



The State Laboratory
An tSaotharlann Stáit

Annual Report
2018



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INTRODUCTION

I am very pleased to present this Annual Report on the work of the State Laboratory for 2018. It was another busy and productive year and one in which there continued to be significant staff changes.

With the improved economy, a number of permanent staff found external job opportunities and for the first time, the Laboratory had trouble recruiting new staff to fill vacancies. This meant that there were six unfilled posts at the end of the year, which had a negative impact on service delivery in a number of areas.

On the other hand, opportunities for promotion for long-serving staff and the influx of new recruits contributed very positively to the work environment.

This resulted in a continuing need for staff training and development and a strong focus on upskilling staff across all work areas. Due to the highly specialised and innovative nature of its work, it is a priority and key strategic driver for the Laboratory to develop and retain highly skilled and expert staff. To do this, the Laboratory must provide a work environment where staff are engaged and motivated and have the opportunities to develop interesting and meaningful careers in chemistry.

Therefore, the results of the 2017 Civil Service Employee Engagement Survey were eagerly awaited and it was heartening to note that the results were significantly more positive than for the 2015 survey, especially across the themes that management had focussed on in the 2015 action plan. These included improving leadership and performance management ability, fostering an innovative climate and commitment to the organisation, and providing opportunities for career development and mobility.

The State Laboratory is a customer focussed organisation and to ensure it is meeting the needs of its client departments, it carries out a customer satisfaction survey every year. The results of the 2018 survey were very positive and showed once again that the most important attribute of the service that the Laboratory provides is quality and 100% of clients indicated that they were very satisfied with the quality of the service provided. There was also a significant improvement in the satisfaction rating for timeliness of results, which is another important attribute of the service for many clients. This reflected the improvements in turnaround times achieved in 2017 following the recruitment of additional staff.

In May 2018, Eurachem Ireland and the State Laboratory hosted the Eurachem General Assembly at Dublin Castle along with Eurachem Working Group Meetings and the Eurachem Executive Committee Meeting. The Eurachem General Assembly was last held in Ireland in 1997. To mark the occasion, Eurachem Ireland organised an International Workshop for approximately 120 delegates on the topic Data - Quality, Analysis and Integrity.

Also in May, the State Laboratory hosted a 2-day workshop of the EURL and NRL Network for Halogenated POPs in feed and food in Dublin Castle, which approximately 50 delegates from 28 member states attended.

Full details of the work of the State Laboratory and its achievements in 2018 are presented in this annual report. As always without the commitment and dedication of its staff none of this would have been possible. I would like to sincerely thank all the staff of the Laboratory for their hard work, enthusiasm and support throughout the year. I would also like to acknowledge the hard work and commitment shown by the facilities management team during the adverse weather event that occurred in the spring when the campus had to be closed for three days. It was thanks to their Trojan snow-clearing efforts over a weekend, that the campus was safe for staff to return to work the following week.



Ita Kinahan

State Chemist



OVERVIEW

The State Laboratory is a scheduled office under the aegis of the Department of Public Expenditure and Reform and it is the Government's principal analytical chemistry laboratory. Its high level objective is to provide an accredited, high quality and timely chemical analysis and advisory service to Government Departments and Offices, which supports their policies, regulatory programmes and strategic objectives, particularly in the areas of food and feed safety; revenue collection; fraud prevention; public health and environment protection. It also provides centralised forensic toxicology services to the Coroners and other public sector clients.

In 2018, a total of 13,781 samples were analysed for 595,562 analytes, a 7% increase in the number of samples submitted for analysis and a 14% increase in the number of analytes tested for compared to 2017. There was an unexpected 12% increase in the number of samples submitted for the Coroners Service, with a ~20% increase in samples in the first six months of the year compared with the same period in 2017. This had a very negative impact on the timeliness of the service provided during the year, which will not improve until additional staff and equipment resources are assigned in 2019.

The detection of elevated levels of dioxins in a liver sample tested as part of a routine monitoring programme in late 2017 led to a 24% increase in the number of food samples tested for dioxins in early 2018. There was also a 7% increase in the number of samples submitted for testing for residues of veterinary drugs and an increase in the number of imported animal feed samples tested for contaminants because of the fodder crisis.

Analytical chemistry is a continually evolving area and staff of the Laboratory keep abreast of technological changes and take advantage of the opportunities offered by new technology to improve the quality and efficiency of the service provided to our clients. EU and Irish legislation is regularly updated to reflect technological developments and the Laboratory must continually update and improve its methods of analysis. In 2018, new methods of analysis were developed and existing methods were extended so that 77 new tests were introduced, using a variety of analytical techniques.

The Laboratory has an important advisory function, particularly in the Customs and Excise area, and its staff act as the Irish representatives at EU scientific committees and technical Working Groups on behalf of Revenue and the Department of Business, Enterprise and Innovation (DBEI). Laboratory staff also actively participate and represent Ireland as national experts in international standardization bodies such as Codex Alimentarius, the European Committee for Standardisation (CEN), Eurachem and the Consultative Committee on the Amount of Substance (CCQM).

The Laboratory has been designated as Ireland's main Official Control Laboratory for animal feedingstuffs and as a National Reference Laboratory (NRL) for parameters such as nutritional additives for use in animal feed, veterinary residues in food of animal origin and dioxins and other contaminants in feed and food. Staff collaborate with the EU Reference Laboratory (EURL) in their area of competence, attend NRL network meetings and workshops and disseminate information supplied by the EURL to the competent authority and official national laboratories.

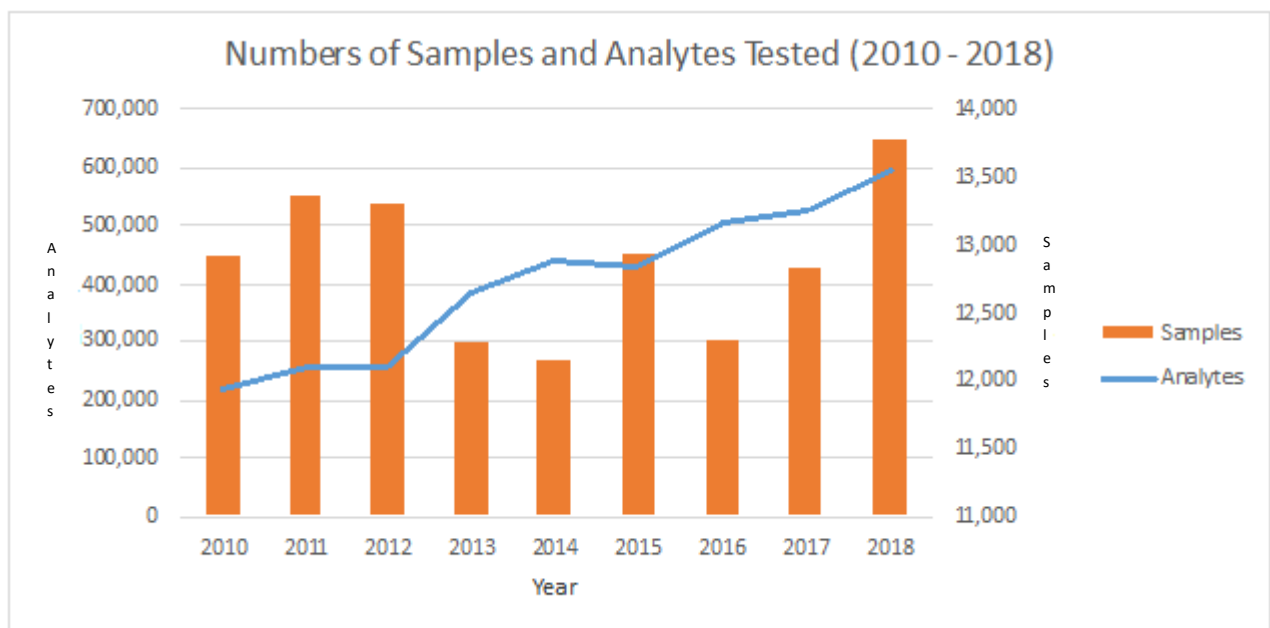
In 2018, the scope of the Laboratory's role as the NRL for dioxins and PCBs was expanded to include all halogenated persistent organic pollutants (POPs) and its role as the NRL for mycotoxins in feed and food of animal origin was expanded to include plant toxins.

National and international acceptance of results of analysis requires laboratories to have third party peer accreditation of its methods of analysis. The State Laboratory operates in accordance with a documented quality system based on an international standard for competence of testing laboratories (ISO/IEC 17025) and is accredited by the Irish National Accreditation Board as being in compliance with this standard for specific areas of work (INAB Reg. No. 146T). The Laboratory successfully underwent a full reassessment and extension to scope visit by INAB in 2018 and it is currently accredited for 52 test methods covering 504 individual analytes. The Laboratory was also awarded flexible scope for a number of multi-analyte methods in the animal feeds and contaminants work areas.

This annual report details the implementation of the State Laboratory's Strategy Statement for 2018 and highlights the Laboratory's main activities and achievements under each Strategic Goal.

