyne Hospitals NHS Foundation Trust; Associate 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 FAACT
Director, NPIS Newcastle and UKTIS; Chair, NPIS Clinical Standards Group; Consultant Physician, Newcastle upon Tyne Hospitals NHS Foundation Trust; Professor of Clinical Pharmacology and Therapeutics, Newcastle University

Other consultants providing on-call support for the NPIS

Professor P I Dargan FRCPE FACMT FRCP ERT 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 FAACT FBPhS
Consultant Physician and Clinical Toxicologist, Chair of Drugs and Therapeutics Committee and Trust Lead for Mortality Surveillance and Review, Guy's and St Thomas' NHS Foundation Trust and King's Health Partners, London; Reader in Clinical Toxicology, 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 DipMedTox
Consultant Emergency Physician with Toxicology, St John's Hospital, Livingston and 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 SOCIETIES

Fellow: American Academy of Clinical Toxicology
Fellow: European Association of Poisons Centres and Clinical Toxicologists

UK ADVISORY COMMITTEES

Member: MHRA Orthopaedic Expert Advisory Group
Member: PHE Lead exposure in children surveillance system steering group

ACADEMIC ACTIVITIES

Honorary Senior Lecturer: School of Biosciences, University of Birmingham
Joint Course Organiser: MSc (Toxicology), University of Birmingham
Educational and Clinical Supervisor: Sandwell and West Birmingham Hospitals NHS Trust

Dr MEMO Elamin

INTERNATIONAL SOCIETIES

Co-Chair: Abstract Review Committee, MENATOX (Middle East & North Africa Clinical Toxicology Association)

ACADEMIC ACTIVITIES

Visiting Lecturer in Clinical Toxicology: Faculty of Medicine, Al-Neelain University, Sudan

NPIS Cardiff

Dr J Coulson

INTERNATIONAL ACTIVITIES

Consultancy in Clinical Toxicology to WHO

UK ADVISORY COMMITTEES

Member: Committee on Toxicity

Co-opted member: Tramadol subcommittee to the Advisory Panel on Substance Misuse

NHS NATIONAL AND REGIONAL COMMITTEES

Chair: New Medicines Group

ACADEMIC ACTIVITIES

Clinical Reader Lecturer: Cardiff University

Visiting Professor of Clinical Pharmacology: University of South Wales

Dr L A Gray

NHS NATIONAL AND REGIONAL COMMITTEES

Member: All Wales Prescribing Advisory Group (AWPAG) for All Wales Medicine Strategy Group

Member: New Medicines Group for All Wales Medicine Strategy Group

ACADEMIC ACTIVITIES

Medical Advisor: Diploma in Medical Toxicology, Cardiff University

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: Programme Management Committee, Certificate/Diploma/MSc in Medical Toxicology, Cardiff University

Member: Programme Management Committee, Certificate/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
Member: TAIEX Panel of Experts for European Commission

INTERNATIONAL SOCIETIES

Fellow: European Association of Poison Centres and Clinical Toxicologists
Fellow: American Academy of Clinical Toxicology

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

Member: Executive Committee, British Toxicology Society
Honorary Secretary: 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

Member: Programme Management Committee 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

INTERNATIONAL ACTIVITIES

Member: EMA Scientific Advisory Group on Paracetamol, Expert Advisory Group EU IMI TransBioLine Consortium

INTERNATIONAL SOCIETIES

Chair: BPS Toxicology Group

NHS NATIONAL AND REGIONAL COMMITTEES

Deputy Director: Yellow Card Centre, Scotland
Member: Lothian Formulary Committee
Member: British Pharmacological Society Clinical Section Committee

ACADEMIC ACTIVITIES

External Examiner: BSc Clinical Pharmacology, Kings College, London
External Examiner: MSc/Diploma in Medical Toxicology, Cardiff University

