



Public Health
England

NPIS

National Poisons Information Service Report 2019/20



**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.

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Foreword

Hundreds of people seek advice from an NHS health professional each day following exposure to a drug or chemical. These may be accidental ingestions, which are common in children, or drug overdoses taken in the context of self-harm or drug misuse. These 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 and advice are provided via our internet database TOXBASE, and the TOXBASE app, to all UK healthcare professionals as well as colleagues in PHE and the Ministry of Defence. For complex cases our 24-hour telephone advice line is available, staffed by specialists in poisons information and supported by an on-call rota of consultant clinical toxicologists for advice on more serious or challenging cases. The NPIS also provides services to the Republic of Ireland, 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, which work together to deliver a fully-integrated service.

The NPIS incorporates the UK Teratology Information Service (UKTIS), located in Newcastle, which is the designated UK source of expert advice regarding exposures to drugs and other chemicals in pregnancy. The unborn child is particularly vulnerable to in-utero effects of drugs and chemicals, the consequences of which can cause significant, life-long morbidity. Information and advice about exposures during pregnancy to hundreds of drugs and chemicals are published openly on the internet. NHS health professionals can access more detailed and fully-referenced information via TOXBASE, and obtain 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.

The cost-effectiveness of the services provided by the NPIS have been demonstrated previously. We have recently demonstrated that our model of providing information via the internet in the first instance, with telephone enquiries reserved for more complex cases, allows a very high proportion of patients to be treated with the benefit of our specialist advice at an overall cost that is substantially lower on a population basis than equivalent services provided in other European countries.

This annual report is written as a statement of activity, accountability and governance of the NPIS during the 2019/20 reporting year. The service continues to receive outstanding user feedback, as detailed in this report. It remains our highest priority to provide services of the highest possible quality and safety. The provision of a quality service that meets the needs of the NHS within the resources provided remains the key challenge for the NPIS over 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

Poisoning is an important public health issue and a common cause of hospital presentation in the UK with approximately 160,000 presentations occurring 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. While the majority of episodes do not produce severe clinical effects, several thousand people die each year as a result of poisoning.

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. This information is provided primarily via TOXBASE, an online database which is also available as an app. There is also a 24-hour telephone advice service, staffed by specialists in poisons information and supported by consultant clinical toxicologists for more complex cases. 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 2019/20 (changes from 2018/19 in parentheses) there were:

NPIS

- 685,745 TOXBASE user sessions (-6.5%) from 6,492 different registered UK healthcare departments. Hospital departments and the NHS telephone advice services NHS 111, NHS 24 and NHS Direct were the most frequent users.
- 224,778 app accesses (+47.4%) from almost 19,000 TOXBASE app subscribers.
- 4,433 TOXBASE entries written or updated (-2.1%).
- 38,197 telephone enquiries received (-5.6%), of which 2,228 were referred to a NPIS consultant clinical toxicologist (+11.7%). The most frequent telephone enquirers were NHS telephone advice services and other healthcare professionals working in primary care.
- 24,000 safety data sheets (SDS) added to the NPIS Product Data Centre (-18%), bringing the total to more than 274,000.

UKTIS

- 756,000 accesses originating from the UK to publically available information about drugs in pregnancy provided by the **bumps** website (+31.0%).
- 29,264 (-19.5%) accesses to the detailed information on drugs and chemical exposures in pregnancy held on TOXBASE.
- 191,000 accesses (-67.6%) to the openly available summaries on the UKTIS website. Note that access data to publically available websites is not directly comparable year to year because of a change to search engine algorithms. This affects how websites are ranked depending on the country in which the search originates.
- 1,153 enquiries (-19.5%) about specific patients handled by the UKTIS telephone advice service.

Quality

The NPIS follows strict clinical governance processes and quality assurance exercises continue to demonstrate that all of the services provided have very high user satisfaction. The proportion of respondents scoring services as five or six out of six (very good or excellent) this year was 94.1% for TOXBASE online, 99.2% for the NPIS telephone poisons information service and 96.8% for the UKTIS telephone service..

Surveillance

The NPIS continues to collect clinical information on important causes of poisoning from across the UK. This helps us improve our clinical advice for health professionals and provides valuable information for public health surveillance of poisoning. Examples of work carried out during 2019/20 include drugs of misuse, pesticides, carbon monoxide and dinitrophenol. The NPIS has also considered the impact of the UK's exit from the European Union on its ability to provide comprehensive poisons services. Further details about these can be found in section six of this report.

1. Introduction

It is common for people to be exposed to substances that are not intended for human use, such as accidental ingestion of a household product or exposures to potentially harmful substances that might be encountered in the environment, such as carbon monoxide or animal venoms. Inappropriate exposures to medicines and other drugs are also common and might involve use by someone who was not prescribed the medicine or accidental or deliberate ingestion of excessive doses ('overdose'). Drug misuse is also common and may involve licensed medicines or other substances. While many of these exposures do not have severe adverse health consequences, some produce adverse clinical effects ('poisoning'), which may be severe or even fatal. This is an important public health issue in the UK, accounting for around 160,000 NHS emergency department presentations each year and many more consultations with primary care and NHS advice services such as NHS 111, NHS 24 and NHS Direct. Severe poisoning is also common and there were 4,359 deaths attributed to drug poisoning in England and Wales alone in 2018¹.

The majority of episodes of poisoning in adults are caused by drug overdose in the context of self-harm, although drug misuse is an important cause of mortality. Accidental exposures are most common in children, but occur across all ages including the elderly. Many thousands of different substances may be involved, making it very difficult for NHS staff to keep up to date on risk assessment, diagnosis and management. The vast majority of UK hospitals do not have specialist clinical toxicology services, therefore 24-hour access to high quality information and clinical advice concerning people with exposure to drugs and chemicals, including those with overt poisoning, is essential for their safe and effective management.

The National Poisons Information Service (NPIS) is a network of dedicated poisons units commissioned by Public Health England (PHE) on behalf of the UK health departments to provide poisons information to healthcare professionals. The role of the NPIS within the NHS is to support the appropriate triage, referral, assessment and treatment of patients with poisoning or where there is concern about possible health consequences from exposures. This is achieved by the provision of advice to emergency departments, GP practices 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. Information and advice are provided in the first instance via TOXBASE[®] (www.toxbase.org)², an online poisons information database,

1

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsrelatedtodrugpoisoninginenglandandwales/2018registrations>

² TOXBASE[®] is a registered trademark of the UK National Poisons Information Service

but there is also a 24-hour telephone advice line for provision of specific advice on individual cases. The information on TOXBASE is updated regularly using published literature, experience from NPIS telephone enquiry data, and direct clinical experience of NPIS-linked clinical departments.

A key component of the service provided by the NPIS is obtaining information 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.

Drug and chemical exposures during pregnancy can cause particular concern because these may affect the fetus as well as the mother. UK Teratology Information Service (UKTIS) is the designated service in the UK to provide advice to healthcare professionals about this and is hosted by the NPIS. As well as providing information and advice, UKTIS also collects new information on the potential adverse fetal effects of exposure to drugs and chemicals during pregnancy, including the therapeutic use of medicines.

The NPIS (including UKTIS) is funded primarily through 'government grant in aid' from UK health departments, with commissioning managed by PHE. The service also receives some contract income for providing services in other countries, as well as research income for specific projects. Overall funding for the service has reduced in real terms in recent years and, as a consequence, there has been a reduction in the number of staff employed for NPIS work. Funding constraints will remain a challenge in future years and this will need to be balanced with the need to provide a robust, high quality 24-hour service that has the capacity to respond rapidly to the continuing need of the NHS to access high quality evidence-based advice in high volume on a 24-hour basis.

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 PHE regarding management of chemical incidents.

The service has 24-hour consultant clinical toxicologist support available to advise on the management of more complex presentations and patients who are seriously unwell. 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 locally-funded 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 NPIS telephone services do 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 most 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, 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 address this, the NPIS provides a 24-hour telephone information service for healthcare professionals using a single national telephone number (0344 892 0111). 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 at least to degree level, with the majority 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 (PSS³). 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 of poisoning in the UK. It is, however, becoming increasingly out of date with an increasing risk of failure and arrangements for updating the platform are currently being discussed.

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.

³ Persson HE, Sjöberg GK, Haines JA, Pronczuk de Garbino J. Poisoning severity score. Grading of acute poisoning. *Clin Toxicol* 1998; 36: 205-13.

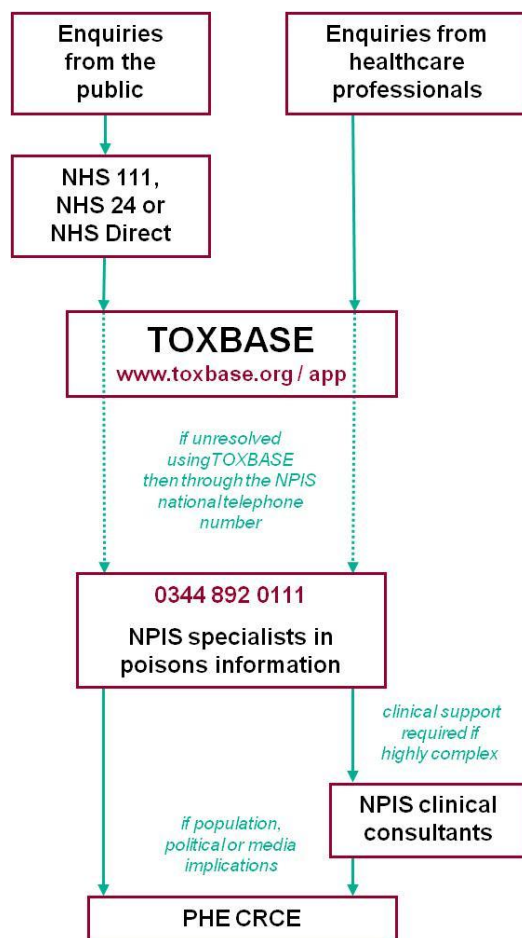


Figure 2.1 How poisons enquiries are answered

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 and TOXBASE, but advice is also openly available on the UKTIS website (www.UKTIS.org) and 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 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, and a senior clinician and manager from each of the four units. Invitations are also extended 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 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 section 3.2). 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 IT issues relating to this 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 has been previously described.⁴

⁴ 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 2019/20

3.1 Overall service profile

- 6,492 UK healthcare departments used www.toxbase.org; generating 685,745 user sessions (-6.5%)
- 18,879 individual UK and international TOXBASE app users generated 224,778 app accesses (+47.4%)
- 4,433 TOXBASE entries written or updated (-2.1%)
- 38,197 telephone enquiries were received regarding poisons information advice (-5.6%)
- 2,228 telephone enquiries were referred to a consultant toxicologist (+11.7%)
- Analgesics and antidepressants were the most common products viewed on TOXBASE
- 24,000 safety data sheets (SDS) were added to the NPIS Product Data Centre which now holds more than 274,000 SDS (-18%)

Figure 3.1.1 shows the annual number of TOXBASE user sessions, TOXBASE app accesses, telephone enquiries and consultant referrals from 2000 to 2019/20. TOXBASE user sessions are defined as one login by a registered user where the user may access one or more products several times.