OVERVIEW—NUMBER OF SAMPLES

Strategic Goal	No. of Samples Tested	No. of Analytes Tested For
Food and Feed Safety	4,974	41,873
Revenue Collection and Fraud Prevention	1,804	8,435
Forensic Toxicology Service	6,510	541,878
Public Health and Heritage Protection	202	1,137
Veterinary Toxicology Service	291	2,239
Overall Total	13,781	595,562

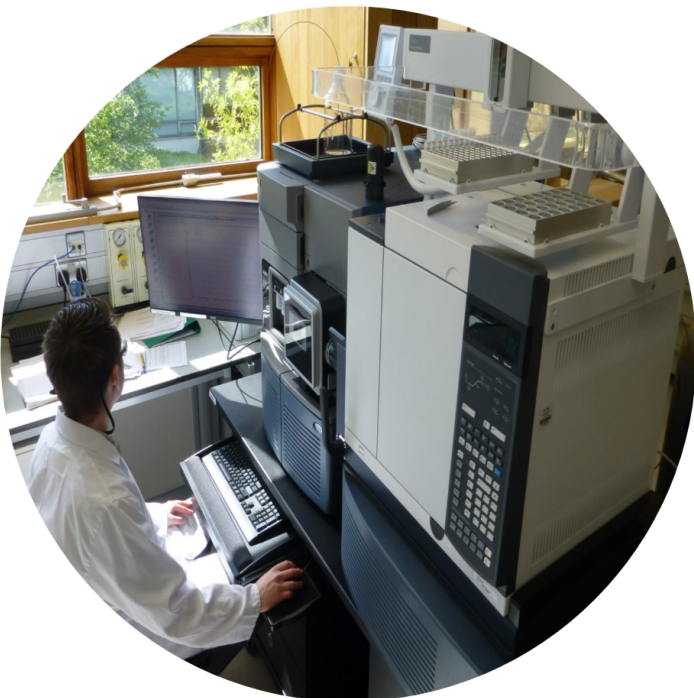


STRATEGIC GOAL 1

Support National Food and Feed Safety Programmes

As Ireland is a major food exporter, monitoring and controlling aspects of food and animal feed safety is a high priority.

The State Laboratory assists the Department of Agriculture, Food and the Marine (DAFM) and the Food Safety Authority of Ireland (FSAI) in ensuring the quality and safety of Irish food by monitoring compliance with European and National legislation governing the production, distribution and sale of animal feedstuffs and by testing a wide range of foods for veterinary residues and other contaminants.



STRATEGIC GOAL 1—FOOD AND FEED SAFETY

Animal Feedingstuffs

Animal feed is one of the most important components of the production chain of food of animal origin. In economic terms, animal feed accounts for up to 70% of the total costs of animal production and has an impact on animal health and productivity as well as on food safety and quality. The aim of animal feed controls is to ensure that feedingstuffs are of good quality and do not constitute a hazard to human or animal health. The controls are implemented through risk-based inspections and sampling of feedingstuffs at all stages of the feed chain.

The State Laboratory is the principal laboratory responsible for feedingstuffs analysis in Ireland. Samples of feed materials, feed additives, mineral mixtures and compound feeds are routinely tested to ensure that they contain the declared nutrients (protein, fat, starch and minerals), micro-nutrients (trace elements, vitamins), ash, fibre and moisture contents and do not contain elevated levels of toxic components (dioxins, mycotoxins, melamine, heavy metals). Legislation requires that the Laboratory is accredited for all test methods used for official control purposes.

In 2018, the LCMS/MS method to test for the presence of melamine in animal feed and infant formula, developed in 2017, was accredited. This method encompasses both the screening and confirmation of melamine, which is an undesirable substance that is sometimes illegally added to food and pet food to increase the apparent protein content of these products.

The Laboratory was also granted flexible scope accreditation for five multi-analyte methods for feed including two LCMS/MS methods for coccidiostats and antibiotics, two ICPMS methods for macro and trace elements and heavy metals and an ICPOES method for macro and trace elements. An extension of range was granted for the accredited method for theobromine.

During 2018, a number of priority samples were submitted for analysis. In April, following sudden cattle deaths, ten samples of complementary feed, feed materials and mineral mixtures were tested for a wide range of substances including mycotoxins, heavy metals, trace elements, iodine and veterinary medicines. No cause of death due to feed was found.

To facilitate a new trade agreement with China, samples of a rumen buffer product, made in Ireland from calcareous marine algae, were tested for fluoride content in May.

In November, four samples of a new type of high performance feed additive were tested for a wide range of analytes including dioxins, mycotoxins, heavy metals, trace elements, melamine, iodine and fluorine. These samples were also tested for potentially performance enhancing substances such as coccidiostats and banned antibiotics for which the State Laboratory already had methods in place. Three new LCMS/MS methods of analysis were also developed to test these samples for 19 steroids, ten β -agonists and six corticosteroids, all of which are banned in animal production. No banned substances were found in any of the samples and no undesirable substances were detected above the maximum permitted levels.

Medicated Feed

Medicated feed is an important route for administering veterinary medicinal products to animals, in particular to animals intended for food production. Two-thirds of veterinary anti-microbials used in Ireland are formulated as pre-mixes or oral remedies. These formulations are used mainly for administering a veterinary drug to animals reared in large groups such as a flock of birds or a group of pigs, where many animals need to be treated at the same time.

Ireland has strict regulations surrounding antimicrobial usage in food producing animals with defined withdrawal periods in place and the correct dosage rate is important to prevent a build up of antibiotic resistance. At a feed manufacturing facility, it is possible that what is termed an “unintended and unavoidable” presence of low levels of certain veterinary drugs can be found in the feed after a batch of medicated feed has been produced using the same facility.

The State Laboratory tests feed samples for authorised veterinary medicines and coccidiostats (feed additives used to prevent coccidiosis, a major disease in poultry and other farm animals) to ensure that the correct therapeutic levels are present.

STRATEGIC GOAL 1—FOOD AND FEED SAFETY

The Laboratory also tests for carryover levels of 11 coccidiostats in rations destined for non-target species and for the presence of low levels of 14 banned or prescription only antibiotics in a range of feeds.

A new EU regulation on medicated feed was finalised during 2018 and this will come into force in early 2019. This legislation specifies the list of antimicrobials that can be used in feed and lays down the tolerances that apply where the composition of a medicated feed is found to deviate from the amount of an antimicrobial active substance indicated on the label.

Food Safety

To ensure that food produced in Ireland is of the highest standard, the FSAI and DAFM work together to implement comprehensive multi-annual control plans to monitor the production of food at all stages of the food chain and ensure compliance with national and international standards of food safety. The State Laboratory has developed a high level of expertise in the chemical analysis of veterinary drug residues and other chemical contaminants such as dioxins and mycotoxins in food.

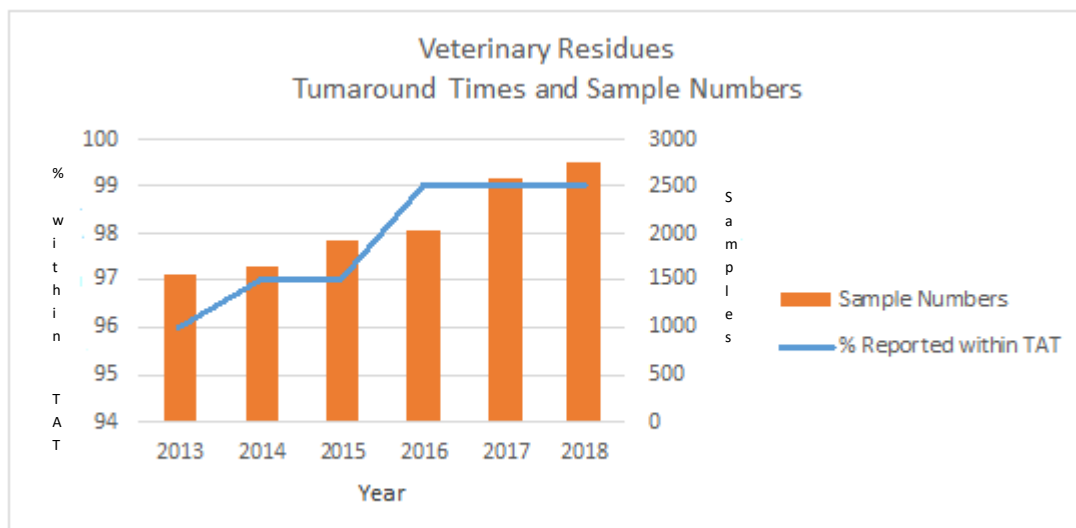
Veterinary Drug Residues

The presence of unauthorised substances, residues of veterinary medicinal products or chemical contaminants in food may pose a risk to public health. Under EU legislation (Council Directive 96/23/EC), DAFM administers a National Residues Monitoring Plan (NRMP) which is designed to safeguard consumers from harmful residues in food of animal origin.

Animal categories and food products covered include bovines, pigs, sheep and goats, horses, deer, poultry, milk, eggs and honey. Nine different matrices are tested including blood, serum/plasma, urine, kidney, liver and fat depending on the analytes being tested for.

There was a 7% increase in the number of samples tested for veterinary drug residues in 2018, mainly due to increased testing for banned steroids in urine and serum samples and for corticosteroids in milk. The average time taken to report results was 11 days and 99% of samples were reported within 30 days.

The problem of horses that were unfit for human consumption entering the food chain with falsified documents arose again in April 2018. The Department of Agriculture launched an investigation to identify and trace the horse meat involved in the case of at least 30 horses sold to abattoirs with false paperwork. The main problem associated with these horses is the potential for phenylbutazone (also known as 'Bute'), being detected in the meat. This drug is prescribed for use in sport horses but they must subsequently be excluded from the food chain. Following a non-compliant sample in 2017, the level of testing for phenylbutazone and other non-steroidal anti-inflammatories (NSAIDs) in equine kidneys was increased in 2018. The Laboratory prioritised this testing, and provided results within an average turnaround time of four working days for these samples. This short turn-round time put a significant strain on the Laboratory's resources but it was considered necessary to protect Ireland's reputation as a major exporter of high quality fresh meat and meat products.



STRATEGIC GOAL 1—FOOD AND FEED SAFETY

Monitoring of Dioxins and other Persistent Organic Pollutants

Persistent organic pollutants (POPs) represent a group of chemicals that are not easily degraded and so can accumulate and persist for long periods, not only in the environment but also in several fat-containing foods. They include dioxins and PCBs, which are highly toxic environmental contaminants that are formed during the combustion of chlorine-containing materials and must be excluded from the human and animal food chain. Approximately 90% of human exposure to dioxins results from the consumption of contaminated food such as dairy produce, meat and fish.