Professor M Eddleston

INTERNATIONAL ACTIVITIES

Member: WHO Expert Advisory Group for the FAO and WHO Joint Meeting on Pesticide Management

Member: FAO Temporary Working Group on Fall Army Worm. Synthetic chemical pesticides.
Advisor: World Health Organization/Department of Evidence and Policy on Environmental Health
External Examiner: Postgraduate diploma in Pesticide Risk Management, University of Cape Town, South Africa

INTERNATIONAL SOCIETIES

Scientific Committee Member: EAPCCT
Board Member: APAMT

INTERNATIONAL JOURNALS

Editorial Board Member: Clinical Toxicology

UK ADVISORY COMMITTEES

Member: UK Department of Health Committee on Antivenoms
Member: Scientific Advisory Group for Emergencies (SAGE), UK government, Nov 2018

NHS NATIONAL AND REGIONAL COMMITTEES

Member: Scottish Commission on Medicines
Member: Area Drug & Therapeutics Committee, NHS Lothian

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

MBChB Year 6 Medicine Module Organiser: University of Edinburgh

Dr A Veiraiah

NHS NATIONAL AND REGIONAL COMMITTEES

Medical Lead: SPSP Medicines

NPIS Newcastle (including UKTIS)

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
Member: British Pharmacological Society Clinical Committee

ACADEMIC ACTIVITIES

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)
Educational Supervisor: PHE Funded Advanced Fellowship in Clinical Toxicology
Site Lead: Foundations of Clinical Practice, MBBS stage 3, Royal Victoria Infirmary, Tyne base unit, Newcastle University

Dr K K Hodson

UK COMMITTEES

Executive Member: MacDonald UK Obstetric Medicine Society

ACADEMIC ACTIVITIES

Lead Consultant: Maternal Medicine Training in NE England
Lecturer: Maternal Medicine Teaching Courses, RCP London and Royal College of Obstetricians and Gynaecologists
Trial Management Group Member: EMPOWER: Emesis in Pregnancy - Ondansetron With mEtoclopRamide Study

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
Course Director: Clinical Pharmacology Therapeutics and Prescribing, MBBS, Newcastle University
External Examiner: Therapeutics, Brighton & Sussex Medical School

Professor S H L Thomas

INTERNATIONAL SOCIETIES

Fellow and Past president: European Association of Poisons Centres and Clinical Toxicologists
Fellow: American Academy of Clinical Toxicology

INTERNATIONAL ACTIVITIES

Expert Panel Member: European Medicines Agency

INTERNATIONAL JOURNALS

Deputy Editor: Clinical Toxicology

UK ADVISORY COMMITTEES

Member: Advisory Council on the Misuse of Drugs
Member: Technical Committee, Advisory Council on the Misuse of Drugs
Chair: Advisory Council on the Misuse of Drugs Novel Psychoactive Substances Committee.
Member: Ministry of Defence Advisory Group on Military and Emergency Response 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: Northern Regional Medicines Optimisation Committee
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
Regional Speciality Advisor (North East), Clinical Pharmacology and Therapeutics

Other 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
Chair: European Association of Poison Centres and Clinical Toxicologists Scientific Committee
Member: American College of Medical Toxicology International Committee
Abstract Reviewer: American Academy of Clinical Toxicology
Expert Adviser: World Health Organization
Member: GSK Global Analgesics Panel
Member: WHO/UN Global Alliance to Eliminate Lead from Paint
Member: WHO Global Burden of Disease Expert Panel

INTERNATIONAL JOURNALS

Senior Editorial Board Member: Clinical Toxicology
Editorial Board Member: Toxicologie Analytique et Clinique

UK ADVISORY COMMITTEES

Expert Adviser: Advisory Council on Misuse of Drugs
Member: Technical Committee, Advisory Council on Misuse of Drugs
Co-chair: College of Emergency Medicine Antidote Guideline Group