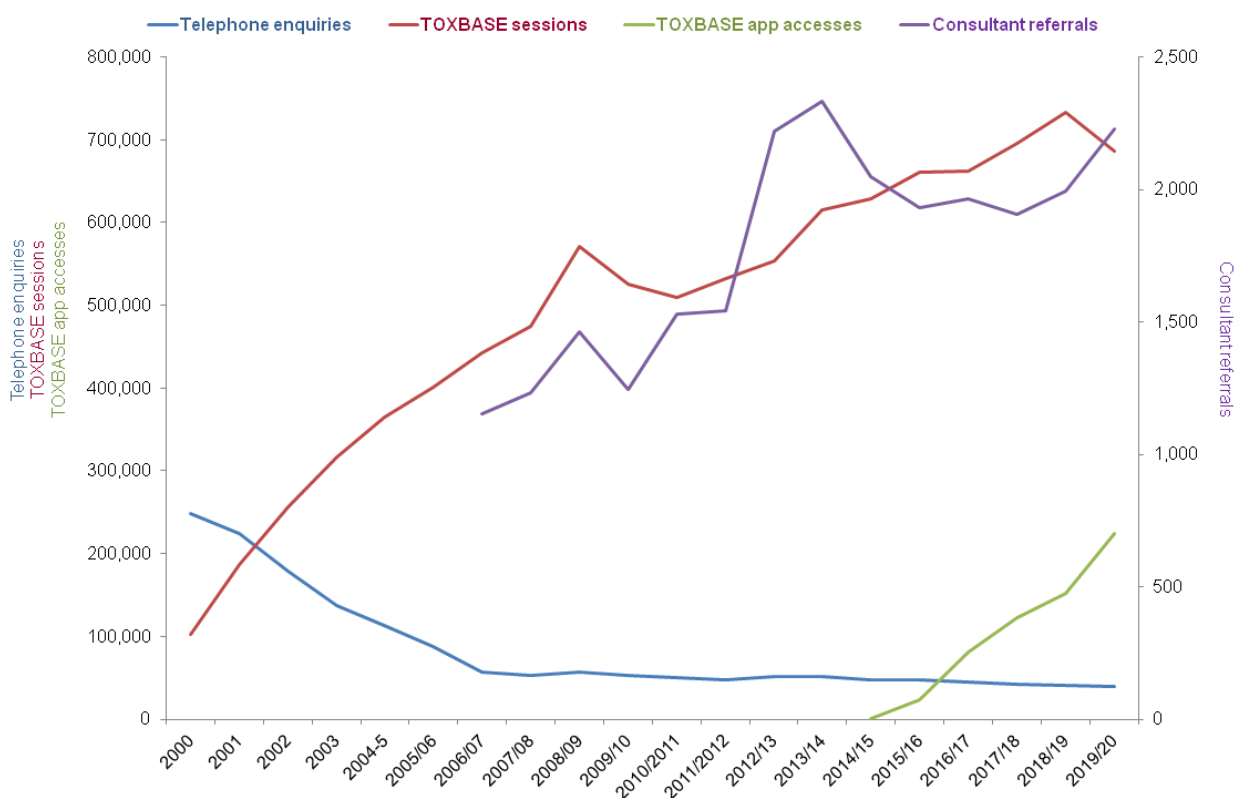


Figure 3.1.1 Number of TOXBASE sessions, TOXBASE app accesses, telephone enquiries and consultant referrals from 2000 to 2019/20

In 2019/20 online user sessions and telephone enquiry numbers have decreased by 6.5% and 5.6% respectively. This may be due to an increased use of the TOXBASE app, which saw a 22.7% increase in user numbers and a 47.4% increase in user activity during the same period. Referrals to the NPIS national consultant on call increased by 11.7% in 2019/20 to 2,228.

3.2 TOXBASE online

As of 31 March 2020 there were 6,492 healthcare departments registered for online access to TOXBASE, reflecting a 2.6% increase on 2018/19. This generated a total of 623,641 UK user sessions with over 2 million individual page views on the database. The most commonly accessed products are listed in Table 3.2.1. The majority of online product page views (69%) were made by hospital users. The top workplace types are shown in Table 3.2.2; general practice and emergency departments were the most common.

The most commonly viewed antidote page on TOXBASE online was acetylcysteine, used in the treatment of paracetamol toxicity (Table 3.2.3). Hospital use accounted for 96% of all antidote page views.

Table 3.2.1 Most commonly accessed product pages on TOXBASE online and the TOXBASE app and most common agents involved in telephone enquiries in 2019/20

	TOXBASE online	No. page views	TOXBASE app	No. accesses	Telephone enquiries	No. calls
1	Paracetamol	145,515	Paracetamol	16,296	Paracetamol	5,077
2	Ibuprofen	46,993	Sertraline	4,796	Ibuprofen	2,329
3	Sertraline	45,596	Ibuprofen	4,055	Cocodamol	1,300
4	Diazepam	29,313	Amitriptyline	3,945	Sertraline	883
5	Quetiapine	25,313	Diazepam	3,307	Multivitamins	673
6	Codeine	24,564	Quetiapine	3,196	Mirtazapine	655
7	Pregabalin	23,572	Mirtazapine	2,778	Naproxen	580
8	Mirtazapine	22,571	Codeine	2,773	Diazepam	561
9	Propranolol	21,918	Pregabalin	2,356	Quetiapine	558
10	Amitriptyline	21,027	Zopiclone	2,245	Pregabalin	501

Table 3.2.2 Top workplace type for TOXBASE online registered departments, and current TOXBASE app individual subscribers at 31 March 2020

	TOXBASE online	No. registered departments	%	TOXBASE app	No. Individual subscribers	%
1	General practice	3,416	52.6	Ambulance	9,336	49.5
2	Emergency department	314	4.8	Emergency department	2,956	15.7
3	Ambulance	180	2.8	General practice	1,886	10.0
4	ITU/HDU	144	2.2	Admissions/ assessment	1,244	6.6
5	Laboratory services	136	2.1	ITU/HDU	829	4.4

Table 3.2.3 Most commonly accessed antidote pages on TOXBASE online and the TOXBASE app in 2019/20

	TOXBASE online	No. page views	TOXBASE app	No. accesses
1	Acetylcysteine	22,072	Atropine	562
2	Fomepizole	1,450	Acetylcysteine	474
3	Naloxone	822	Naloxone	339
4	Flumazenil	789	Glucagon	219
5	Digoxin antibodies	697	Ethanol	193
6	Desferrioxamine	455	Berlin blue	192
7	Procyclidine	417	Cyanide antidotes	190
8	Ethanol	387	Calcium chloride	164
9	Glucagon	313	Flumazenil	152
10	Cyanide	222	BAL	132

TOXBASE is produced and maintained by the NPIS within an audit framework of user feedback and clinical governance. It is UK health policy that TOXBASE is the first point of information for poisons enquiries and it is therefore essential that content is relevant and up to date. This creates a substantial ongoing workload that is shared by the NPIS units and led 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 are agreed by the national TOXBASE editing committee. The NPIS TOXBASE Editing Group includes representatives from all aspects of the service. 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 2019/20, 4,433 entries were added or edited.

An important component in the review process of TOXBASE entries is user feedback from 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.

3.3 TOXBASE app for iOS and Android mobile devices

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

The app underwent a significant redesign in December 2019 to improve usability and to update the appearance in line with TOXBASE online. Examples of screenshots from the current app are shown in Figure 3.3.1.

The app provides NHS, PHE and Ministry of Defence (MOD) users with full and free TOXBASE access on validation of professional email addresses. For other users, a paid version of the app is available. Funding from the small fee charged contributes towards ongoing development and hosting costs.

The number of subscribers changes daily as accounts are created, lapse and are renewed; on 31 March 2020 there were 18,879 current subscribers (18,155; 96.2% NHS/PHE/MOD and 724; 3.8% other). NPIS clinicians and SPIs have access to the app

to support their NPIS duties and to increase service resilience in case of interruptions of internet access. The top workplace types are shown in Table 3.2.2 above; ambulance personnel were the most common.

During the 2019/20 reporting year, app subscribers (excluding NPIS users) accessed 224,778 pages including 167,822 product entries and 56,956 antidote and information entries. Tables 3.2.1 and 3.2.3 above show the top product and antidote pages accessed on the app.

Whilst there was a 17.9% increase in the number of subscribers from 2019/20 there was a 47.4% increase in the number of pages accessed. This differential suggests that our subscribers are accessing many more pages and in doing so the app is becoming their primary source of poisons information (Figure 3.3.2).