The State Laboratory tests a wide range of feedingstuffs (including recycled foods used for animal feeding) for dioxins and PCBs, in addition to infant formula samples and foods such as milk and vegetable oils used in the dairy industry. Other matrices tested for dioxins include fat and liver samples under the National Residue Monitoring Plan, fish and egg samples for the FSAI and milk samples for the Environmental Protection Agency.

Other POPs include brominated flame-retardants (BFRs) and perfluoroalkylated compounds (PFAs), which are used in firefighting foams and to provide stain and dirt repellence in carpets, packaging and clothing.

The State Laboratory has been designated the National Reference Laboratory (NRL) for dioxins and PCBs since 2009 but in 2018, its NRL scope was expanded to include all halogenated persistent organic pollutants in food and feed. It is currently developing new methods of analysis to test for BFRs and PFAs, but progress with this new work was delayed during 2018 due to an increased demand for dioxin testing.

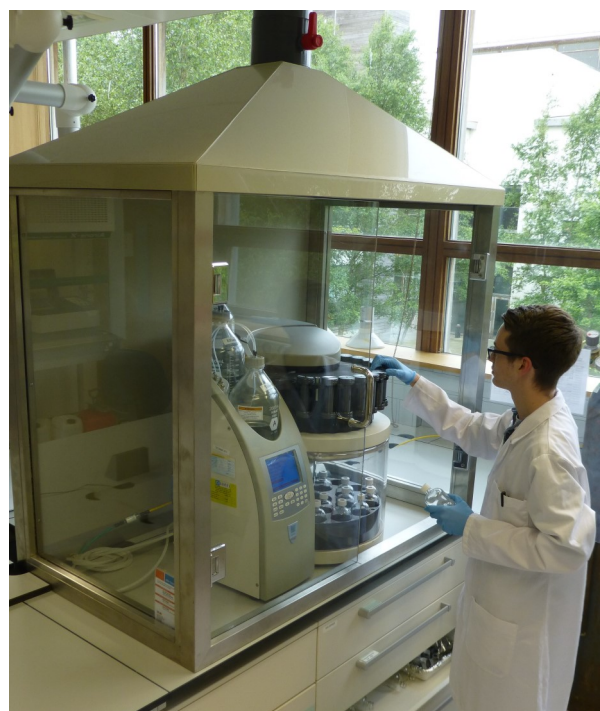
Investigation into elevated dioxin levels in ovine liver

In December 2017, elevated levels of dioxins were detected in a sample of ovine liver. This led to an in-depth investigation by the FSAI and the Department of Agriculture to determine the source and extent of the contamination. The Laboratory tested an additional 47 samples (24% increase) of ovine meat, liver and fat for dioxins in 2018 in support of this investigation, which concluded that the source of the dioxins was not a specific contamination incident but represented background environmental contamination. The levels detected did not represent a risk to human or animal

health but it was recommended that sampling strategies for existing dioxin monitoring programmes should be reviewed to ensure that they yield the most suitable data in terms of matrices tested and the animal population to be covered.

Monitoring of persistent organic pollutants in human breast milk

The Laboratory also supported a human biomonitoring study to measure levels of persistent organic pollutants (POPs), including dioxins, in human breast milk. As POPs can accumulate and persist for long periods in fat-containing foods and since human breast milk contains fat, human exposure to POPs can be estimated from the amounts of POPs present in breast milk. The aim of this project was to assess the levels of exposure to these chemicals in Ireland and to compare the levels found to the levels of exposure found from previous studies in Ireland and other European countries. This could indicate if human body burdens have reduced in response to recent actions taken to reduce human exposure to POPs. In 2018, the State Laboratory tested 16 pooled breast milk samples (each comprising ~10 samples from individual mothers) for dioxins and PCBs, while the BFR and PFA contents were analysed by a collaborating university in the UK, as the State Laboratory does not yet have this capability. The results of this study will be available in 2019.



STRATEGIC GOAL 1—FOOD AND FEED SAFETY

Mycotoxins, Plant Toxins and Nitrates

Mycotoxins are substances naturally produced by moulds and fungi that can be present on a crop in the field or can affect stored grain. Many mycotoxin-producing fungi are able to produce more than one type of mycotoxin and several types of fungi can affect a single crop leading to the presence of multiple mycotoxins. Mycotoxins can cause severe symptoms of toxicity at high doses and they enter the food chain via contaminated animal feedingstuffs.

The State Laboratory uses a multi-analyte LCMS/MS method capable of detecting 16 mycotoxins in feed (12 quantitatively, 4 qualitatively) for routine testing of feed samples. In 2018, a more sensitive LCMS/MS method of analysis was introduced that can now include all analytes in a single extraction step. This reduced the analysis time and improved the efficiency of this analysis. There was a 16% increase in the number of feed samples tested for mycotoxins due to the increased volumes of feed imported because of the fodder crisis.

Food samples of animal origin are also tested under the National Residue Monitoring Plan with samples of milk and liver tested for aflatoxin M1 and ochratoxin A respectively.

Patulin is a mycotoxin produced by moulds commonly found on rotting apples and the amount of patulin in apple products indicates the quality of the apples used in production. An accredited HPLC method is used to determine patulin in apple juice to assist DAFM to monitor the quality of apple juices produced in Ireland.

The scope of the NRL for Mycotoxins expanded in 2018 to include plant toxins such as ergot, tropane and pyrrolizidine alkaloids. Pyrrolizidine alkaloids are naturally occurring plant toxins that can cause chronic poisoning and potentially result in liver failure in cattle, horses and pigs. Grazing animals normally avoid plants that contain pyrrolizidine alkaloids, but animals can be poisoned by eating the plant material incorporated into hay, silage and pellets. During early 2019, the Laboratory will participate in a CEN collaborative trial of an LCMS/MS method for determining twenty-six pyrrolizidine alkaloids in 13 samples of feed materials, complementary and complete feeds.

There is concern at EU level regarding the possible health risks associated with high dietary intakes of nitrates and since leafy vegetables are the main source of dietary nitrate, maximum levels have been established for nitrate content in lettuce and spinach and samples taken by DAFM are analysed by the State Laboratory on a regular basis.

Fertilisers and Liming Materials

The State Laboratory is Ireland's approved laboratory for checking that fertilisers placed on the market comply with EU legislation. Fertilisers and liming materials play an essential role in supporting plant growth and animal production. Fertilisers supply the nutrients required to produce forage and crops, and liming materials ensure that soil pH is optimised to support plant growth. Fertilisers are routinely monitored for the following nutrients: nitrogen, phosphorous, potassium, and sulphur. The minerals magnesium and sodium are also tested for in relevant fertiliser samples. A new ICP/MS method of analysis was developed for cadmium in fertilisers and this will be validated in 2019 and possibly extended to include other heavy metals such as arsenic, lead and mercury.

Liming materials are monitored for particle size, total neutralising value (TNV) and moisture content. This testing is particularly important when new limestone quarries are opened. The European Regulation (EC) 2003/2003 for fertilisers was amended in 2013 to include liming materials. The purpose of the new legislation was to prevent a diversity of national rules in relation to liming materials leading to distortion of the EU internal market. Where limestone samples submitted for new licence applications are to be evaluated under this new legislation, the fineness of the liming materials has to be determined using a wet sieving procedure and also for these samples total calcium, total magnesium and TNV expressed as CaO values have to be determined.

STRATEGIC GOAL 1—FOOD AND FEED SAFETY

National Reference Laboratory Responsibilities

Under the new Official Controls Regulation (EU) 625/2017, the State Laboratory is a designated National Reference Laboratory (NRL) in the following areas:

- residues of veterinary medicinal products (steroids, corticosteroids, non-steroidal anti-inflammatories (NSAIDs), nitroimidazoles and sedatives) in food of animal origin;
- additives for use in animal nutrition;
- halogenated persistent organic pollutants (POPs) in food and feed;
- mycotoxins and plant toxins in animal feed and food of animal origin; and
- heavy metals and nitrogenous compounds in feed.

The requirements applicable to NRLs under the new regulation are more demanding in terms of infrastructure, equipment and staffing, in particular where they have an oversight role in relation to official laboratories carrying out screening analyses.

As the NRL for steroids, the State Laboratory oversees two screening laboratories, the Irish Equine Centre and the Agri-Food and Biosciences Institute (AFBI) who carry out analyses under contract to DAFM.

The scope of the State Laboratory’s Dioxin NRL designation expanded in 2018 to include all halogenated persistent organic pollutants (POPs) in food and feed including brominated flame-retardants (BFRs) and perfluoro-alkylated substances (PFAs).

The scope of the NRL for Mycotoxins expanded to include plant toxins such as ergot, tropane and pyrrolizidine alkaloids.

State Laboratory staff collaborate with the relevant European Union Reference Laboratories (EURLs) on analytical test methods, oversee the performance of screening methods in official laboratories, and where necessary provide technical assistance and advice to the official laboratories and DAFM as the Competent Authority.