ACADEMIC ACTIVITIES

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
Member: MRCP (UK) Scenario Editorial Committee
Examiner: MRCP (UK) Part 2 Clinical Examination (PACES)
External Examiner: 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

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 (EMCDDA)
Member: American Academy of Clinical Toxicology Scientific Review Committee
Member: Clinical Toxicology Collaborative: Activated Charcoal Systematic Review
Member: EXtracorporeal TReatments In Poisoning (EXTRIP) 2 workgroup
Expert Advisor: United Nations Office on Drugs and Crime (UNODC)
Expert Advisor: World Health Organisation

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 (ACMD) Technical and Novel Psychoactive Working Groups
Member: Scientific advisory group on the Health Foundation Funded ‘Project Neptune’
Member: Advisory Board of the Angelus Foundation, now part of Mentor UK
Member: COMed Working Group/All-Party Parliamentary CO Group (on behalf of the NPIS)

NHS NATIONAL AND REGIONAL COMMITTEES

Member: Department of Health Early Warning System
Member: Public Health England NPS Clinical Network
Member: Steering Group of the PHE RIDR project

ACADEMIC ACTIVITIES

Joint Project Co-ordinator: European Drug Emergencies Network (Euro-DEN) Plus project
Lecturer: NPIS/RCEM Clinical Toxicology Training Days
Lecturer: NPIS Cardiff Update in Medical Toxicology course
Royal College of Physicians (RCP) representative: Royal College of Pathology (RCPath) Specialty Advisory Committee on Toxicology

APPENDIX B NPIS publications in 2018/19

62 contributions to the scientific literature were published in 2018/19 by NPIS staff*

* NPIS staff are given in **bold** type
# early online publication details for these publications were previously listed in the 2017/18 NPIS report

Peer-reviewed papers

Aldridge R, Ford L, **Bradberry S**. A curious case of cannabinoid toxicity. Clin Toxicol; published online 12/03/2019.

Bateman DN, **Eagling V**, **Sandilands EA**, **Jackson G**, Crawford C, **Hawkins L**, **Cheung T**, **Cooper G**, **Bradberry SM**, **Thompson JP**, **Thomas SHL**, **Eddleston M**. Iron overdose epidemiology, clinical features and iron concentration-effect relationships: the UK experience 2008-2017. Clin Toxicol 2018; 56: 1098-1106.#

Cauldwell M, Steer PJ, Bonner S, Asghar O, Swan L, **Hodson K**, Head CEG, Jakes AD, Walker N, Simpson M, Bolger AP, Siddiqui F, English KM, Maudlin L, Abraham D, Sands AJ, Mohan AR, Curtis SL, Coats L, Johnson MR. Retrospective UK multicentre study of the pregnancy outcomes of women with a Fontan repair. Heart 2018; 104: 401-6.

Channavajjhala SK, Bramley R, Peltz T, Oosthuyzen W, Jia W, Kinnear S, Sampson B, Martin N, Hall IP, Bailey MA, **Dear JW**, Glover M. Urinary extracellular vesicle protein profiling and endogenous lithium clearance support excessive renal sodium wasting and water reabsorption in thiazide induced hyponatremia. Kidney Int Rep 2018; 4: 139-47.

Crawford C, **Anderson M**, **Cooper G**, **Jackson G**, **Thompson J**, **Vale A**, **Thomas S**, **Eddleston M**, Bateman DN. Overdose in young children treated with anti-reflux medications: Poisons enquiry evidence of excess 10-fold dosing errors with ranitidine. Hum Exp Toxicol 2018; 37: 343-9.#

Day RC, **Bradberry SM**, **Sandilands EA**, **Thomas SHL**, **Thompson JP**, **Vale JA**. Exposures to automatic dishwashing rinse aids reported to the United Kingdom National Poisons Information Service 2008-2016. Clin Toxicol 2018; 56: 427-32.#

Day R, **Bradberry SM**, **Jackson G**, **Lupton DJ**, **Sandilands EA**, **Thomas SHL**, **Thompson JP**, **Vale JA**. A review of 4652 exposures to liquid laundry detergent capsules reported to the United Kingdom National Poisons Information Service 2008-2018. Clin Toxicol; published online 20/03/2019.