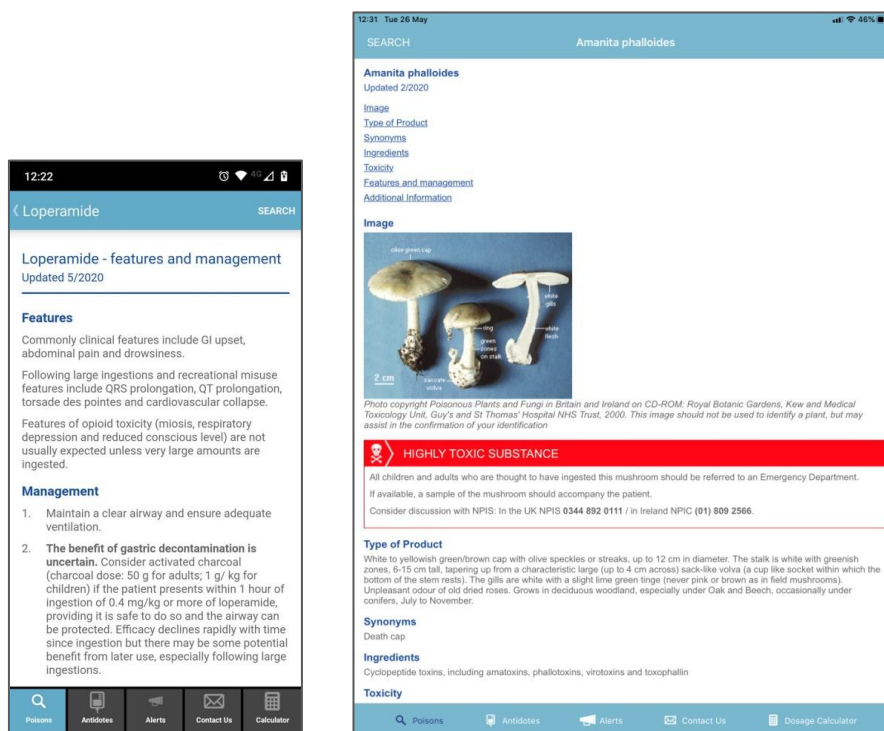


Figure 3.3.1 TOXBASE app screenshots

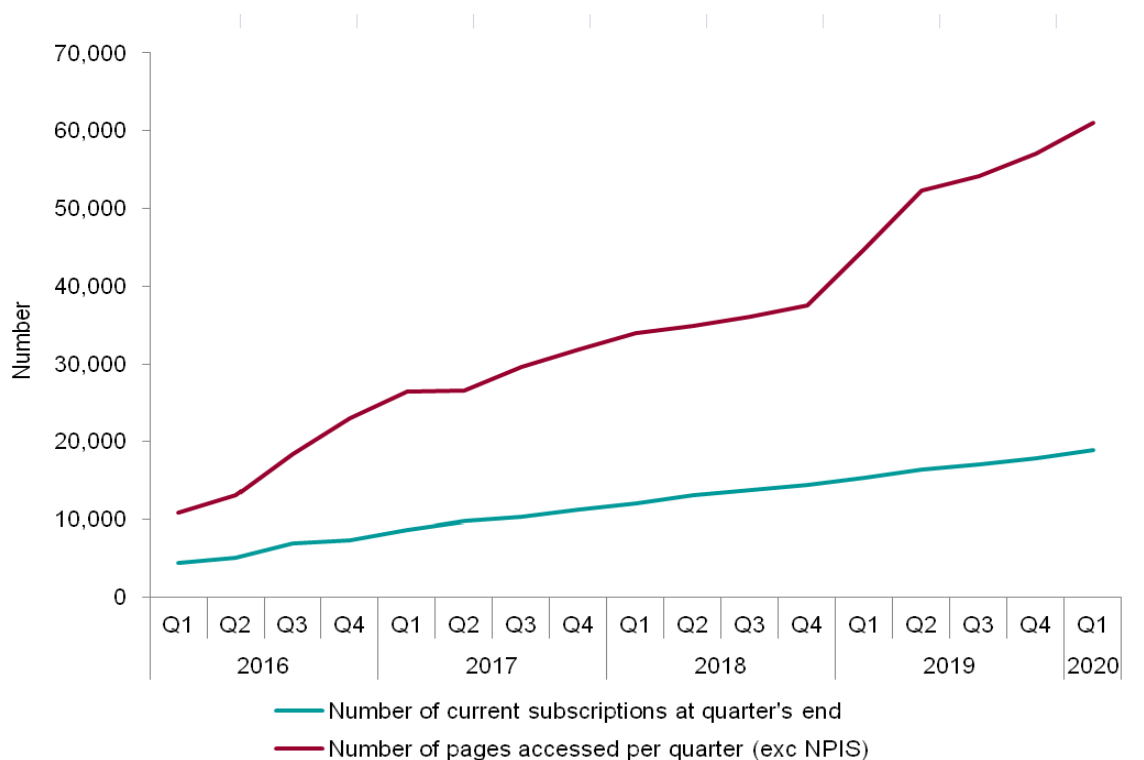


Figure 3.3.2 TOXBASE app subscriptions and pages accessed per quarter from Q1 2016 to Q1 2020

3.4 Telephone answering

The NPIS uses a bespoke BT Cloud Contact™ system to coordinate telephone enquiries received from healthcare professionals via a single national number (0344 892 0111). This system has several benefits: it allows remote working and therefore increasing service resilience and this has been of particular benefit during the COVID-19 pandemic. A further advantage is its conference call functionality, allowing enquirer, SPI and NPIS consultant to discuss cases together. It is also able to provide comprehensive and detailed reports on telephone call handling, enabling close monitoring of call workload, wait times, abandoned calls and call duration at national, individual unit and individual scientist level. From a governance perspective, it allows assessment of compliance against key performance indicators (KPI) as agreed with the commissioner. Enquiry details and the advice provided (including any consultant advice) and follow-up details are entered into the UK Poison Information Database in real time.

In 2019/20 there were 38,197 telephone enquiries to the NPIS national telephone advice line requesting poisons information advice. The most common agents discussed are listed above in Table 3.2.1. NHS telephone triage services (NHS 111, NHS 24 and NHS Direct) were the largest users of this service, accounting for 38% of all enquiries; 28% of telephone enquiries originated from hospitals, 18% from GPs and 10% from ambulance services. Other users (6%) included dentistry professionals, emergency

responders and community pharmacists. The majority of enquiries (85%) concerned an exposure that had occurred within the home, most commonly (88%) as a result of ingestion. Children under 5 years of age were involved in 25% of enquiries.

3.5 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). Sixteen consultant clinical toxicologists (thirteen from the four NPIS units and three from hospitals in York and London) contribute to out-of-hours cover (weekdays 18:00-09:00 hours, weekends and public holidays). All are involved in the care of poisoned patients in their own local NHS hospitals. A nationally agreed protocol is used to determine when SPIs should refer enquiries to a consultant. The national consultant rota is managed from NPIS Edinburgh.

Daytime cover is provided by consultants in each NPIS unit, who may be supported by consultants, academic clinical staff and specialist registrars, with appropriate supervision where needed.

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 logged on the UKPID database 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 2,228 referrals to NPIS consultants in 2019/20, of which 1,192 (53.5%) were received during working hours and 1,036 (46.5%) out-of-hours. The median number of referrals per day was six (IQR, 4-8). There were 2,057 (92.3%) consultant referrals from hospitals (Table 3.5.1), with calls from GPs/primary care being the next most common source (87; 3.9%). The proportion of consultant referrals from telephone advice services remained low at 1.9%.

Substances involved

Table 3.5.2 shows the most common types of agents involved in referrals to consultants. Heading the list are products containing paracetamol, drugs of misuse, and toxic alcohols or glycols, e.g. ethylene glycol, methanol and antifreeze. For 170 (7.6%) referrals, the drug or substance (if any) was unknown and help with diagnosis was required. There were 114 (5.1%) referrals which involved the ingestion of alcoholic beverages.

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.

Table 3.5.1 NPIS consultant referrals from hospital by department in 2019/20

Source	Number of referrals from hospital (2,057)	% of total referrals
Emergency departments	1000	48.6
Intensive care units	446	21.7
Paediatrics	202	9.8
Other hospital units	159	7.7
General medicine	106	5.2
Admission/assessment units	97	4.7
Unspecified hospital units	23	1.1
Medicines information & pharmacy	17	0.8
Minor injuries units	7	0.3

Table 3.5.2 Agents commonly involved in NPIS consultant referrals in 2019/20

Rank	Agent	Number of Referrals (2,228)	% of total referrals
1	Paracetamol (inc combination products)	490	22.0
2	Drugs of misuse	207	9.3
3	Ethylene glycol/methanol/antifreeze	93	4.2
4	Propranolol	92	4.1
5	Bites and stings	91	4.1
6	Ibuprofen	68	3.1
7	Sertraline	67	3.0
8	Amitriptyline	66	3.0
8	Lithium	66	3.0
9	Amlodipine	65	2.9
10	Digoxin	64	2.9

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

3.6 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 end-users to obtain specific advice on many common products. Details of these SDS are held within the NPIS Product Data Centre, to which all NPIS staff have 24-hour access.

NPIS Birmingham is responsible for the NPIS Product Data Centre and for liaising with manufacturers to ensure that the data held are comprehensive and up to date. In 2019/20, some 24,000 SDS were added to the NPIS Product Data Centre which now holds more than 274,000 entries. The database is indexed by product name, manufacturer, date of SDS, and the accession date for the SDS to the database. The

database is also fully text searchable, allowing searches to be made on other criteria such as active ingredients or use.

3.7 NPIS during the COVID-19 pandemic

In December 2019, the first case of COVID-19, the infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was reported in Wuhan, China. Since then the virus has spread to almost every country in the world with millions of people affected. In the UK, the first reported case was in late January 2020. Health services in the UK have been under considerable pressure as they have dealt with the significant number of patients affected, with the cancellation of routine and elective care and the re-organisation of many services.

As an essential frontline service, the NPIS was required to function normally to provide poisons management advice throughout the pandemic. In addition, it was recognised that extra support could be provided to frontline health services in an effort to reduce the burden. Protocols were put in place to allow home working, including answering telephone enquiries. An NPIS national protocol was devised to reduce the threshold for consultant toxicologist input to telephone referrals to the service, the aim of which was to identify more patients that might be managed safely at home, avoiding the need to attend an Emergency Department. Data collection will continue throughout the pandemic to assess the impact of this change in our referral processes.

Specific toxico-surveillance work has also been implemented by the NPIS during the pandemic. Following an initial request from the World Health Organization, the NPIS and PHE have been collecting and analysing NPIS data on various potential sources of exposure that might be affected by the COVID-19 pandemic. Examples include exposure to hand sanitisers, disinfectants and chemicals used in cleaning products and to drugs that might be used to treat COVID-19, such as hydroxychloroquine. As the pandemic continues these exposures will remain under review and further information will be provided in future reports.

4. UKTIS activities in 2019/20

4.1 Overview

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 undertakes teratogen surveillance in collaboration with other UK organisations as well as with international teratology information services.

UKTIS 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. However, for many years there has been a shift to access online UKTIS resources, allowing 24-hour access at the convenience of users.

UKTIS provides detailed and fully referenced systematic evidence reviews for registered health professionals via TOXBASE. Abstracts of these documents are openly available on the UKTIS website (uktis.org). The service also provides information for the general public via its **bumps** website (medicinesinpregnancy.org). All information is produced and maintained by a small team of experienced scientists.

4.2 Service activity

In 2019/20 UKTIS responded to almost 1.5 million information requests when considering telephone enquiries and online accesses together, which is a reduction compared to previous years. Along with many other health related websites, UKTIS.org and medicinesinpregnancy.org have been affected by Google's broad core algorithm updates which have caused both websites to drop in their ranking, consequently reducing overall hits to the information pages. However, Google algorithm updates have allowed better exposure to local geographical areas which means that hits have decreased from international users but have increased from those in the UK. In the past three years (when monitoring has been available) from the total number of accesses to the **bumps** patient information leaflets, the percentage from the UK increased from 27% to 61%, which equates to the number of UK hits rising from 577,338 in 2017/18 to 756,274 in 2019/20. The number of telephone enquiries and access to information via TOXBASE has fallen as accesses to openly available information by UK users increase (Table 4.2.1).

Table 4.2.1. Telephone enquiries, full systematic evidence reviews (www.uktis.org) and *bumps* patient information leaflet downloads (www.medicinesinpregnancy.org) showing the impact of Google algorithms on openly available online information over the past two years, as absolute figures and as the percentage of enquiries for each year

Year	Telephone enquiries		TOXBASE		UKTIS		<i>bumps</i>		Total
	n	%	n	%	n	%	n	%	
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
2019/20	1,153	0.07	29,264	2.0	191,136	13.1	1,239,794	84.8	1,461,347

Towards the end of the financial year, UKTIS responded to requests for information regarding the fetal effects of drugs used in clinical trials for the treatment of COVID-19. UKTIS updated existing systematic evidence reviews and produced a new openly accessible summary document of all available treatments and their effects in pregnancy.⁵ Corresponding patient information leaflets were also produced at the request of the trial coordinators.

4.3 Surveillance and research

In the past year UKTIS carried out a proof of concept study aimed to test the feasibility of linking congenital anomaly data from the National Congenital Anomaly and Rare Disease Registration Service (NCARDRS) to maternal medication use data from the NHS Business Services Authority (NHSBSA). UKTIS were able to confirm the feasibility of performing electronic linkage of the NHSBSA and NCARDRS datasets. However, several important data points were unavailable, including the exact date medications were dispensed and the prescribed dose. These data points are crucial in assessing the relationship between drug exposure and outcome. Future work with the NHSBSA will focus on inclusion of these data fields potentially making this method of analysis extremely powerful for future teratogen surveillance.