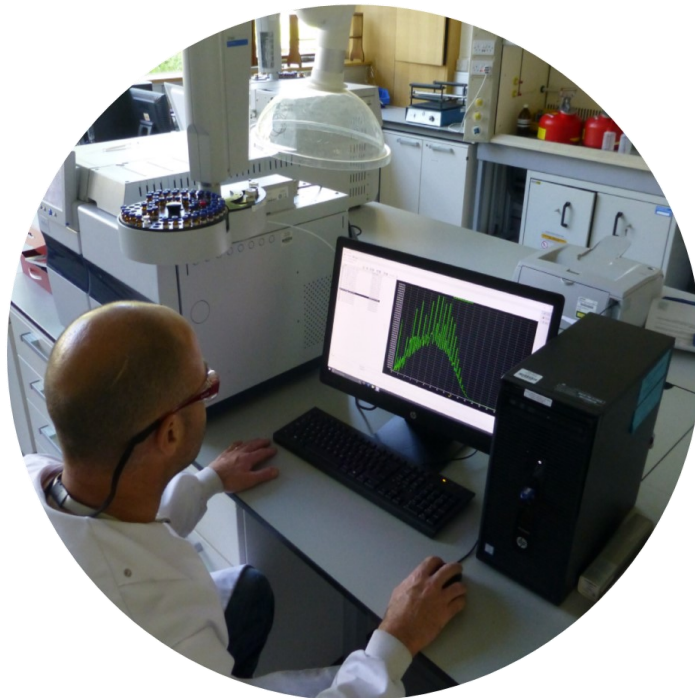
Food and Feed Safety - Numbers of Samples Tested		
Category of Sample	No. of Samples	No. of Analytes Tested For
Veterinary Residues in Food	2,764	16,279
Animal Feedingstuffs	916	5,671
Dioxins in Feed and Food	471	16,450
Mycotoxins in Feed and Food	537	2,590
Nitrate in Vegetables	33	33
Fertilisers / Liming Materials	253	850
Total	4,974	41,873

Food and Feed Safety - New Methods Developed		
Test Method	Analytical Technique	No. of Analytes
β-agonists in animal feed	LCMS/MS	10
Corticosteroids in animal feed	LCMS/MS	6
Steroids in animal feed	LCMS/MS	19
Total		35

STRATEGIC GOAL 2

Support Revenue Collection and Fraud Prevention

The State Laboratory advises the Office of the Revenue Commissioners on the classification of goods and on the application of appropriate excise duties on hydrocarbon oil products and alcoholic beverages and provides an analytical and advisory service in relation to mineral oils, alcoholic beverages and non-potable alcohol-containing products.



STRATEGIC GOAL 2—REVENUE COLLECTION

Customs Samples

The number of samples submitted in the Customs area was less than in 2017. All traded goods such as chemicals, foods, medicaments and plastics imported into or exported from the EU must be classified for Customs purposes and each separate product is assigned a particular classification code. State Laboratory staff have a high level of expertise in this area, which enables them to advise Revenue on tariff classification of samples that require chemical analysis to support classification decisions.

An important aspect of this work is attendance at meetings of Technical Committees of both the European Union and the World Customs Organisation where issues relating to the interpretation of tariff headings are discussed and decisions made on the classification of products. In 2018, tariff classification advice was provided for 207 samples.

Support was also provided to Revenue's Detection Technologies Unit to evaluate six hand-held analysers that use Raman technology and could be used by Customs Officers at ports and airports to identify illegal substances in a safe, non-destructive manner.

The decision of the UK to leave the EU could potentially have significant implications for the work of the Laboratory, particularly if the UK decides to leave the single market and the EU customs union. Due to the volume of trade between Ireland and the UK, this would result in a large increase in the number of tariff classification opinions requested by Revenue.

The Laboratory also supported a number of divisions of the Department of Business, Enterprise and Innovation (DBEI). Technical advice was provided to the Inward Investment division on the processing of applications for suspension of Customs duty. This involved liaising with applicants for duty suspensions and deputising for DBEI staff at relevant EU meetings. All applications were processed successfully.

Scientific and technical information in relation to the fibre composition of textile products was reviewed for the Competition and Consumer Policy section and State Laboratory staff provided representation for DBEI at EU textile labelling expert group meetings.

During 2018, the Laboratory agreed to provide the Trade Licensing and Control unit of DBEI with technical support on request, in relation to applications for export licences, or claims for exemptions from licencing requirements in

respect of exports of sensitive goods.

Excise Samples

The State Laboratory provides an analytical and advisory service to Revenue in relation to mineral oils, alcoholic beverages and non-potable alcohol-containing products to assist them in determining the appropriate duties applicable and in prosecuting fraud where attempts are made to evade such duties. There was a significant equipment replacement programme undertaken during 2018, to update the instrumentation used in the Excise area and replace obsolete equipment.

Mineral Oil Testing

Rebated (lower-taxed) fuel for off-road use (agriculture/home heating) is marked with dyes or chemical markers so that its use for any other purpose or illegal sale can be identified. A major illicit activity in relation to mineral oil is the laundering of marked fuel to remove these markers. This has been a persistent problem for many years as fuel laundering poses a serious threat to the Exchequer, to legitimate trade and, because of the processes used in laundering, to the environment. There were two fuel-laundering plants discovered in Co. Louth in October 2018 and a large tanker of diesel sludge was illegally dumped in Dundalk. This followed a large increase in the number of containers holding illegally dumped and toxic fuel laundered waste discovered in the early part of the year.

The State Laboratory supports the work of Revenue by analysing samples of the fuel seized for the presence/absence of oil markers and by providing analytical evidence and expert advice to facilitate court prosecutions. The number of fuel oil samples submitted for analysis to the Laboratory decreased by 6% in 2018 compared to the previous year, which enabled the Laboratory to clear the remaining backlog of samples that had built up over previous years and by the end of the year agreed turnaround times were being achieved. There were 146 priority samples identified in 2018, 13% of the total. These required urgent analysis, usually on the day of receipt, and this had a negative impact on turnaround times for routine samples. However, this is an important aspect of the service provided to Revenue officials.

The GCMS method used for determining the fuel marker Accutrace S10 in gas oil was extended to include kerosene and petrol matrices and this was accredited in 2018. An inter-laboratory ring-trial of samples containing Accutrace 10 was organised by the State Laboratory.

STRATEGIC GOAL 2—REVENUE COLLECTION

Five samples in duplicate for both kerosene and gasoil were sent to three other laboratories for testing and the results were compared to enable the participating laboratories to evaluate their performance.

Preparation for and attendance at Court cases can take a significant amount of laboratory staff time. One Court case was attended in June 2018. Responding to disclosure requests can also be time-consuming and two cases currently before the court involved full legal disclosure during 2018.

Alcohol Testing

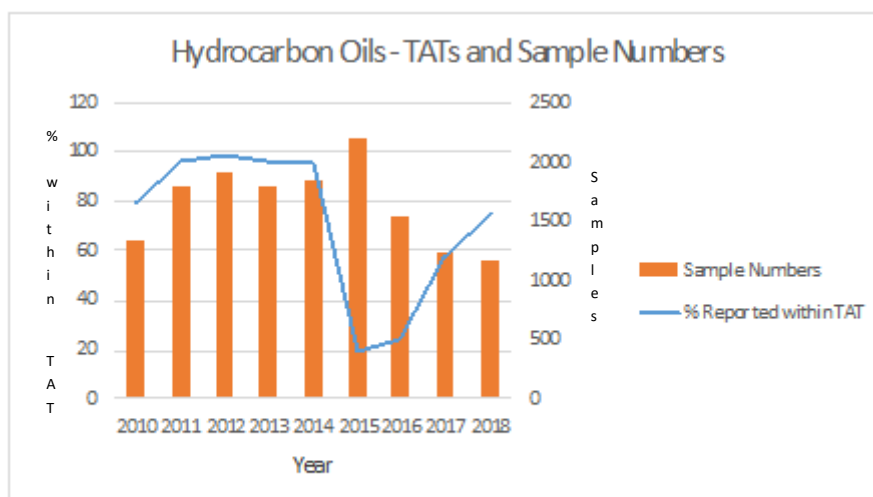
For excise purposes, alcoholic beverages are classified as beers, wines, ciders or spirits and duty is based on the alcohol content. Counterfeit spirits are illegally produced alcoholic drinks, which are often sold to consumers as legitimate product.

Revenue officers target the supply and sale of illegal and counterfeit alcohol. Illicit trade in alcohol occurs through smuggling from countries with lower excise tax rates, illegally diverting untaxed alcohol onto the market, or the production of counterfeit alcohol. Vodka is the most

commonly counterfeited alcohol and often contains high quantities of poisonous chemicals such as methanol and isopropyl alcohol.

The State Laboratory assists Revenue to determine the excise duty payable on alcohol-containing products, monitor compliance and combat excise duty fraud and the production and distribution of counterfeit spirits. Most samples are tested for alcohol content and, where required, congener profiling and testing for authenticity indicators is carried out. A small number of samples containing non-potable alcohol are tested for denaturants. In 2018, the Slovakian authorities notified the FSAI of a consumer complaint they received regarding the sensory characteristics for Tullamore Dew Irish Whiskey. The sample was tested in the State Laboratory and the congener profile indicated that the product in question was legitimate.

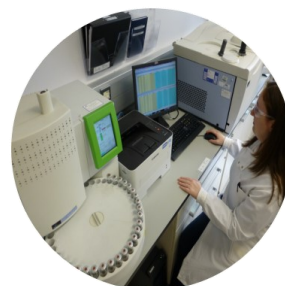
Revenue Collection and Fraud Prevention - Numbers of Samples Tested		
Category of Sample	No. of Samples	No. of Analytes Tested For
Customs	213	94
Excise - Mineral Oils	1,150	7,318
Excise - Alcohols	441	1,023
Total	1,804	8,435



STRATEGIC GOAL 3

Provide a Forensic Toxicology Service to the State

The State Laboratory provides a forensic toxicology service to assist Coroners and the State Pathologist to investigate the causes of unexpected death by analysing post mortem samples to confirm the presence or absence of ethanol, legal and illegal drugs and other toxic substances. The levels of substances detected are also quantified. Staff attend and give evidence on their findings in legal proceedings and Coroners' inquests as required.