Dear J. New biomarkers for drug-induced liver injury. Hepatol 2018; 67: 2480-1.

Elamin MEMO, James DA, Holmes P, **Jackson G**, **Thompson JP**, **Sandilands EA**, **Bradberry S**, **Thomas SHL**. Reductions in emergency department visits after primary healthcare use of the UK National Poisons Information Service. Clin Toxicol 2018; 56: 342-7.#

Fok H, Victor P, **Bradberry S**, **Eddleston M**. Novel methods of self-poisoning: repeated cardenolide poisoning after accessing *Cerbera odollam* seeds via the internet. Clin Toxicol 2018; 56: 304-6.#

Govier P, **Coulson JM**. Civilian exposure to chlorine gas: A systematic review. Toxicol Lett 2018; 293: 249-52.#

Gray LA, Routledge PA. Adverse Drug Reactions, still masquerading after all these years? Adv Drug React Bull 2019; 314: 1215-8.

Kaplan YC, **Richardson JL**, Keskin-Arslan E, Erol-Coskun H, Kennedy D. Use of ondansetron during pregnancy and the risk of major congenital malformations: A systematic review and meta-analysis. Reproductive Toxicol 2019; 86: 1-13.

McCrae JC, Morrison EE, MacIntyre IM, **Dear JW**, Webb DJ. Long-term adverse effects of paracetamol - a review. Br J Clin Pharmacol 2018; 84: 2218-30.

McDermott JH, Reynard C, Perry J, **Dear JW**, Child F, Jenner R. Acute carbon monoxide toxicity in a paediatric cohort: analysis of 10 boys poisoned during a scuba diving lesson. Clin Toxicol 2018; 56: 856-9.#

McParlin C, **Hodson K**, Barnes AC, Taylor R, Robson SC, Araujo-Soares V. Views, experience and adherence among pregnant women with gestational diabetes participating in a weight loss study (WELLBABE). Diabetic Med 2019; 36: 195-202.

Mukhtar O, Cheriyan J, Cockcroft JR, Collier D, **Coulson JM**, Dasgupta I, Faconti L, Glover M, Heagerty AM, Khong TK, Lip GYH, Mander AP, Marchong MN, Martin U, McDonnell BJ, McEniery CM, Padmanabhan S, Saxena M, Sever PJ, Shiel JI, Wych J, Chowienczyk PJ, Wilkinson IB. A randomized controlled crossover trial evaluating differential responses to antihypertensive drugs (used as mono- or dual therapy) on the basis of ethnicity: The comparIsoN oF Optimal Hypertension RegiMens; part of the Ancestry Informative Markers in HYpertension program-AIM-HY INFORM trial. Am Heart J 2018; 204: 102-8.

Pettie J, Burt A, Knipe DW, Torrance H, Dow M, **Osinski K**, Greig R, Sabatini D, Easterford K, **Dear J**, **Eddleston M**. New drug controls and reduced hospital presentations due to novel psychoactive substances in Edinburgh. Br J Clin Pharmacol 2018, 84: 2303-10.

POP Trial Investigators, **Dear J**. Randomised open label exploratory, safety and tolerability study with calmangafodipir in patients treated with the 12-h regimen of N-acetylcysteine for paracetamol overdose—the PP100–01 for Overdose of Paracetamol (POP) trial: study protocol for a randomised controlled trial. Trials 2019; 20: 27.