UKTIS are also part of a five year research study called ConcePTION, supported by the Innovative Medicines Initiative (IMI), a public-private partnership between the EU and the European pharmaceutical industry. UKTIS are working with 87 other organisations

⁵ <https://bit.ly/2YqYoUo>

from 22 countries, including the European Medicines Agency, drug manufacturers, academia, public health organisations, and teratology networks to tackle research gaps related to medications used by pregnant and breastfeeding women.

UKTIS is a consortium partner in the project and are participating in a number of tasks which hope to improve the collection, analysis and interpretation of pregnancy pharmacovigilance data, and the dissemination and education for healthcare providers, pregnant and breastfeeding women and the general population. UKTIS are collaborating on developing guidance and a sustainable system to optimise the early identification of major teratogens by making best use of existing human pregnancy exposure data. Work has begun on developing an updated catalogue of standardised core data elements for prospective follow-up of pregnancy exposure and retrospective adverse drug reaction reporting to include longer term and non-malformation offspring outcomes. Other areas of development that UKTIS are involved with include the development of an EU centralised public accessible digital repository (knowledge bank) for up to date information about the effects of medicines in pregnancy and breastfeeding, the development of methods for increasing awareness of the importance of this information, and the stimulation of pregnancy reporting through pharmacovigilance systems and participation in research.

4.4 Future work

UKTIS will continue to generate data and disseminate reliable evidence-based information both independently and as part of collaborative projects with national and international colleagues. An update to the UKTIS website interface to assist easier access to information for healthcare providers, as well as work to make the patient facing website more user friendly is planned for 2020/21. Continuing to build on the data linkage using the NCARDRS and NHSBSA systems will be an important part of enhancing teratogen surveillance in the UK in the coming year. The development of novel methods for signal detection on an international platform as part of the ConcePTION project will also feature in the output from UKTIS in the next 12 months.

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. We have described our approaches to clinical governance in detail in previous annual reports. They include analysis of critical events and a comprehensive system of user feedback; the results of these are described below for this reporting year.

5.1 Analysis of critical events

During 2019/20 there were 11 events discussed nationally. Two involved the advice held on TOXBASE, relating to paracetamol and iron, and in each case resulted in limited modifications to TOXBASE information to improve clarity and provide additional management advice. A further event involved updating information provided on TOXBASE because of the reduced national availability of the antidote procyclidine, alerting users to the issue and providing an alternative treatment option. There were two episodes involving temporary loss of TOXBASE functionality that was resolved by joint working with the service supplier. One incident arose after a telephone cable was severed, resulting in one NPIS unit being unable to respond to telephone enquiries for 24 hours. Enquiries were automatically routed to other units without impacting on users. Two events involved procedural errors. In one a SPI went off shift without logging off from the telephone enquiry system, resulting in delays for some enquirers for calls to be answered. The second involved delayed referral of a potential minor chemical incident involving vinyl chloride to CRCE. This delay did not have adverse consequences for those exposed or for wider public health. For both of these, further training was provided to those involved and procedures put in place in all units to reduce the risk of recurrence.

Following a public health event, the NPIS identified a lack of availability nationally of anticholinesterase assays. This would delay diagnosis and adversely affect patient outcome after exposure to organophosphate-related substances, including nerve agents and some insecticides. The NPIS is not responsible for provision of assays, so this issue was highlighted to PHE and to NHS England via the Emergency Preparedness and Response Clinical Reference Group.

In response to a request by the Medicines and Healthcare products Regulatory Agency, further advice on appropriate reporting of respiratory symptoms after use of e-cigarettes and other substances inhaled by vaping has been included on TOXBASE. Follow-up of these enquiries by the NPIS, where possible, has also been instituted.

During the year the Healthcare Safety Investigation Branch (HSIB) published a report concerning propranolol poisoning that contained one recommendation for the NPIS. This was that the Association of Ambulance Chief Executives works with the NPIS to review its guidance on the treatment and transportation of patients known to have taken an overdose of propranolol or other beta blocker medication. In response to this the NPIS is now working to support ambulance services in revising their guidance. A further safety observation was for revised presentation of TOXBASE documents to allow clinicians to quickly and more easily interpret key steps in the treatment of overdose. This is being considered carefully, but is very challenging and requires additional resources.

5.2 Quality assurance exercises

Telephone information service user satisfaction

Since 2002, NPIS units have gathered information on user satisfaction with their telephone enquiry service to monitor service performance, user requirements/expectations and identify any areas for improvement.

A random sample of telephone enquiries was selected using the same methodology for each unit. The sample size to be surveyed is at least 5% for each of the three units which operate a 24-hour telephone service and at least 10% for the Edinburgh unit which does not operate 24-hour and therefore takes fewer enquiries. The Birmingham, Cardiff and Newcastle units successfully surveyed for the full financial year 2019/20 but the Edinburgh unit was not able to send out questionnaires during the last week of March 2020 as a result of the COVID-19 situation. All units achieved the target sample size.

Survey results

During the reporting year 2,361 questionnaires were sent out and 408 responses were received, reflecting a response rate of 17.3%. The most common responder groups were general practitioners (29.9% of all responses), NHS 111 nurses (17.9%) and nurse [other] (10.0%).

The majority of respondents (57.8%) had checked TOXBASE prior to making their enquiry. The telephone enquiry had been made because the user required more information than currently presented on TOXBASE (45.9%), special circumstances or other reasons (39.7%), inability to interpret the information on TOXBASE (9.5%), a local protocol to contact NPIS (3.3%) or the information on TOXBASE appeared to contradict other information they had (1.7%).

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

Table 5.2.1 Reason why TOXBASE was not consulted first

Reason	% of respondents	
	2018/19	2019/20
"I don't know what TOXBASE is"	9.4	6.0
"We don't have it in our department"	28.6	22.8
"It was in a part of the department that we didn't have access to"	2.8	4.2
"We couldn't get logged on / the connection wasn't working"	20.2	24.0
"We've not been trained to use it yet"	11.3	14.4
Other	27.7	28.7

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 (Table 5.2.2). The responses received reflect a very high level of satisfaction with the way the enquiry was dealt with.

Table 5.2.2 Satisfaction scores 2018/19 vs 2019/20

Question	Satisfaction score %*	
	2018/19	2019/20
"The person I spoke to was polite and pleasant"	99.2	99.2
"Once my call was answered by a specialist in poisons information the enquiry was dealt with promptly"	98.8	99.5
"The information was given to me at an appropriate speed"	99.4	99.0
"I had confidence in the reply I was given"	99.2	99.0
"The reply from NPIS was relevant and useful"	98.0	98.5
"I was given an appropriate amount of information for my needs"	99.0	98.5
"My telephone call was answered without delay by a specialist in poisons information"	94.2	97.5

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

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 99.2% grading the service a five or a six (excluding non-

respondents), which is an improvement on the previous year (99.0%). Figure 5.2.1 below represents the overall quality scores for the individual units and Figure 5.2.2 represents the yearly trend from 2009/10 to 2019/20.

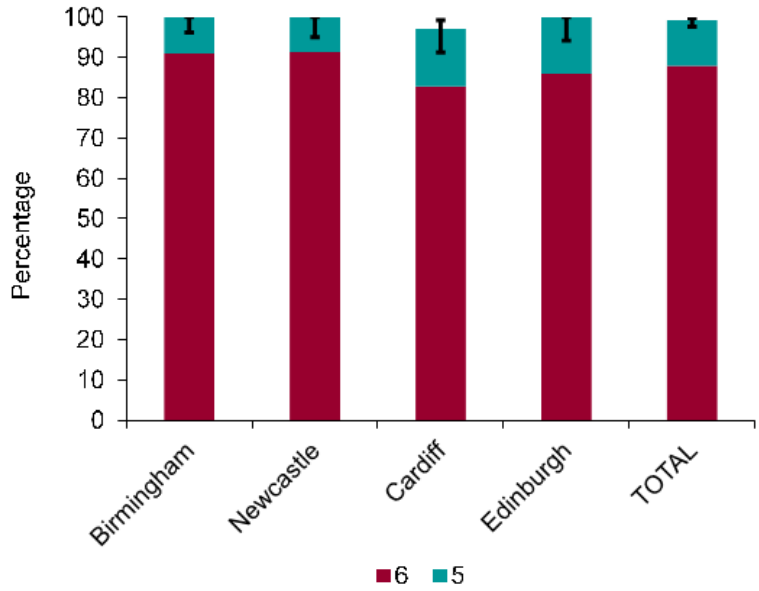


Figure 5.2.1 Overall quality scores for 2019/20 for the four NPIS units expressed as a proportion of respondents scoring five or six (non-respondents excluded from the denominator)

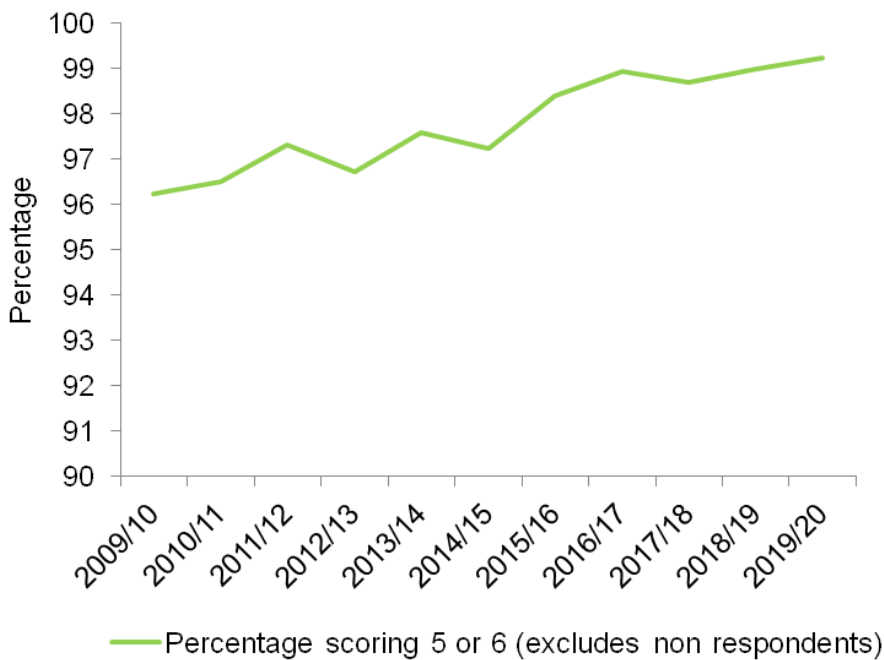


Figure 5.2.2 Yearly trend from 2009/10 to 2019/20 showing respondents scoring 5 or 6 (excluding non-respondents)

In summary, respondents continued to have an excellent level of satisfaction with the service overall, with user satisfaction remaining high for calls dealt with by all NPIS units. The response rate this year, however, was the lowest to date at 17.3%. This may introduce bias, which could be in either direction. The QA process, including the questionnaire design and method of data collection is being reviewed with the aim of improving the response rate in future years.