STRATEGIC GOAL 3— FORENSIC TOXICOLOGY

Forensic Toxicology Service

A constant challenge in post-mortem toxicology is the balance between satisfying the clients' demand for a sufficiently complex and timely service whilst ensuring the scope of testing adequately reflects the current drug market. Several recent reports have highlighted the marked increase and severity of Ireland's drug abuse problem. Data collated by the Health Research Board shows a startling upward trend in polydrug use over recent years, involving a combination of alcohol, illicit drugs and prescription medication.

State Laboratory staff are pro-active about using their wide network of contacts to keep abreast of the latest drugs of abuse in circulation and where possible they extend the scope of the methods of analysis to include these new compounds as soon as reference standards become available. The Laboratory is also represented on the Irish national early warning system, which is instrumental in identifying new drugs, monitoring trends and making recommendations that ultimately support national harm reduction initiatives.

In 2017, data reported through the EU Early Warning System showed a significant increase in detections of carfentanil in seizures and deaths in Europe. Carfentanil is a highly potent opioid drug of abuse that acts as a narcotic analgesic and is 10,000 times more potent than morphine. The most serious acute health risk from using carfentanil is rapid and severe respiratory depression, which could be fatal. In early 2018, the Laboratory developed a method and analysed a post-mortem sample for carfentanil. Appropriate safety procedures were put in place in advance to manage any potential risk to staff in the unlikely event of accidental exposure to carfentanil during analysis.

All post-mortem samples nationwide are submitted to the State Laboratory for both screening and confirmatory analysis and the Laboratory continues to streamline and expand the service provided to all Coroners. During 2018, the Laboratory developed eight additional tests to detect prescribed drugs and drugs of abuse in post-mortem samples, which means that for 2019, all samples submitted will be screened for 167 different drugs. Where a drug is detected during a screening analysis, the level of substance present is confirmed and quantified in a separate analysis. Additional development and optimisation work was carried out on the LCMS/MS confirmatory method to improve the quantitative

information provided.

Novel psychoactive substances (NPS), more commonly known as designer drugs, pose a particular analytical challenge because of the rapidly evolving nature of this drug market. Traditionally samples are screened for a defined cohort of prescribed and illicit drugs but now new drug products are easy to access online, often have very similar chemical structures and can be highly toxic in small amounts. Designer drugs are generally 'invisible' in traditional toxicology screens and are not available in commercially purchased databases.

The State Laboratory has developed and implemented an analytical strategy, using high resolution mass spectrometry (HRLCMS), that allows post mortem toxicology samples to be screened for previously 'invisible' designer drugs outside the laboratory's traditional defined scope of testing. This novel analytical approach is now in routine use with suspect samples being screened for all national and European NPS alerts. At the end of 2018, there were 217 analytes present in this database, up from 172 drugs at the end of 2017. This approach also allows for retrospective analysis of data without physical sample reanalysis. This work has supported the Irish Coroners service in solving death investigations that previously could not have been satisfactorily concluded.

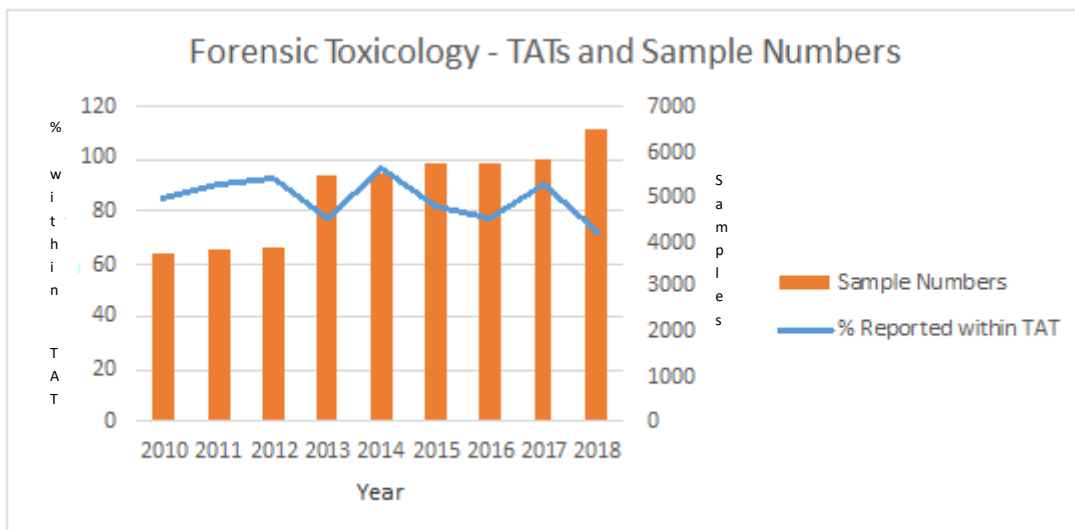
During the period 2012-2018, there has been a 68% increase in post-mortem sample numbers, with an unexpected 12% increase in 2018 alone. This had a very negative impact on the time taken to report cases in 2018, particularly because there was ~20% increase in samples in the first six months of the year compared to the same period in 2017. Additional staff and equipment resources had been assigned to this work in 2017, which enabled the Laboratory to meet its turnaround target of 90% of samples being reported within 3 months for 2017.

However, this fell to 72% within 3 months in 2018, and an average of 84 days taken to report cases compared to an average of 69 days in 2017. An increased budget allocation for 2019 will provide the additional staff and equipment resources required to clear the backlog of ~1500 samples carried over into 2019. This will enable the Laboratory to work towards meeting again the turnaround times required by the Coroners and the families of the deceased.

STRATEGIC GOAL 3— FORENSIC TOXICOLOGY

Forensic Toxicology Service - Numbers of Samples Tested		
Category of Sample	No. of Samples	No. of Analytes Tested For
Coroners	6,057	509,692
State Pathologist	448	31,530
Criminal Cases	5	656
Total	6,510	541,878

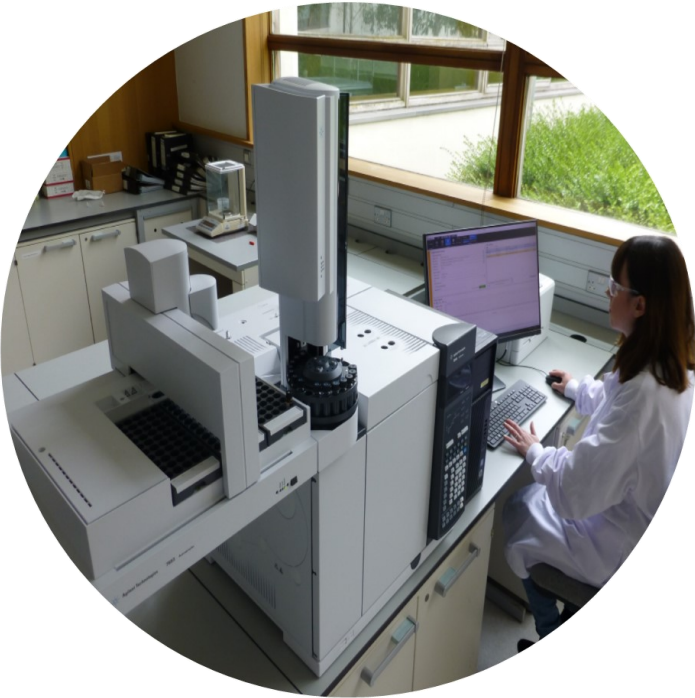
Forensic Toxicology Service - New Methods Developed		
Test Method	Analytical Technique	No. of Analytes
Screening method for drugs in urine extended to include additional drugs	HRLC/MS/MS	4
Screening method for drugs in blood extended to include additional drugs	HRLC/MS/MS	4
Total		8



STRATEGIC GOAL 4

Support Public Health and Environment Protection Initiatives

The State Laboratory assists the Health Products Regulatory Authority (HPRA) to control the use of unlicensed medicines by analysing seized pharmaceutical and herbal products for the presence of pharmaceutically active compounds and scientific staff provide expert testimony in subsequent court prosecutions.



STRATEGIC GOAL 4—PUBLIC HEALTH

Analysis of Pharmaceutical Products

In October 2018, the HPRA, in partnership with Revenue's Customs Service and An Garda Síochána, revealed that they had detained almost 90,000 dosage units of illegal prescription medicines, valued at over €375,000, as part of the Interpol-coordinated Operation Pangea XI. Operation Pangea is an international week of action targeting the online sale of falsified and illegal medicines where Irish authorities joined representatives from 116 other countries working to target criminal networks behind the sale of falsified and illegal medicines via illicit online suppliers and online e-commerce platforms. The medicines detained during the week of action in Ireland included anabolic steroids, sedatives, analgesics and erectile dysfunction products.

During 2018, the State Laboratory developed two new methods of analysis, which were accredited under flexible scope for nitrazolam, a benzodiazepine sold online as a designer drug and triprolidine, an antihistamine. As in 2017, many of the samples tested were for anabolic steroids. The sale and supply of anabolic steroids to the public outside of a registered pharmacy is illegal and in October 2018, the HPRA launched a new public information campaign to raise awareness of the potentially serious side effects and health risks of using unprescribed anabolic steroids. This campaign targeted young Irish men and was developed in light of growing evidence of an increased use of anabolic steroids for body enhancement as well as new research, which showed a significant lack of awareness of the serious health complications posed by these products.

A new development in 2018 was the availability on the Irish market of large quantities of unregulated food supplements that were suspected of being adulterated with unlabelled pharmaceuticals. In January 2018, FSAI authorised officers procured a range of supplements from sports nutrition shops, gyms and online suppliers and sent these samples to the State Laboratory for analysis. A number of these were found to contain an illegal steroid or stimulant that posed a serious health risk to consumers and in March 2018, the FSAI initiated a recall of these products.