Pyper K, **Eddleston M**, Bateman DN, **Lupton D**, **Bradberry S**, **Sandilands E**, **Thomas S**, **Thompson JP**, Robertson C. Hospital usage of TOXBASE in Great Britain: Temporal trends in accesses 2008 to 2015. Hum Exp Toxicol 2018; 37: 1207-14.[#]

Oosthuyzen W, Ten Berg PWL, Francis B, Campbell S, Macklin V, Milne E, Gow AG, Fisher C, Mellanby RJ, **Dear JW**. Sensitivity and specificity of microRNA-122 for liver disease in dogs. J Vet Internal Med 2018; 32: 1637-44.

Pettie J, Burt A, Knipe DW, Torrance H, **Dow M**, **Osinski K**, Greig R, Sabatini D, Easterford K, **Dear J**, **Eddleston M**. New drug controls and reduced hospital presentations due to novel psychoactive substances in Edinburgh. Br J Clin Pharmacol 2018; 84: 2303-10.

Quelch D, Pucci M, Coleman J, **Bradberry S**. Hospital management of alcohol withdrawal: elective versus unplanned admission and detoxification. Alcohol Treat Q; published online 11/08/2018.

Richardson JL, Martin F, **Dunstan H**, **Greenall A**, **Stephens S**, **Yates LM**, **Thomas SHL**. Pregnancy outcomes following maternal venlafaxine use: A prospective observational comparative cohort study. Reprod Toxicol 2019; 84: 108-13.

Ten Berg PW, Shaffer J, Vliegenthart ADB, Mccrae J, Sharkey N, Webb DJ, **Dear JW**. Attending a social event and consuming alcohol is associated with changes in serum microRNA: a before and after study in healthy adults. Biomarkers 2018; 23: 781-6.

Th'ng F, Vliegenthart A, Lea JD, Antoine D, **Dear J**, Mole D. Evaluation of plasma microRNA-122, high-mobility group box-1 and keratin-18 concentrations to stratify acute gallstone disease: a pilot observational cohort study in an emergency general surgery unit. BMJ Open 2018; 8: e020061.

White JC, Wood DM, **Hill SL**, **Eddleston M**, Officer J, Dargan PI, Dunn M, **Thomas SHL**. Acute toxicity following analytically confirmed use of the novel psychoactive substance (NPS) methiopropamine. A report from the Identification of Novel psychoActive substances (IONA) study. Clin Toxicol; published online 24/01/19.

Williams AM, Shave RE, **Coulson JM**, White H, Rosser-Stanford B, Eves ND. Influence of vagal control on sex-related differences in left ventricular mechanics and hemodynamics. Am J Physiol Heart Circ Physiol 2018; 315: H687-8.

Wong A, Homer N, **Dear JW**, Choy KW, Doery J, Graudins A. Paracetamol metabolite concentrations following low risk overdose treated with an abbreviated 12-h versus 20-h acetylcysteine infusion. Clin Toxicol 2018; published online 19/11/2018.

Book chapters

Hill SL, Dargan PI. Patterns of acute toxicity associated with new psychoactive substances. In 'Handbook of Experimental Pharmacology'. Brandt SM, Maurer (Eds), Springer, 2018.

Thanacoody HKR. Drug Interactions. In 'Clinical Pharmacy & Therapeutics', 6th Edition, Whittlesea C, Hodson K (Eds), Churchill Livingstone, 2019.

Thomas SHL. Poisoning. In 'Davidson's Principles and Practice of Medicine,' 23rd Edition, Ralston S, Penman I, Strachan M, Hobson R (Eds). Elsevier, 2018.

Published congress abstracts

Campbell AAJ, **Dear JW**, O'Brien R, Odam M. Attitudes towards research among adult acute toxicology admissions. Clin Toxicol 2018; 56: 509-10.

Capleton AC, **James M**, **Coulson JC**, **Bradberry SM**, **Sandilands EA**, **Thomas SHL**, **Thompson JP**. Mercury exposures from measuring devices reported to the UK National Poisons Information Service, 2008-2016. Clin Toxicol 2018; 56: 492.