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 1,682 returns were received during the 2019/20 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 1,643 returns; 94.1% 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.

Table 5.2.3 Summary of user satisfaction scores

Rank	No. of responses	Question	Satisfaction score (%)*	
			2018/19	2019/20
1	678	"I had confidence in the information for my query"	95.5	95.1
2	374	"Finding the information I required was easy"	91.7	93.3
3	600	"Logging on to the database was easy"	90.4	91.3
4	595	"The information was sufficient for managing this case"	88.3	88.7

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

TOXBASE quality assurance forms: free text comments

Free text comments were included on 204 returns (12.1%). These can be grouped as shown in Table 5.2.4.

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

Type of comment	Number (% value) *
Positive comments and thanks	114 (55.9%)
Suggestions	48 (23.5%)
Information technology	17 (8.3%)
Comment related to other NPIS services	15 (7.4%)
Specific issues	10 (4.9%)
Negative comments	6 (2.9%)

* users often offered multiple comment types within one response

UKTIS

In 2019/20 UKTIS sought feedback via paper questionnaire sent to a random sample of 350 telephone enquirers with 95 (27%) responding. The responses indicated a high degree of satisfaction with the service, with all responders reporting that enquiry staff were polite and helpful. Information was reported to be relevant and useful in 99% of enquiries received. Of 93 people who rated the service on a 6 point scale (1=poor and 6=excellent), 72 (77%) gave a rating of 6 and 18 (19%) a rating of 5. Six people suggested that we should advertise our services more widely and three asked for better website functionality.

Spontaneous feedback relating to information on **bumps** continues to be very positive and suggests appreciation and demand for coverage of additional exposures. Thirty eight of 45 (84%) responders provided feedback that they couldn't find the information they were looking for on the website. Approximately 12 of these were requests for **bumps** leaflets regarding over the counter products. We hope to create new leaflets to cover some of these requests in the forthcoming year.

5.3 Education and training

5.3.1 NPIS

Continuing professional development (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. 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 European Association of Poisons Centres and Clinical Toxicologists.

Training for scientific staff

Each NPIS unit provides structured in-house training and assessment in both clinical and non-clinical (e.g. communication) skills to prepare scientific staff 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, scientific staff may wish to undertake a postgraduate qualification in toxicology to further enhance their knowledge and expertise.

Continuing professional development

The NPIS annual CPD programme consists of two-day meetings held twice each year, with all NPIS units hosting in turn, allowing 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 directors every three years, to organise the rolling programme of meetings. An NPIS scientist is also appointed every two years to ensure the needs of the scientific staff are well represented within the educational programme.

The primary role of the CPD meetings is to ensure that clinicians and scientists remain up to date with the latest developments within clinical and academic toxicology. This includes education on new poisons, 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.

NPIS and NPIC (Dublin) held a joint CPD event in the Royal College of Surgeons of Ireland (RCSI) in Dublin in September 2019. This was well attended with good participation from NPIS and NPIC staff as well as external speakers. The event also included a simulation session using the state-of-art simulation facilities in RCSI. The event received excellent feedback with 99.5% of attendees stating it was good or excellent. The programme for this CPD event is shown in Box 5.3.1.

Box 5.3.1 NPIS/NPIC CPD programme, Dublin

Venue: Royal College of Surgeons, Ireland

Day 1: Thursday 5 September 2019

First aid for jellyfish stings *Dr Tom Doyle, Cork University*

Poisonous mushrooms *Dr Tom Harrington, University of Limerick*

Yew exposures reported to NPIS *Pardeep Jagpal, NPIS Birmingham*

Poisonous plants *Dr Mark Anderson, NPIS Newcastle*

Paracetamol overdose: is methionine obsolete? *Dr Edel Duggan, NPIC Dublin*

Anaphylactoid reactions to NAC *Dr Mary Keogan, Beaumont Hospital, Dublin*

A 10-year review of enquiries to the NPIS involving high-dose insulin *Emma Moyns, NPIS Birmingham*

Simulation Session *Led by Dr Laurence Gray, NPIS Cardiff*

Day 2: Friday 6 September 2019

Extra NAC for large paracetamol overdoses *Patricia Casey, NPIC Dublin*

What's on the horizon in paracetamol overdose: SNAP *Dr James Dear, NPIS Edinburgh*

Novichok: public health response *Nick Brooke, PHE*

Mass poisoning in Uganda *Dr James Coulson, NPIS Cardiff*

Management of digoxin overdose *Dr Aravindan Veiraiah, NPIS Edinburgh*

Symptom search: a seldom used "salvage" strategy *Ryan Lee, NPIS Birmingham*

Buyer beware! *Dr Edel Duggan, NPIC Dublin*

Threshold for arsenic-induced peripheral neuropathy: a systematic review *Dr James Coulson, NPIS Cardiff*

A blue patient *Claire Gilfillan & Dr Ruben Thanacoody NPIS Newcastle*

Respiratory complications in the poisoned patient *Prof Ger Curley, Beaumont Hospital*

Fat overload *Dr Mark Anderson, NPIS Newcastle*

To facilitate access of NPIS staff to educational resources, audio and video recordings of presentations from meetings will be uploaded on the NPIS-only space on TOXBASE for staff who have been unable to attend the CPD days and we are expecting to make use of webinars in future. Due to the COVID-19 situation, the CPD event which was to be held in Newcastle in March 2020 was cancelled.

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 2019. 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 at www.toxlearning.co.uk (Figure 5.3.1).

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. It is especially useful for NHS 111, NHS 24 and Direct staff learning how to use TOXBASE effectively when handling enquiries about poisoning, as well as training in 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 CPD files.

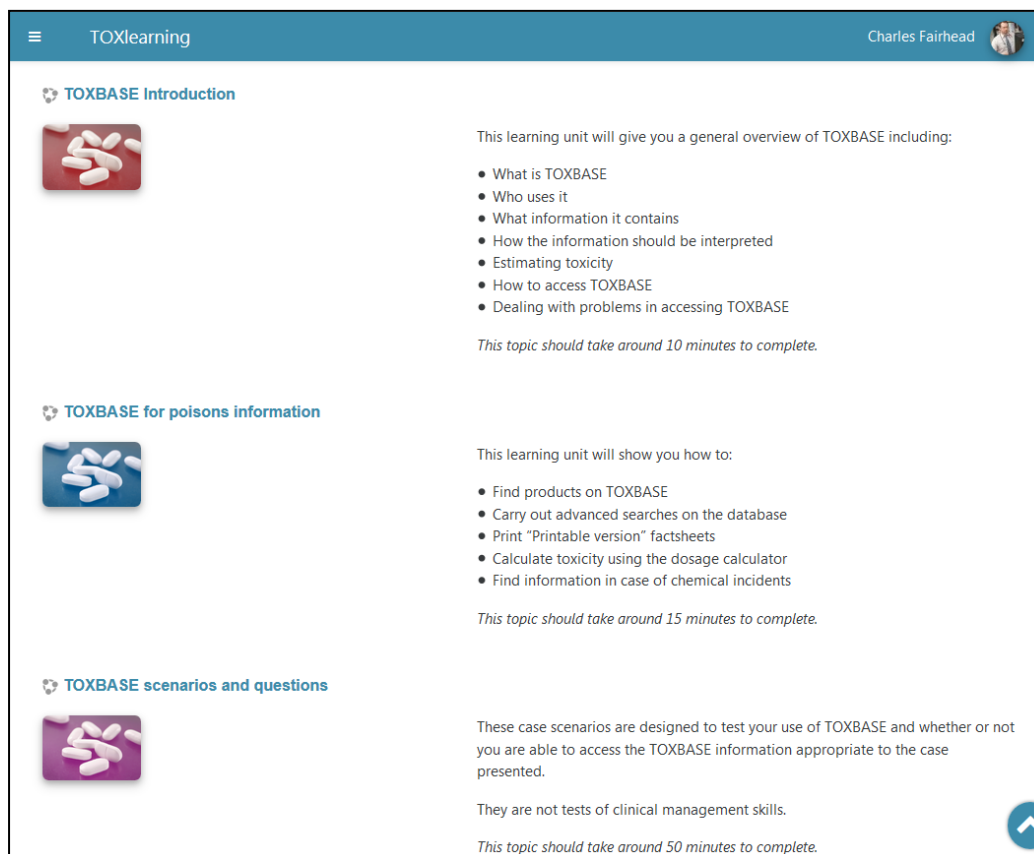


Figure 5.3.1 Screenshot from www.toxlearning.co.uk

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

5.3.4 Nurse training

It is within the remit of the NPIS to deliver training on the management of poisoning to NHS staff. By way of example, NPIS Birmingham and senior nursing staff of the West Midlands Poisons Unit (WMPU) developed a new process of “Tox training” to ensure registered nurses within Sandwell and West Birmingham NHS Trust were rapidly equipped with the appropriate knowledge and training to provide optimal care to poisoned patients.

Accreditation to become a “tox trained” nurse involved:

- completion of a bespoke training manual and associated assessments
- attendance at four study days facilitated by senior WMPU and NPIS staff
- completion of TOXBASE e-learning modules
- production of a reflective piece

In 2019/20 27 staff successfully completed this training. The study days counted as CPD hours and, together with the reflective piece, contributed towards revalidation. Feedback has prompted modification of the curriculum, for example to include poisoning with “poppers” and specific training on the Mental Health Act. There is also considerable interest from surrounding Trusts to ‘roll out’ the training more widely, and this is being considered.

6. Areas of interest in 2019/20

6.1 Drugs of misuse

Introduction

The number of NPIS telephone enquiries and the volume of TOXBASE online and app accesses give an indirect indication of the drugs of misuse most commonly encountered by health professionals using our services. 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 Public Health England, 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

As in previous years, 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 information scientist receiving the call, irrespective of the substance involved, and including medicinal drugs. This has the advantage of identifying substances not previously recognised as being involved in misuse.

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 as a result of a therapeutic error. For this reason accesses to TOXBASE pages that relate to licensed medications are omitted from cumulative data, with the exceptions of methylphenidate and methadone, substances which are under specific surveillance.

Overall activity

During the 2019/20 reporting year there were 1,112 NPIS telephone enquiries meeting the misuse criteria described above, an 8.9% decrease compared to 2018/19. These enquiries related to 362 different substances or products and accounted for 2.9% of all NPIS telephone enquiries. The reduction in telephone enquiries related to drugs of misuse is larger than in previous years. The impact of COVID-19 during early 2020 and the increasing use of TOXBASE and the TOXBASE app may be contributory factors.

There were also 68,195 TOXBASE online accesses, an increase of 3%. These related to 977 different substances or products and accounted for 5.1% of all TOXBASE online accesses. TOXBASE app users are presented with an alphabetical index of substances on the opening screen. Usage data reveal a disproportionate interest in substances located on this screen, presumably due to inadvertent, accidental, or 'for-interest' views. These account for around 25% (~3000 accesses) of drug of misuse views on the app. The app data have therefore been used carefully in this report. The substances involved are specific synthetic cannabinoids or cathinones. Accesses to these substances are assumed to be accidental because they are rarely encountered clinically and have very few corresponding TOXBASE online accesses. App data for substances that are not visible on the first app screen do reflect genuine healthcare professional activity and so are reported where individually relevant. Overall TOXBASE app accesses for drugs of misuse continue to rise, from 9,818 last year to 12,205 accesses this year, albeit including the inadvertent accesses described above.