Also in March 2018, the US FDA sent a warning to the FSAI about a number of products containing steroids or steroid-like substances associated with potentially serious health risks including liver injury. These products were also being sold as dietary supplements but were

thought to contain pharmaceutically active ingredients. The Laboratory tested a range of test purchases of these products and all contained substances known as specific androgen receptor modulators (SARMs), which are chemically similar to anabolic steroids and come with many of the same risks and side effects. This led to the closure of the SARMs.ie website and the seizure of a large quantity of product by the HPRA.

There are likely to be additional requests for this type of testing in 2019 due to the proliferation of botanical and other dietary supplement type products coming onto the market in recent years.

Tobacco Products Analysis

The State Laboratory has been designated by the Department of Health as the testing laboratory for Ireland, for the purposes of carrying out testing on tobacco products as set out in the European Union (Manufacture, Presentation and Sale of Tobacco and Related Products) Regulations 2016.

During 2018, the Laboratory procured some of the instrumentation required for this analysis. It also commenced a project, with the support of the Office of Public Works, to upgrade one of its laboratories to provide the necessary controlled temperature and humidity environment required for the correct operation of a smoking machine, which is required to test the emissions produced by tobacco products. The Laboratory is also in the process of procuring a smoking machine but this cannot be completed until the necessary laboratory infrastructure is in place. It is hoped to have this in place in early 2019 and commence testing cigarettes for tar, nicotine and carbon monoxide before the end of the year.

The HSE is the competent authority for the enforcement of the tobacco products regulation and it is the market surveillance authority for e-cigarettes and refill containers. It has asked the State Laboratory to provide an analytical service in relation to testing these products for nicotine content and additives. The initial sampling programme will focus on the e-liquids but ultimately the vapours produced during use may need to be tested and this would require a specialist 'vaping' machine. The Laboratory is currently developing methods of analysis to test for nicotine content and other additives in e-liquids.

STRATEGIC GOAL 4—PUBLIC HEALTH

Heritage Protection

The State Laboratory provides scientific assistance to the Office of Public Works and a variety of other bodies responsible for the conservation of Ireland’s heritage.

In 2018, the State Laboratory tested samples of wood for pH and moisture content for the OPW to establish moisture content after a ‘dip strip’ process. This was in advance of treating decorative timbers in Leinster House with the same process. The purpose of the testing was to monitor samples from timbers left in the same conditions as the decorative timbers at intervals until a satisfactory moisture contest was achieved.

The Laboratory also analysed a sample from a Mainie Jellett painting by XRF for the Conservation Department of the National Gallery (NGI) to determine the elements present.

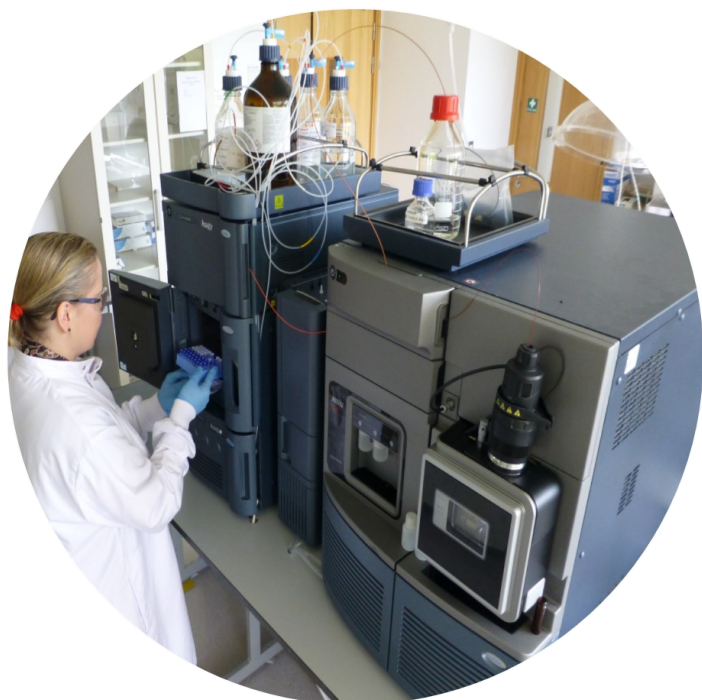
Public Health and Heritage Protection - Numbers of Samples Tested		
Category of Sample	No. of Samples	No. of Analytes Tested For
Medicinal Products	70	78
Food Supplements	100	1,028
Tobacco Products	24	24
Heritage Protection	8	7
Total	202	1,137

Public Health and Heritage Protection - New Methods Developed		
Test Method	Analytical Technique	No. of Analytes
Drugs in medicinal products	QTOF LCMS	2
Steroids / Stimulants in food supplements	LCMS/MS	10
SARMs in dietary supplements	LCMS/MS	12
Total		24

STRATEGIC GOAL 5

Provide a Centralised Veterinary Toxicology Service

The State Laboratory provides a toxicant testing service to DAFM and the National Parks and Wildlife Service (NPWS) to assist investigations into suspected poisonings of birds of prey. These include the re-introduced golden eagles, white tailed sea eagles and red kites and other highly vulnerable species (peregrine falcons, buzzards, kestrels and owls) and support is also provided for investigations into cases of suspected farm or companion animal poisonings.



STRATEGIC GOAL 5—VET TOXICOLOGY

Veterinary Toxicology Service

There was a 25% increase in the number of samples submitted in 2018 compared to 2017. As in previous years, many of the samples taken from dead birds were found to contain a range of rodenticides. While the use of second generation anticoagulant rodenticides is important for the effective control of rodents on farms and other food premises, these products need to be used correctly to prevent other wildlife species being accidentally exposed to these products. While poisoning with rodenticides can be accidental, in 15 cases submitted for analysis in 2018, the banned and highly toxic pesticide carbofuran was detected and in five other cases, the presence of alpha and beta chloralose, which are also illegal, was detected.

Of the 29 bird poisoning incidents in 2018, 14 involved common buzzards, five red kites, two peregrine falcons, two barn owls, one kestrel and one sparrow hawk. In one case in Cork, three buzzards were found to contain high levels of carbofuran in their bodies and two types of rodenticide were detected. In another case, a pair of nesting peregrine falcons were found to have been poisoned with large amounts of carbofuran.

There were also three cases of birds such as starlings, crows and magpies poisoned with alpha and beta chloralose.

Two samples of suspected poisoned bait were also submitted for analysis and it was found that a sample of sausages had been laced with nitroxylnil (an anthelmintic that is toxic for birds), and a sample of sausages and bread had been laced with rat poison.

Veterinary Products

The Laboratory analyses veterinary medicinal products seized for enforcement purposes by DAFM Investigations Division. Sample numbers were significantly up in 2018 and there were 10 new methods developed. The majority of these were for steroids, corticosteroids or antibiotics.

Staff from the State Laboratory prepared for four court cases and one Veterinary Council hearing in 2018 in relation to breaches of the Animal Remedies Regulations, but all were postponed and no court cases were attended.

Veterinary Toxicology Service - Numbers of Samples Tested

Category of Sample	No. of Samples	No. of Analytes Tested For
Toxicants in post mortem samples	198	2,144
Veterinary Medicinal Products	93	95
Total	291	2,239

Veterinary Toxicology Service - New Methods Developed

Test Method	Analytical Technique	No. of Analytes
Drugs in veterinary products	HPLC/PDA	7
Drugs in veterinary products	LCMS/MS	3
Total		10

ADMINISTRATION

Administration

In 2018, there continued to be an emphasis on recruitment and filling vacancies due to retirements, resignations and other staff movements that occurred during the year.

Staffing

At the end of December 2018, the Laboratory had 96 staff members and 93 Whole Time Equivalent (WTE) staff. This compares with 95 WTEs at the end of 2017.

Eleven staff members left the Laboratory during 2018. The following staff members retired - John Clancy (Executive Officer) and Simon Chiu (Laboratory Attendant). One Senior Chemist, three Laboratory Analysts and one Laboratory Attendant resigned to take up positions elsewhere. Two Clerical Officers transferred to other Government Departments and two staff members (a Chemist II and a Chemist) were granted career breaks.

Ten staff joined the Laboratory during 2018. One Chemist and six Laboratory Analysts were recruited following open competitions undertaken by the Public Appointments Service. One Assistant Principal (IT Manager) was appointed on secondment and two Laboratory Attendants were appointed, one in a temporary capacity.

Sick Leave

In 2018, the Laboratory's Lost Time Rate was 3.6%, up from 2.6% in 2017 and this compares with a Lost Time Rate of 4.4% for the Civil Service as a whole. The average working days lost per full time employee was 8.3 days (the Civil Service average was 10).

Flexible Working Arrangements and Equality of Opportunity

State Laboratory staff can avail of flexible working arrangements including work-sharing, flexitime, parental leave and shorter working year.

The numbers of males and females in each grade at the end of 2018 is shown in the adjacent table.

Gender Breakdown in The State Laboratory		
Grade	Female	Male
State Chemist	1	0
Principal Chemist	2	0
Senior Chemist	5	2
Assistant Principal Officer	2	0
Technical Information Manager	0	1
Chemist Grade II	8	4
Chemist	13	9
Higher Executive Officer	2	1
Senior Laboratory Analyst	7	4
Laboratory Analyst	14	9
Executive Officer	1	2
Clerical Officer	3	1
Head Laboratory Attendant	0	1
Storekeeper	0	1
Laboratory Attendant	2	1
Total	60	36

Family Friendly Policies	
Scheme	% of staff availing of scheme in 2018
Work-sharing	10%
Parental Leave	6%
Career Breaks	2%
Shorter Working Year	14%

ADMINISTRATION

Civil Service Employee Engagement Survey (CSEES)

The results of the 2017 survey became available in July 2018. The State Laboratory had an excellent response rate of 72% and overall, the results of the 2017 survey were significantly more positive than for the previous survey in 2015. The themes with the biggest changes all showed very significant improvements as shown in the following table.