Cirronis M, Masini E, Schneemann S, **Pettie J**, **Eddleston M**, **Dear JW**. Finger prick capillary MIR-122 is a biomarker of paracetamol hepatotoxicity. Basic Clin Pharmacol Toxicol 2018; 123: 78.

Cirronis M, Masini E, Schneemann S, **Pettie JM**, **Eddleston M**, **Dear JW**. Finger prick capillary microRNA-122 is a biomarker of paracetamol hepatotoxicity. Clin Toxicol 2018; 56: 545.

Cryans D, **Lupton DJ**, **Gordon LD**, **Sandilands EA**. Adolescent poisoning in Edinburgh: a 10 year analysis. Clin Toxicol 2018; 56; 555.

Docherty S, Iles R, Zmuidinaite R, **Coulson J**, Besser M. Matrix-assisted laser desorption ionisation time-of-flight mass spectrometry as a novel technique to detect sulphated haemoglobin. Br J Haematol 2018; 181: 64.

Dunn MD, **Hill SL**, Officer J, **Thomas SHL**. Analytical prevalence of drugs of misuse in homeless people presenting with severe toxicity after suspected use of novel psychoactive substances. Clin Toxicol 2018; 56: 463.

Eddleston M. Are oximes still indicated for acute organophosphorus insecticide self-poisoning? J Med Toxicol 2018, 14: 1-2.

Gentile DM, **Adams RD**, **Thomas SHL**, **Thompson JP**, **Bradberry SB**, **Jackson G**, **Sandilands EA.** Carbon monoxide poisoning: data from the UK National Poisons information Service (NPIS). Clin Toxicol 2018; 56; 489.

Gordon LD, **Lupton DJ**, **Jackson G**, **Adams RD**, **Bradberry SM**, **Thompson JP**, **Thomas SHL**, **Sandilands EA**. User experience of the TOXBASE app. Clin Toxicol 2018; 56; 486.

Law D, Singh M, **Coulson J**, **Gray L**. An assessment of allergy and adverse reaction history and documentation in patients on a Medical Emergency Admissions Unit (MEAU). Clin Translational Allergy 2018; 8(Suppl 3)**:** 142.

Harbon SCD, **Thompson JP**, **Bradberry SM**, **Sandilands EA**, **Thomas SHL**, **Coulson JM**. A nine year retrospective review of trends in oral anticoagulant enquiries to the UK National Poisons Information Service. Clin Toxicol 2018; 56: 472.

Jackson G, **Bradberry SM**, **Thompson JP**, **Thomas SHL**, **Sandilands EA**. Poisoning in the UK: what is the true incidence? Clin Toxicol 2018; 56; 519.

Jagpal PS, **Pucci M**, **Sandilands EA**, **Thompson JP**, **Thomas SHL**, **Bradberry SM**. Baclofen exposures reported to the UK National Poisons Information Service (NPIS) over 12 years (2005-2017). Clin Toxicol 2018; 56: 483.

Jarman H, Moss P, Dunn MD, **Hill SL**, **Thomas SHL**. Analytically confirmed recreational use of oberacetam (Noopept®) in the UK. Clin Toxicol 2018; 56: 467.

Jonas RH, **Bradberry SM**, **Sandilands EA**, **Thomas SHL**, **Thompson JP**. Cyanogenic glycoside ingestions: A review of enquiries received by the UK National Poisons Information Service (NPIS), 2008–2016. Clin Toxicol 2018; 56: 578.

Margolina ZR, Severtson SG, Leroy SJ, Fischera LJ, Green JL, Mégarbane B, Villa A, Schaper A, Ebbecke M, Sesana F, **Thomas SHL**, **Thompson JP**. Unintentional pediatric exposures to prescription medications in Europe as reported to the RADARS® System Global Toxicosurveillance Network. Clin Toxicol 2018; 56: 550.