Substances involved

The top 10 substances of misuse involved in telephone enquiries and TOXBASE online accesses are shown in Table 6.1.1.

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

	Telephone enquiries	Number 2019/20	% change from 2018/19	TOXBASE accesses	Number 2019/20	% change from 2018/19
1	Cocaine (inc crack)	244	-15.0	Cocaine (inc crack)	14,101	3.4
2	Cannabis	156	-4.9	MDMA (inc ecstasy)	10,398	9.0
3	MDMA (inc ecstasy)	105	-29.4	Cannabis	5,472	9.7
4	Heroin	88	-24.8	Methylphenidate**	5,152	16.8
5	Drug of misuse NK*	64	-36.0	Heroin	5,126	-1.2
6	Diazepam	60	-29.4	Ketamine	4,126	14.9
7	Methadone	59	15.7	SCRA	2,753	-17.3
8	Poppers	44	29.5	Amfetamine	2,447	-33.2
9	Amfetamine	42	-22.2	GHB	2,418	13.1
10	Pregabalin	40	-42.0	Methamphetamine	2,314	62.4

* Drug of misuse NK refers to calls where the clinician knows that the person has taken a drug of misuse but not which one/s.

**May include enquiries relating to therapeutic use

There were no telephone enquiries and very few TOXBASE accesses related to synthetic opioids and specifically synthetic fentanyl derivatives. Novel benzodiazepines such as etizolam generated limited activity with eight telephone enquiries and 233 TOXBASE online and app accesses. It should be noted, however, that opioid and benzodiazepine users may not be aware of novel psychoactive substances in the drug products they use.

The most common telephone enquiries associated with recreational use of medications involved opioids, such as methadone and codeine based products (70 calls), and pregabalin (40 calls).

Table 6.1.2 shows NPIS activity related to selected substances of interest over the last five years.

Table 6.1.2 Trends with time for selected substances 2015/16 to 2019/20

Telephone enquiries	2015/16	2016/17	2017/18	2018/19	2019/20
New psychoactive substances					
Mephedrone	55	14	13	10	4
SCRA	108	52	59	47	27
Branded products	276	74	36	31	16
Traditional drugs					
Cocaine	172	163	256	287	244
Heroin	124	68	96	117	88
MDMA	131	140	164	153	105
Cannabis	109	116	135	164	156
Methamphetamine	8	17	26	25	18
Ketamine	33	34	35	47	37
Total telephone enquiries (drugs of misuse)	1,613	1,210	1,245	1,220	1,112
TOXBASE online accesses	2015/16	2016/17	2017/18	2018/19	2019/20
New psychoactive substances					
Mephedrone	4,385	1,454	785	562	425
SCRA	5,542	3,343	3,532	3,330	2,753
Branded products	8,009	2,025	1,689	2,045	1,990
Traditional drugs					
Cocaine	9,492	11,499	11,971	13,364	14,101
Heroin	5,626	5,201	4,810	5,189	5,126
MDMA	10,128	10,281	10,057	9,542	10,398
Cannabis	4,319	3,887	4,328	4,987	5,472
Methamphetamine	1,131	1,137	1,141	1,541	2,314
Ketamine	1,918	2,148	3,067	4,012	4,126
Total TOXBASE online accesses (drugs of misuse)	67,228	64,015	63,373	66,287	68,195
Total TOXBASE app accesses (drugs of misuse)	n/a	6,297	8,808	9,818	12,205

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, 1,596 TOXBASE entries for pesticides and biocides are being monitored, an increase from the 1,579 tracked during 2018/19. 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 4,013 accesses to TOXBASE about pesticides of interest and information on 519 potential exposures was collected via the NPIS telephone enquiry service. From the TOXBASE accesses, 329 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, an unknown number of the TOXBASE accesses were for educational purposes rather than care of patients, reducing the response rate denominator.

Overall, information was gathered on 912 potential exposures involving pesticides during 2019/20, an overall return rate of 22.7%. Twenty exposures involved multiple patients. The number of cases identified in 2018/19 was 1,026.

Of the 912 potential exposures available for analysis, there were 26 cases where symptoms were not thought to be related to the pesticide exposure, e.g. where a pre-existing illness or concomitant infection was the likely cause of symptoms. These cases were excluded, leaving 886 exposures for further analysis. The results presented below include both unintentional acute (712 cases; 80.4%) and chronic (62; 7.0%) exposures and deliberate self-harm exposures (81; 9.1%). The circumstances of exposure in 31 (3.5%) cases were unknown.

Most acute unintentional exposures were graded as PSS 0 (377 cases; 42.6%) or PSS 1 (272; 30.7%). Smaller proportions were graded moderate (PSS 2; 9; 1.0%) or severe (PSS 3; 1; 0.1%). In 31 (3.5%) cases the severity was unknown. There were no fatalities reported (compared with one in 2018/19).

The agents most commonly involved in exposures are shown in Table 6.2.1. In addition, there were 105 cases involving unknown rodenticides, 23 cases of unknown herbicides, 16 of unknown ant killers, 11 of unknown pesticides and 9 of unknown insecticides.

Table 6.2.1 Pesticides most frequently reported by respondents in suspected pesticide exposures during 2019/20 compared with 2018/19, frequency \geq 20, ordered by rank in 2019/20

Ingredient	2018/19	2019/20
Permethrin	112	90
Glyphosate	100	87
Difenacoum	66	57
Phenols/cresols	48	40
Bendiocarb	41	39
Diquat	9	34
Cypermethrin	30	31
Bromadiolone	54	30
Metaldehyde	45	27
Tetramethrin	43	25
Brodifacoum	20	20
Fluranaler	14	20
Fipronil	14	20

In 2019/20, patients potentially exposed to pesticide products comprised 511 adults (13 years or older – 57.7%) and 320 children (12 years or younger – 36.1%), with 55 of unknown age (6.2%). There were 474 (53.5%) male patients and 373 (42.1%) female patients and 39 cases (4.4%) where the gender was not specified.

The classes of product most commonly involved in exposures are shown in Figure 6.2.1. Multiple/combination products were involved in some incidents.

There were 11 enquiries involving pregnant patients reported in 2019/20 (12 in 2018/19). All 11 exposures were unintentional and acute and graded PSS 0 (none) or PSS 1 (minor).

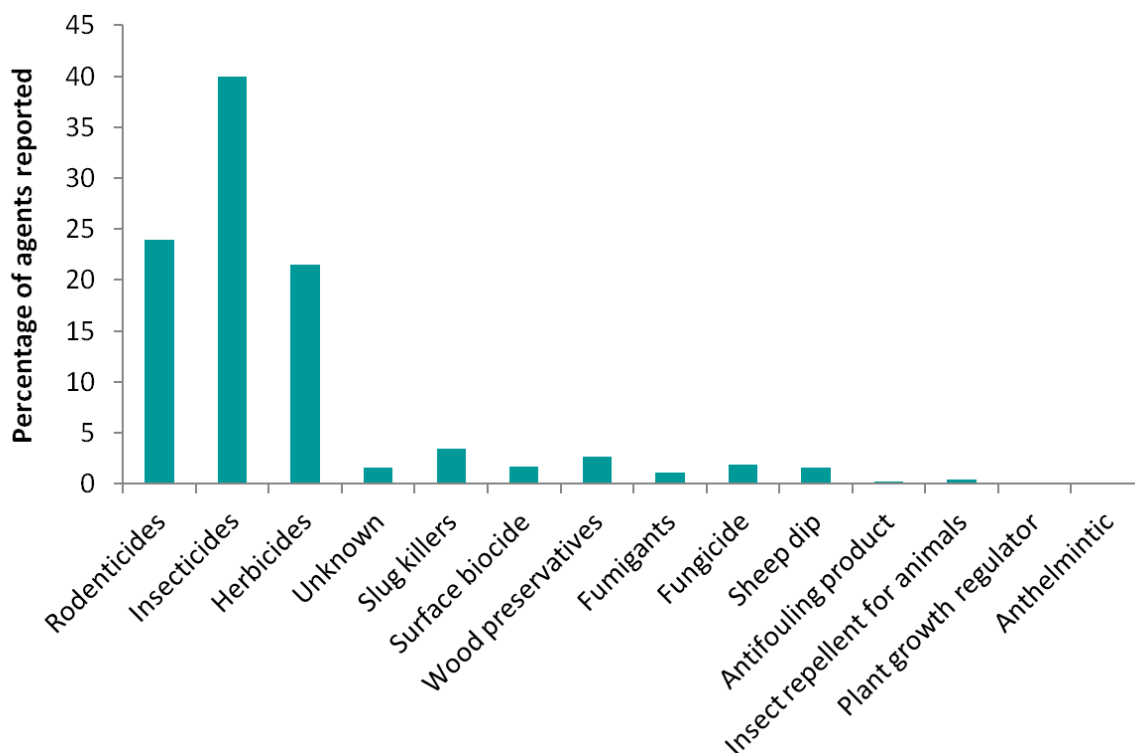


Figure 6.2.1 Pesticide exposures by class of product (as reported by respondent) in 2019/20 (902 agents)

6.3 Carbon monoxide

Since June 2015, the NPIS has received funding from the Gas Safety Trust (GST) to analyse all NPIS enquiries relating to carbon monoxide (CO) exposure in the UK. The epidemiology of CO exposures is difficult to elucidate accurately, in part due to the complexity of how different exposures are categorised. Exposures may occur either intentionally through an act of self-harm or unintentionally. Unintentional exposures may be further subdivided into those related to fires (where additional toxicity such as cyanide may contribute) and those that are non-fire related. Unintentional non-fire related CO exposures pose a serious public health challenge and as such were the primary focus of this study.

During the period 1 January 2019 to 31 December 2019, data were available for 757 patient-related CO exposures. There were 175 (23.1%) male patients and 212 (28.0%) female; gender not specified for 370 (48.9%) patients. Exposures comprised 497 adults (≥ 13 yrs, 65.7%) and 160 children (≤ 12 yrs, 21.1%). Age was not specified in 100 exposures (13.2%). Twenty three exposures involved pregnant women (3.0%).

The highest proportion of exposures was as a result of faulty domestic boilers (221, 29.2%). Exposures were most commonly of low severity (562, 74.2%) and associated with no symptoms or mild symptoms only. Central nervous system symptoms were

most prominently observed with headache reported with the highest frequency. One (0.1%) fatality was reported during this period.

Whilst a raised carboxyhaemoglobin concentration (COHb%) is considered necessary to confirm an exposure, clinical interpretation is complex. It may be affected by patient-related factors such as smoking status and co-morbidity, together with environmental factors such as atmospheric concentration of CO at the scene, exposure duration, time since removal from source and administration of oxygen. In this cohort, COHb% concentrations were reported in 242 (32.0%) patients and ranged from 0% to 27.6% (median = 3.9%). It is likely that more patients did not have a COHb% concentration measured since the test is invasive, requiring blood sampling, and many patients were not acutely unwell at the time of presentation. More work is required to assess if there a correlation between measured COHb% and poisoning outcome.