Theme	2017	2015	Change
Leadership	59	45	+14
Public Perception of the C.S.	40	29	+11
Performance Standards	55	46	+9
Innovative Climate	54	46	+8
Career Development & Mobility	54	47	+7
Commitment to the Organisation	52	45	+7
Social Support	67	61	+6
Organisational Support	52	46	+6
Manager Career Support	66	60	+6
Involvement Climate	40	35	+5

Five of the themes that showed the greatest improvement in 2017 were amongst the themes with the most negative responses in the 2015 survey. These were chosen by State Laboratory management as the main challenges to be addressed in the 2015 CSEES Action Plan. The 2017 results indicated that the actions taken following the 2015 survey were successful in bringing about positive changes in the culture of the State Laboratory and in its leadership and staff management practices.

Prior to developing an appropriate action plan to respond to the 2017 survey results, the State Chemist met with all staff on a sectional basis and in the absence of section managers, to get their feedback and seek suggestions for improvements. She then met with management grades and agreed the 2017 Action Plan with the senior management team. The aim of this action plan is to foster staff engagement and encourage high levels of performance and internal communications, which are key strategic drivers for the Laboratory.

Wellness at Work

In line with its strategy to promote a positive work environment and the well-being of its staff, the State

Laboratory undertook a number of wellness initiatives in 2018. It held a physical health awareness morning with presentations on cancer prevention and healthy eating for both male and female staff. There were also weekly meditation sessions and yoga classes available, lunchtime walks and a healthy breakfast morning was organised. Health screening, provided by staff from the CMO's office, the flu vaccination and monthly in-house massage sessions were also available to all staff.

A knitting club was formed and participants produced hats for premature babies and bravery blankets for young cancer patients. The annual charity coffee morning proved very popular with staff and in 2018 it raised funds for Breast Cancer Ireland. Many staff availed of a Friends and Family CPR course provided by a member of staff and a book club was formed that met monthly.

ICT Developments

Prior to 2018, a Senior Chemist who had an aptitude and an interest in computing and who had developed the necessary competencies and skill set held the role of ICT Manager on a part-time basis. The Laboratory was the subject of a serious Malware attack in 2015, which highlighted how reliant the Laboratory was on its ICT systems and how under-resourced the ICT area was. The Laboratory has since recruited additional IT qualified staff and invested heavily in updating its ICT infrastructure with the help of outside contractors to make it more secure.

Since 2017, two IT qualified staff have been employed full-time, supported by a number of laboratory staff on a part-time basis. In September 2018, a full-time ICT Manager, who had the appropriate IT qualifications and experience to head up the ICT Unit, was appointed. This will enable the Laboratory to continue to deliver on its strategy of maintaining secure ICT systems and maximising the use of ICT solutions to improve efficiencies.

Good progress was made with a number of ICT projects in 2018 including:

- moving all Disaster Recovery servers off-site to a Revenue hosted data centre
- completing the upgrade of all servers and server environments so that all are operating on Windows 2012 or newer
- upgrade of Microsoft Office to 2016 version
- upgrade of port protection software and roll out to all PCs

ADMINISTRATION

Student Placement Programme

The State Laboratory continued its student placement programme in 2018. The work placements are a compulsory part of the students' four-year honours degree course and must be completed before the students begin their final year. The placements are confined to students whose degree courses are particularly relevant to the work of the Laboratory.

In 2018, students were employed from Dublin City University, Dublin Institute of Technology, Galway-Mayo Institute of Technology, Limerick Institute of Technology, and University College Maynooth. Seven students in all were placed in areas complementary to their academic discipline for a period of six months.

During their placement, students obtained experience of the work in the Animal Feedingstuffs, Contaminants, Human Toxicology, Veterinary Toxicology and IT sections of the Laboratory. In the analytical sections, students carried out routine analysis on samples of food, animal feed, fertilisers and biological fluids/tissues in line with the Laboratory's quality and safety policies and under the supervision of Senior Laboratory Analysts. In the IT section, the placement involved providing Helpdesk support, PC maintenance and repair and software upgrades for users.

Energy Use Statement

In 2018, the gross energy consumption by the State Laboratory was as follows:

◆ Electricity	2,648,666 kWh
◆ Gas	4,824,578 kWh
◆ Total	7,473,244 kWh

The total gross energy consumption value for 2018 compares with a baseline value (2006-2008) of 7,346,772 kWh and is a 36.7% increase on the value for 2017. The predicted energy performance indicator (EnPI) for 2018 is 13.5% (29.8% in 2017) when total useable floor area (TUFA) is used as the metric for the Laboratory.

Electricity consumption increased by 11.6% and gas consumption was 56% higher in 2018 compared to 2017. This increased use of gas (which is used to heat the Laboratory building) is likely to have resulted from engaging under-floor heating for a number of months in an attempt to improve working conditions for staff during cold weather. The increase noted in electricity usage is probably due to the use of portable cooling units, which were required across many areas of the Laboratory during the summer heatwave in 2018, when the excess heat presented problems for both staff and sensitive laboratory instrumentation.



GOVERNANCE

Quality System / Accreditation

The quality of analytical work from the State Laboratory is enhanced by having a documented quality system in place and national and international acceptance of results of analyses requires the Laboratory to be accredited to ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories) by the Irish National Accreditation Board (INAB Reg. No. 146T). This is particularly so in the case of official control of food and feed and to ensure successful court prosecutions.

In 2018, the Laboratory underwent a full reassessment visit by INAB and subsequent to the visit, two new methods were added to its scope of accreditation and flexible scope accreditation was granted to two additional sections. The Laboratory is currently accredited for 52 test methods covering 504 individual analytes, which are listed in Appendix III.

Customer Satisfaction Survey

The Laboratory has always been conscious of recording the effectiveness of its service delivery to client departments and offices. The results of the 2018 Customer Satisfaction survey once again showed that the most important attribute of the service that the laboratory provides is Quality. This reflects the fact that as a regulatory laboratory, the analytical results and advice the State Laboratory provides are used to inform important decision-making and implement legislation and to support court prosecutions and Coroners inquests.

It was therefore very positive to note that 100% of clients indicated that they were very satisfied with the Quality of the service provided and the other results of the 2018 Customer Survey were as follows:

- 100% of clients expressed satisfaction with the range of the service provided, with the scientific advice given and with the helpfulness and flexibility of staff and
- 97% of clients expressed satisfaction with the timeliness of the service provided.

The response for timeliness is a great improvement on the 74% satisfaction rating received in the 2017 survey. The much-improved response rating received in 2018 reflected the excellent progress made across the Laboratory during 2017 with clearing backlogs and reducing turnaround times.

Health and Safety

The State Laboratory has a legal obligation to provide a safe work environment for all its staff and visitors.

Managing laboratory safety correctly and mitigating the hazards associated with working with potentially dangerous chemicals is a high priority for the Laboratory's Management Board. A Principal Chemist, who was supported and advised by a Management Safety Adviser during 2018, holds the role of Safety Officer.

The Management Safety Advisor was a staff member who had the relevant health and safety qualifications and who performed this role in a part-time capacity. However, the requirements of the role have expanded significantly in recent years and the need to perform risk assessments for all methods of analysis is a major undertaking, which the Laboratory commenced in 2018. External training on performing risk assessments was provided to relevant staff, and this highlighted that the Laboratory lacked the in-house expertise required to meet its statutory obligations and also indicated that insufficient staff resources were being assigned to Health and Safety activities.

Management has decided to recruit a full-time Health & Safety manager in 2019 to implement a comprehensive Safety Programme drawn up by the Safety Officer. This will include maintaining up-to-date risk assessments for all chemicals and activities, setting up and maintaining a chemical inventory with safety related information, reviewing the chemical storage infrastructure and ongoing management of routine Health & Safety activities.

System of Internal Financial Control

The State Chemist's Statement on Internal Financial Control, which can be found at Appendix I, was submitted to the Office of the Comptroller and Auditor General along with the State Laboratory's 2017 Appropriation Account in March.

The C&AG's Office carried out their annual audit of the State Laboratory's 2017 Appropriation Account in May 2018 and no issues were raised during the audit.

The State Laboratory's Audit Committee met twice in 2018. Internal audits were conducted on General Procurement and Inventory, and on Payroll and Travel & Subsistence payments. The System of Internal Control was also reviewed and progress on implementing corrective actions recommended in the course of previous audits was tracked. An Internal Audit Quality Assurance assessment, as required by D/PER's updated '*Internal Audit Standards for Government Departments and Offices, 2018*', was also conducted in 2018.

GOVERNANCE

Financial Information

The following table summarises the State Laboratory’s financial expenditure in 2018, with figures for 2017 provided for comparative purposes.

Gross Expenditure	2017 €000	2018 €000
A1. Salaries, Wages & Allowances	5,279	5,369
A2. Travel and Subsistence	33	37
A3. Training and Development & Incidental Expenses	248	249
A4. Postal & Telecommunications Services	48	68
A5. Apparatus & Chemical Equipment	2,321	2,527
A6. Office Premises Expenses	1,376	1,471
A7. Consultancy Services (Internal Audit)	13	21
Gross Total	9,318	9,742

Prompt Payments

In 2018, the Laboratory had no late payments.

Freedom of Information

The State Laboratory received no non-personal Freedom of Information requests in 2018.