Moyns E, **Williams H**, **Pucci M**, **Sandilands EA**, **Thompson JP**, **Thomas SHL**, **Bradberry SM**. The role of the UK National Poisons Information Service (NPIS) in the diagnosis of death in poisoned and non-poisoned patients. Clin Toxicol 2018; 56: 485-6.

Parnell TA, **Thompson JP**, **Coulson JM**. Levosimendan as a potential calcium channel blocker antidote: a systematic literature review. Clin Toxicol 2018; 56: 532-3.

Pettie JM, Dow MA, **Osinski K**, Macrae E, Brogan E, Dalglish M, **Sandilands EA**, **Dear JW**. Unintentional paracetamol overdose: 3-year analysis of patients admitted for treatment with acetylcysteine to a toxicology unit in the UK. Clin Toxicol 2018; 56; 523.

Scullion KM, Vliegenthart BAD, Farrah TE, Dhaun N, **Dear JW**. MicroRNA-126 is a marker of vascular dysfunction in human ANCA vasculitis. FASEB J 2018; 33(Suppl): 713-4.

Thanacoody RHK, **Elamin MEMO**, Webb NE, De La Rue L, Layne K, **Hill SL**, Archer JRH, Wood DM, Dargan PI, **Thomas SHL**. Clinical effectiveness of a shorter 12 hour acetylcysteine (SNAP) protocol in routine clinical practice. Clin Toxicol 2018; 56: 504.

Thomas E, **Bradberry SM**, **Sandilands EA**, **Thomas SHL**, **Thompson JP**. Inadvertent instillation of electronic cigarette liquid as eye drops. Clin Toxicol 2018; 56: 482.

Thomas SHL, Dunn MD, **Hill SL**, Tucker S, Wood DM, Dargan PI, Grundlingh J, Jarman H, Keating L, Katariah H, **Eddleston M**, Officer J, Cooper J, Baombe J, Thornley J, Parris R. Changes with time in analytically confirmed exposure to novel psychoactive substances (NPS) in patients with severe clinical toxicity in the UK. Clin Toxicol 2018; 56: 499-500.

Watt A, **Adams RD**, **Thomas SHL**, **Thompson JP**, **Bradberry SM**, **Jackson G**, **Sandilands EA**. Petroleum distillate poisoning in the UK: the National Poisons Information Service (NPIS) experience. Clin Toxicol 2018; 56; 488-9.

Wheatley N, **Bradberry SM**, **Sandilands EA**, **Thomas SHL**, **Thompson JP**. Managing superglue exposure: a sticky subject. Clin Toxicol 2018; 56: 563.

White J, Dargan PI, Wood DM, **Hill SL**, Biswell E, Archer JRH, Dunn MD, **Thomas SHL**. Acute toxicity following analytically confirmed use of the novel psychoactive substance (NPS) methiopropamine: a report from the Identification Of Novel psychoActive substances (IONA) study. Clin Toxicol 2018; 56: 461-2.

Williams H, **Moyns E**, **Pucci M**, **Sandilands EA**, **Thompson JP**, **Thomas SHL**, **Bradberry SM**. A review of the methods and efficiency of follow-up of enquiries to the UK National Poisons Information Service (NPIS) in 2016. Clin Toxicol 2018; 56: 483-4.

Wong A, Homer N, **Dear JW**, Choy KW, Doery J, Graudins A. Investigation of paracetamol metabolites to compare efficacy of acetylcysteine regimens in paracetamol overdose. Clin Toxicol 2018; 56: 507.

Other

Ang E, Tuthill D, **Thompson J**. E-cigarette liquid ingestion: a fast growing accidental issue in children. Arch Dis Child 2018; 103: 1091. Letter.

Bateman DN, **Victoria E**, **Sandilands EA**, **Jackson G**, **Bradberry SM**, **Thompson JP**, **Thomas SHL**, **Eddleston M**. Iron overdose - Response. Clin Toxicol 2019; 57: 72-3. Letter.