These data demonstrate the ability of the NPIS to collect valuable epidemiological information on all aspects of CO poisoning from across the UK. Further work includes a planned data linkage study with SGN (Scotia Gas Networks) and the electronic Data Research and Innovation Service (eDRIS), to assess the health outcome of patients where a confirmed CO leak was reported from a SGN gas engineer.

6.4 Dinitrophenol

2,4-Dinitrophenol (DNP) is a highly toxic industrial chemical sometimes used as a 'fat burner' to promote weight reduction or for 'body sculpting'. If ingested, DNP can cause serious health effects including high fever, rapid heart rate, agitation, headache, diarrhoea, vomiting, convulsions, acidosis, muscular rigidity and multi-organ failure, effects that can be fatal in spite of intensive medical treatment. The NPIS first reported an increase in enquiry numbers and deaths relating to DNP in 2013, and has since been monitoring and reporting these to Public Health England and the Food Standards Agency, who have taken various actions as detailed in previous annual reports. The updated information provided here has been obtained using the same methodology described previously.

Quarterly numbers of DNP TOXBASE accesses and individual cases of systemic exposure reported in telephone enquiries are shown in Figure 6.4.1 for the period January 2011 to March 2020. During the 2019/20 reporting year there were 15 further cases of systemic DNP exposure referred to the NPIS, five of which culminated in fatality. This compares to 14 cases in 2018/19 and 18 cases in 2017/18. Including these recent cases, there have now been 135 cases of systemic DNP exposure discussed by phone with the NPIS since 2007 and 25 (18.5%) of these patients 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, meaning that there have been at least 31 DNP-related deaths in the UK since 2007, including 23 since January 2015.

Systemic exposures to DNP have continued in spite of the public health measures taken so far. The NPIS will continue to monitor enquiries relating to DNP and encourage responsible government agencies to consider further actions to restrict exposures to this highly toxic chemical.

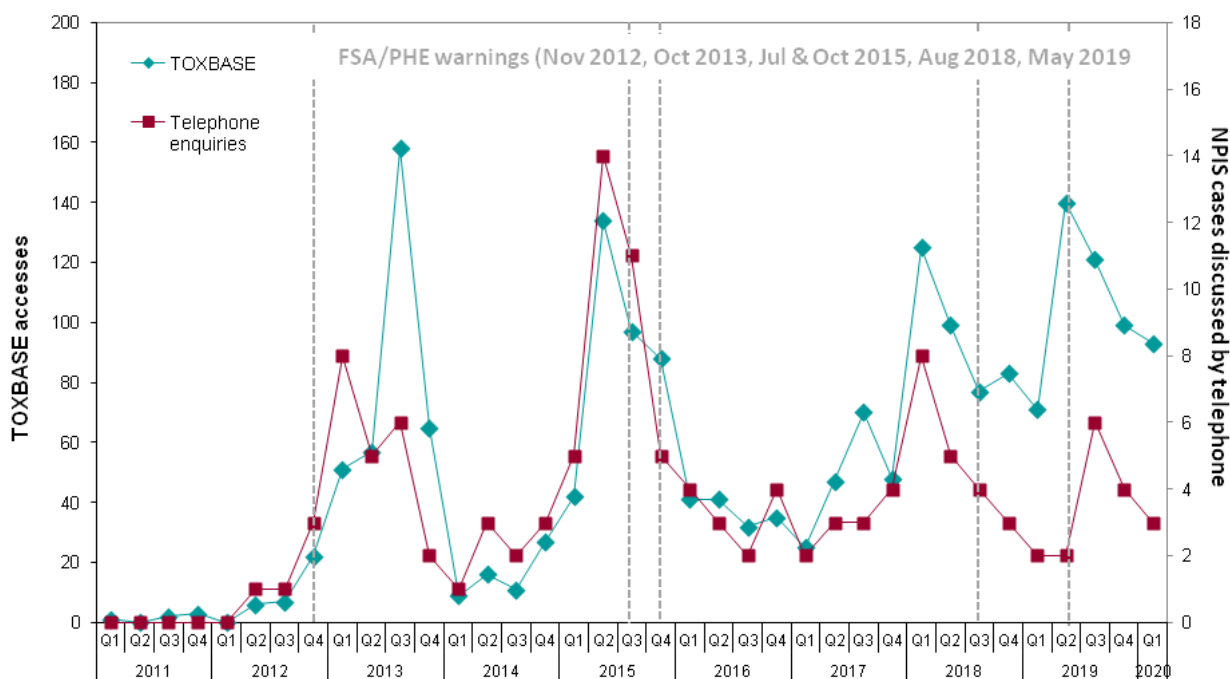


Figure 6.4.1 Quarterly numbers of NPIS cases referred by telephone and TOXBASE accesses relating to systemic DNP exposure, January 2011 to- March 2020

6.5 Impact of EU Exit on the NPIS

The UK left the European Union (EU) on 31 January 2020 and although EU law continues to apply to and in the UK during the transition period (1 February to 31 December 2020), the NPIS has had to consider the impact of EU Exit on its ability to deliver poisons information advice to healthcare professionals once the transition period comes to an end.

To prepare for the end of the transition period, we have undertaken work in two areas, the first pertaining to cosmetics and the second to all other chemical products.

The Cosmetic Products Notification Portal (CPNP)

The CPNP is a free of charge online notification system created for the implementation of Regulation (EC) No 1223/2009 on cosmetic products. It has been accessible to European poison centres since January 2012 and provides valuable composition information for handling enquiries to the NPIS involving cosmetics (approximately 2,000 per year).

Although the NPIS continuously updates TOXBASE, it is not possible to ensure that every marketed cosmetic in the UK has a specific TOXBASE entry. It is for this reason that access to the CPNP is a key source of information for specialists in poisons information in dealing with enquiries pertaining to cosmetic product exposures.

To mitigate for the information gap as a result of the UK's departure from the EU, the NPIS has been collaborating closely with colleagues within the Department for Business, Energy and Industrial Strategy and the Office for Product Safety and Standards, to develop a UK-specific cosmetic product notification portal that meets the needs of the NPIS as well as minimising the impact to industry.

Chemical Safety Data, the NPIS Product Data Centre and the ECHA Portal

The NPIS Birmingham unit is the Appointed Body (on behalf of the UK) to receive (on a voluntary basis) chemical composition data as safety data sheets (SDS) for preparations marketed in the EU that may be potentially dangerous to human health. This information is stored securely on the NPIS Product Data Centre.

The requirement to have an 'Appointed Body' was incorporated into Article 45 of the CLP (Classification, Labelling Packaging) Regulation ((EC) No 1272/2008) which entered into force on 20 January 2009. However, in the absence of harmonised information requirements there was considerable variation in the existing national notification systems of individual Member States. Thus, companies placing mixtures on the market in different Member States needed to submit similar information multiple times, and in different formats. This diversity led to inconsistencies in the information available to medical personnel in cases of poisoning or accidental exposure incidents in different Member States.

Following a European Commission review to assess the possibility of harmonising the information (undertaken in consultation with stakeholders and with the support of the European Association of Poison Centres and Clinical Toxicologists), Commission Regulation (EU) 2017/542 was adopted, adding Annex VIII to CLP which entered into force on 12 April 2017. Annex VIII sets provisions to facilitate:

- Harmonisation, in terms of format and content, of the information companies submit to the 'Appointed Bodies' upon placing hazardous mixtures on the EU market
- Consistency, by requiring all notifications to be submitted by electronic means in a specified format, which enables the Appointed Bodies to easily retrieve the relevant information
- Specificity, all products will be assigned a unique formula identifier (UFI) to allow poison centres to unambiguously identify the mixture and recommend the appropriate medical treatment in the event of poisoning

To support industry in submission of harmonised, consistent data and compliance with the legislation, the European Chemicals Agency (ECHA) developed the Poison Centres Notification (PCN) format, offering a centralised means for generating the information 'dossier' with additional tools to validate the data prior to submission, and enabling a submitter to notify multiple Member States through one single submission. Poison Centres, upon compliance with ECHA's security requirements, would be able to access toxicity data in order to disseminate emergency healthcare advice as required. At the time of writing, the ECHA PCN is not being used by all Member States and development work is continuing.

To understand the impact of legislative changes resulting from EU Exit (including the Northern Ireland Protocol), the NPIS is collaborating closely with colleagues in PHE, the Department of Health and Social Care and the Department for Business, Energy and Industrial Strategy to evaluate the long term suitability of the current national system.

7. Conclusions

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 excellent user feedback reflects the quality of the services provided and the continuing commitment and hard work of all our staff.

Over the last 20 years information has increasingly been provided via our online platforms rather than by telephone. This model is highly responsive for NHS users as they can access detailed online written information and advice immediately at the point of care. It also reduces the requirement for information provision by telephone, preventing this service from being overwhelmed, whilst still allowing health professionals to obtain specialist advice for complex or severe cases. Overall, this model is cost-effective and less expensive than the exclusive telephone services provided in most other countries. This has become increasingly important in recent years because of year-on-year reductions in real-terms funding for the service. However, providing a high quality responsive service to NHS users, including maintaining our essential and highly-used online platforms, remains a priority.

8. Recommendations

Outcome of Recommendations for NPIS in 2019/20

- 1. 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.**

Outcome: PHE completed and shared its report during the 2019/20 reporting year. The NPIS is working with PHE to realise savings where possible, although the amounts involved do not match projected financial shortfalls affecting the service. The NPIS will continue to work with PHE, DHSC and other partners to identify further resources or reductions in services and expenditure to allow the service and its constituent units to operate within balanced budgets.

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

Outcome: The NPIS has continued to support global public health initiatives as required by PHE.

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

Outcome: The NPIS has continued with this activity, with findings summarised in this report.

Recommendations for NPIS in 2020/21

1. Continue to work with PHE, DHSC and other partners to identify further resources or reductions in services and expenditure to allow the NPIS and its constituent units to operate with a balanced budgets.
2. Redesign the user satisfaction survey for telephone enquirers with the aim of improving response rates, reducing workload for our staff, and reducing impact on the environment.
3. Support toxicovigilance work being led by PHE in the context of the current COVID-19 pandemic and publish findings.
4. Continue support of PHE in delivery of global public health initiatives relating to poisons centres, where funding is available.
5. 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 M E M O Elamin MBBS, DTM&H, MRCP, PgCert ClinEd, MSc(Med Tox)
Consultant Physician & Clinical Toxicologist, NPIS Birmingham and West Midlands Poisons
Unit, Birmingham City Hospital

Mr P S Jagpal BSc MSc
Service Manager, NPIS Birmingham

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 BA MBBCh MRCP
Medical Director, NPIS Cardiff; 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
Consultant, NPIS Cardiff; Senior Lecturer in Clinical Pharmacology, Centre for Medical
Education, Cardiff University and Honorary Consultant, Cardiff and Vale University Health
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NPIS Edinburgh

Professor J W Dear PhD FRCPE
Professor of 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, Translational and Clinical Research Institute, 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, Translational and Clinical Research Institute, 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, Translational and Clinical Research Institute, Newcastle University

Dr H K R Thanacoody MD FRCP FRCPE
Director, NPIS Newcastle and UKTIS; Consultant Physician and Clinical Toxicologist, Newcastle upon Tyne Hospitals NHS Foundation Trust; Honorary Senior Clinical Lecturer, Translational and Clinical Research Institute, Newcastle University

Professor S H L Thomas BSc MD FRCP FRCPE FEAPCCT FAACT
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 and Caldicott Guardian, Guy's and St Thomas' NHS Foundation Trust, 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, Co-Chair of Medication Safety Committee, 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

Vice president: Clinical and Translational Toxicology Speciality Section, Society of Toxicology

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

Member: Home Office, Office for security and counter terrorism. Chemical Expert Panel

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 M E M O Elamin

INTERNATIONAL SOCIETIES

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

ACADEMIC ACTIVITIES

Member: MRCP Part 1 & 2 Specialty Question Writing Group

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

Lecturer: NPIS/RCEM Clinical Toxicology Training Days

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

Visiting Professor of Clinical Pharmacology: University of South Wales

Dr L A Gray

NHS NATIONAL AND REGIONAL COMMITTEES

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

ACADEMIC ACTIVITIES

Medical Advisor: Diploma in Medical Toxicology, Cardiff University

Member: Prescribing Safety Assessment (PSA) Assessment Board, British Pharmacological Society

Lecturer: Cardiff Update in Medical Toxicology

Dr A Thomas

NHS NATIONAL AND REGIONAL COMMITTEES

Medical Director: Yellow Card Centre Wales

Member: Deputy Member, All Wales Medicines Strategy Group

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

Professor 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

Advisor: World Health Organization/Department of Environment, Climate Change and 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 Expert Advisory Group on Antivenoms

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

MBChB Year 4 Exam Board Chair: University of Edinburgh

Dr A Veiraiah

NHS NATIONAL AND REGIONAL COMMITTEES

Medical Lead: SPSP Medicines

ACADEMIC ACTIVITIES

Faculty: Primary Care Improvement Programme, Healthcare Improvement Scotland

NPIS Newcastle (including UKTIS)

Dr S Hill

UK ADVISORY COMMITTEES

Member: New Psychoactive Substances sub group of the Advisory Council on the Misuse of Drugs

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

MBBS year 3 lead, Newcastle Upon Tyne Hospitals NHS Foundation Trust

Dr K K Hodson

INTERNATIONAL SOCIETIES

Member: ENTIS (European Network of Teratology Information Services)

UK COMMITTEES

Executive Member: MacDonald UK Obstetric Medicine Society

Member: MHRA Optimising Data on the Safety of Use of Medicines in Pregnancy

Member: MHRA Safer Medicines in Pregnancy and Breastfeeding Consortium

ACADEMIC ACTIVITIES

Lead Consultant: Maternal Medicine Training in NE England

Lecturer: Maternal Medicine Teaching Courses, RCP London and Royal College of Obstetricians and Gynaecologists

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) Exam 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, MBBS, 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 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

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

Member: North of Tyne Area Prescribing Committee, Formulary Subcommittee

ACADEMIC ACTIVITIES

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 and United Nations Office on Drugs and Crime

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

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)

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

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: European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)
Expert Advisor: United Nations Office on Drugs and Crime (UNODC)
Expert Advisor: World Health Organisation

INTERNATIONAL SOCIETIES

Member: Scientific Committee of European Association of Poisons Centres and Clinical Toxicologists (EAPCCT)

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) Chemsex, Monitoring, Technical and Novel Psychoactive Working Groups
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 2019/20

85 contributions to the scientific literature were published in 2019/20 by NPIS staff*

* NPIS staff are given in **bold** type

early online publication details for these publications were previously listed in the 2018/19 NPIS report

Peer-reviewed papers

Abhinav K, Feng L, Morrison E, Jung Y, **Dear J**, Takahashi S, Heck MMS. The conserved metalloprotease invadolysin is present in invertebrate haemolymph and vertebrate blood. *Biology Open* published online 4/11/19.

Ahrensberg H, Madsen LB, Pearson M, Weerasinghe M, **Eddleston M**, Jayamanne S, Hansen KS, Ariyaratna V, Rajapaksha S, Konradsen F. Estimating the government health-care costs of treating pesticide poisoned and pesticide self-poisoned patients in Sri Lanka. *Global Health Action* 2019; 12: 1692616.

Al-Banaa I, **Hawkins L**, **Hill SL**, **Lupton DJ**, **Jackson G**, **Sandilands EA**, **Bradberry SB**, **Thompson JP**, Rushton S, **Thomas SHL**. Effect of the UK Psychoactive Substances Act 2016 on episodes of toxicity related to new psychoactive substances as reported to the National Poisons Information Service. A time series analysis. *Int J Drug Policy* published online 4/2/20.

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Bateman DN, **Dear J**. Acetylcysteine in paracetamol poisoning: a perspective of 45 years of use. *Toxicol Res* 2019; 8: 489-98.

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Caparrotta TM, **Dear JM**, Colhoun HM, Webb DJ. Pharmacoepidemiology: using randomised control trials and observational studies in clinical decision-making. Br J Clin Pharmacol 2019; 85: 1907-24.

Cauldwell M, Steer PJ, Curtis SL, Mohan A, Dockree S, Mackillop L, Parry HM, Oliver J, Sterrenberg M, Wallace S, Malin G, Partridge G, Freeman LJ, Bolger AP, Siddiqui F, Wilson D, Simpson M, Walker N, **Hodson K**, Thomas K, Bredaki F, Mercaldi R, Walker F, Johnson MR. Maternal and fetal outcomes in pregnancies complicated by Marfan syndrome. Heart 2019; 105:1725-31.

Dhanarisi J, Shihana F, Harju K, Mohamed F, Verma V, Shahmy S, Vanninen P, Kostianen O, Gawarammana I, **Eddleston M**. A pilot clinical study of the neuromuscular blocker rocuronium to reduce the duration of ventilation after organophosphorus insecticide poisoning. Clin Toxicol 2020; 58: 254-61.

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Day RC, Bradberry SM, Sandilands EA, Thomas SHL, Thompson JP, Vale JA. Features reported after exposure to automatic dishwashing rinse aids. Hum Exp Toxicol; published online 24/1/20.

Day RC, Bradberry SM, Sandilands EA, Thomas SHL, Thompson JP, Vale JA. Toxicity of traditional and soluble film automatic dishwashing tablets. Hum Exp Toxicol; published online 4/12/20.

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Gifford RM, Chathuranga U, Lamb T, Verma V, Sattar MA, Thompson A, Siribaddana S, Ghose A, Forbes S, Reynolds RM, **Eddleston M**. Short-term glucose dysregulation following acute poisoning with organophosphorus insecticides but not herbicides, carbamate or pyrethroid insecticides in South Asia. *Clin Toxicol* 2019; 57: 254-64.

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Pearson J, Watkeys LJ, **Coulson JM**, Schlader ZJ, Crandall CG, Cockcroft JR, McEniery CM, McDonnell BJ. Association between Aortic Stiffness and Cerebral Pulsatility is Modestly Influenced by Augmentation Index. *Artery Res* 2019; 25: 95-100.

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Potts AJ, Cano C, **Thomas SHL**, **Hill SL**. Synthetic Cannabinoid Receptor Agonists: classification and nomenclature. *Clin Toxicol* 2020; 58: 82-98.

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Thompson A, Dunn M, Jefferson RD, Dissanayake K, Reed F, Gregson R, Greenhalgh S, Clutton RE, Blain PG, **Thomas SH, Eddleston M**. Modest and variable efficacy of pre-exposure hydroxocobalamin and dicobalt edetate in a porcine model of acute cyanide salt poisoning. Clin Toxicol 2020; 58: 190-200.

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Anderson M, Coulson J, Dunn M, Harvey J, Humber A. Overdose and poisoning. In 'JRCALC Clinical Guidelines'. Brown SN, Kumar DS, James C (Eds). Class Publishing, 2019.

Kapil V, **Bradberry S**, Pirmohamed M. Prescribing, Therapeutics and poisoning. In: Clinical Medicine, 10th edition. Kumar P, Clark M (Eds). Elsevier, Edinburgh, 2020.

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Al-Banaa I, Balin A, Rushton S, **Thomas S**. Poisons centre enquiries relating to synthetic cannabinoids receptor agonists (SCRAs) in the UK, 2009-2018. Toxicol Lett 2019; 314: S1.

Alossies AS, **Thanacoody RHK**, Harnett J, Layne K, Archer JRH, Hilla SL, Wood DM, Dargan PI, **Thomas SHL**. Derivation of a clinical decision rule allowing earlier discharge of patients with

paracetamol poisoning after a shorter 12- hour acetylcysteine (SNAP) protocol. Clin Toxicol 2019; 57: 531.

Capleton AC, Arya R, Palmer C, **Thomas A**, **Thompson JP**. Vaginal button battery insertion in an adult patient. Clin Toxicol 2019; 57: 581.

Cooper GA, **Thompson JP**, **Bradberry SM**, **Sandilands EA**, **Thomas SH**, **Coulson JM**. A review of enquiries received by the UK National Poisons Information Service (NPIS) involving colchicine exposure (2008 to 31 July 2018). Clin Toxicol 2019; 57: 449.

Day R, **Bradberry SM**, **Jackson G**, **Lupton DJ**, **Sandilands EA**, **Thomas SHL**, **Thompson JP**, **Vale JA**. Review of features in 4,313 exposures to liquid laundry detergent capsules reported to the UK National Poisons Information Service (NPIS) over a 10-year period (2008-2017). Clin Toxicol 2019; 57: 554-5.

Dunn M, **Hill SL**, Hardy G, Cooper J, Dargan PI, Wood DM, Grundling J, Parris R, Kataria H, **Eddleston M**, Officer J, **Thomas SHL**. Analytical prevalence of novel synthetic opioids including fentanyl in samples from patients presenting with apparent heroin overdose in the UK. Clin Toxicol 2019; 57: 443-4.

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Jackson G, **Thomas SHL**, **Thompson JP**, **Bradberry SM**, **Sandilands EA**. Poisoning in the UK: estimating incidence and circumstance. Clin Toxicol 2019; 57: 494-5.

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Jagpal PS, Williams HA, Elamin MEMO, Sandilands EA, Thomas SHL, Thompson JP, Bradberry SM. Review of enquiries to the UK National Poisons Information Service (NPIS) Birmingham Unit originating from NHS 111, NHS 24 and NHS Direct advice services. *Clin Toxicol* 2019; 57: 452-3.

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James DA, George N, Bradberry SM, Sandilands EA, Thompson JP, Thomas SHL. Avoiding emergency ambulance dispatch for suspected nonintentional poisoning by prior telephone consultation with the UK National Poisons Information Service. *Clin Toxicol* 2019; 57: 425-6.

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Other

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Capleton AC, Arya R, Palmer C, **Thomas A**. Vaginal button battery insertion in an adult patient. Clin Toxicol 2020; 58: 218-9. Letter.

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