Protected Disclosures

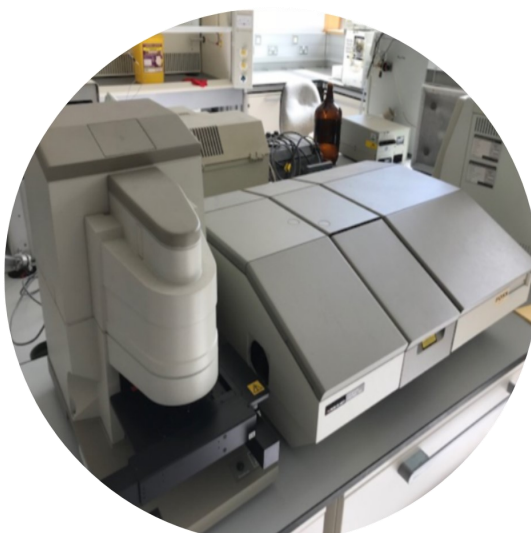
No protected disclosures were received in the reporting period up to 31 December 2018.

Asset Management

As analytical chemistry continues to evolve and new technologies become available, the Laboratory invests in new instrumentation to ensure that the service it provides meets the needs of its clients and delivers on its vision of providing a world-class regulatory scientific service to the State. This has enabled the Laboratory to improve the quality and efficiency of its service whilst also meeting any new analytical challenges presented by updated legislation.

In 2018, in parallel with the purchase of new instrumentation, the Laboratory developed a new Asset Management strategy to donate older, less reliable or obsolete equipment to external stakeholders. Interested third level institutions and public sector bodies were invited to inspect the laboratory equipment for which the State Laboratory no longer had a use and following a review of the expressions of interest received, almost 100 items of laboratory equipment were donated to ten different institutions in a fair and transparent manner.

The Laboratory received excellent feedback from the recipients of the equipment and the success of the process prompted interest from other Public Sector laboratories to use it as a template for carrying out a similar exercise. The State Laboratory will repeat the process in 2019 and include other interested public sector bodies.



Responsibility for system of Internal Financial Control

As Accounting Officer I acknowledge my responsibility for ensuring that an effective system of internal financial control is maintained and operated by the State Laboratory. This responsibility is exercised in the context of the resources available to me and my other obligations as Head of Office. Also, any system of internal financial control can provide only reasonable and not absolute assurance that assets are safeguarded, transactions authorised and properly recorded, and that material errors or irregularities are either prevented or would be detected in a timely manner. Maintaining the system of internal financial controls is a continuous process and the system and its effectiveness are kept under ongoing review.

I have fulfilled my responsibilities in relation to the requirement of the Service Management Agreement between the State Laboratory and the National Shared Service Office for the provision of payroll shared services and human resource shared services.

I rely on a letter of assurance from the Accounting Officer of the Vote for Shared Services that the appropriate controls are exercised in the provision of shared services to the Laboratory.

Financial Control Environment

I confirm that a control environment containing the following elements is in place:

- ◆ financial responsibilities have been assigned at management level with corresponding accountability
- ◆ reporting arrangements have been established at all levels where responsibility for financial management has been assigned
- ◆ formal procedures have been established for reporting significant control failures and ensuring appropriate corrective action
- ◆ there is an Audit Committee to advise me in discharging my responsibilities for the internal financial control system
- ◆ procedures for all key business processes have been documented
- ◆ there are systems in place to safeguard the assets.

Administrative Controls and Management Reporting

I confirm that a framework of administrative procedures and regular management reporting is in place including segregation of duties and a system of delegation and accountability and, in particular, that:

- ◆ there is an appropriate budgeting system with an annual budget which is kept under review by senior management
- ◆ there are regular reviews by senior management of periodic and annual financial reports which indicate financial performance against forecasts
- ◆ a risk management system operates within the State Laboratory
- ◆ there are systems aimed at ensuring the security of the ICT systems
- ◆ there are appropriate capital investment control guidelines and formal project management disciplines
- ◆ the State Laboratory ensures that there is an appropriate focus on good practice in purchasing and that procedures are in place to ensure compliance with all relevant guidelines. The State Laboratory complied with the guidelines with the exception of four contracts to the value of €198,204 which were listed in my annual return in respect of circular 40/2002. These contracts were not competitively procured for the following reasons:
 - ◇ One contract with a total value of €67,546 was awarded to a company who is the sole supplier for certain laboratory consumables.
 - ◇ One contract to the value of €27,552 was awarded to a supplier of specialist laboratory software and is the sole supplier for support and software upgrade.
 - ◇ One contract to the value of €59,177 was awarded to a supplier who is the sole European agent for specialist consumables for a particular laboratory instrument.
 - ◇ €43,930 was spent with the supplier of laboratory gases following expiry of the contract in March 2017. The Education Procurement Service (EPS) is establishing a Framework Agreement for this requirement, which was delayed.

APPENDIX I

STATEMENT BY THE ACCOUNTING OFFICER ON INTERNAL FINANCIAL CONTROL

Internal Audit and Audit Committee

I confirm that the State Laboratory has an internal audit function with appropriately trained personnel, which operates in accordance with a written charter which I have approved. Its work is informed by analysis of the financial risks to which the State Laboratory is exposed and its annual internal audit plans, approved by me, are based on this analysis. These plans aim to cover the key controls on a rolling basis over a reasonable period. The internal audit function is reviewed periodically by me and by the Audit Committee. I have put procedures in place to ensure that the reports of the internal audit function are followed up.

Risk and Control Framework

The State Laboratory has implemented a risk management system which identifies and reports key risks and the management actions being taken to address and, to the extent possible, to mitigate those risks.

A risk register is in place which identifies the key risks facing the laboratory and these have been identified, evaluated and graded according to their significance. The register is reviewed and updated by the Management Board on a bi-annual basis. The outcome of these assessments is used to plan and allocate resources to ensure risks are managed to an acceptable level.

The risk register details the controls and actions needed to mitigate risks and assigns responsibility for operation of controls to specific staff.

Ongoing Monitoring and Review

Formal procedures have been established for monitoring control processes and control deficiencies are communicated to those responsible for taking correction action and to management and the Management Board, where relevant, in a timely way. I can confirm that key risks and related controls have been identified and processes have been put in place to monitor the operation of those key controls and report any identified deficiencies.

Review of Effectiveness

I can confirm that the State Laboratory has procedures to monitor the effectiveness of its risk management and control procedures. The State Laboratory's monitoring and review of the effectiveness of the system of internal financial control is informed by the work of the internal and external auditors and the senior management within the laboratory responsible for the development and maintenance of the internal financial control framework.

Internal Financial Control Issues

No weaknesses in internal financial control were identified in relation to 2018 that resulted in, or may result in, a material loss.



March 2019

APPENDIX II

MEETINGS AND CONFERENCES ATTENDED BY STATE LABORATORY STAFF

The State Laboratory services EU and other international committees at the request of its client Departments. Laboratory personnel also participate in the work of other international expert scientific bodies and conferences. The following list indicates the range of committee work undertaken by State Laboratory personnel and the meetings and conferences attended during 2018.

- ◆ Codex Alimentarius Committee on Methods of Analysis and Sampling (CCMAS) session in Budapest, Hungary
- ◆ Codex Alimentarius CCMAS EU Working Party meeting in Brussels
- ◆ Eurachem General Assembly in Dublin,
- ◆ Eurachem workshop—Data— Quality, Analysis and Integrity in Dublin
- ◆ Eurachem Method Validation Working Group meeting, Teddington, UK
- ◆ 24th Meeting of the Consultative Committee on Quantity of Material: Metrology in Chemistry (CCQM), BIPM, Paris
- ◆ VDRA 8th International Symposium on Hormones and Veterinary Drug Residues, Ghent, Belgium
- ◆ CEN (European Committee for Standardization)
 - ◇ 22nd Plenary meeting of CEN/TC 327 Animal Feedingstuffs: Methods of Sampling and Analysis
 - ◇ Meeting of CEN Technical Committee TC/327 WG1 on Organic Contaminants
 - ◇ Meeting of CEN Technical Committee TC/327 WG4 on Heavy Metals, Trace Elements and Minerals in Animal Feed
 - ◇ Meeting of CEN Technical Committee TC/327 WG3 on Feed Additives and Drugs
 - ◇ Meetings of CEN Technical Committee TC/327 WG5 Natural Toxins in Animal Feed, Berlin
- ◆ Meetings of European Union Reference Laboratories (EURL) and National Reference Laboratories (NRLs) networks
 - ◇ 7th Workshop of the EURL for Feed Additives (EURL-FA) in Brussels
 - ◇ EURL/NRL Workshop—Metals and Nitrogenous Compounds in feed and food, Copenhagen
 - ◇ Working Group on review of Regulation 152/2009, Brussels
 - ◇ Carotenoids hand-on trainings for NRLs, Geel, Belgium
 - ◇ EURL workshop— Mycotoxins and plant toxins, Wageningen, Netherlands
 - ◇ Workshop on Brominated Flame Retardants (BFRs)- Freiburg, Germany
 - ◇ EURL Dioxin meeting, Dublin
 - ◇ Meetings of BFR Working Group of Dioxin EU-RL Network, Athens, Greece
 - ◇ EURL meeting—Halogenated POPs, Freiburg, Germany
 - ◇ EURL/NRL workshop on steroids, corticosteroids and sedatives, Wageningen, Netherlands
 - ◇ EURL workshop on NSAIDS and nitroimidazoles, Berlin, Germany
- ◆ Meeting of The International Association of Forensic Toxicologists (TIAFT), Ghent
- ◆ SOFT-TIAFT meeting, Boca Raton, USA
- ◆ London Toxicology Group and UKIAFT joint meeting, London
- ◆ 8th Annual UK & Ireland Forensic Toxicology Network (UKIAFT) in Dublin
- ◆ Thermo Scientific Users meeting, London
- ◆ 38th International Symposium on Halogenated Persistent Organic Pollutants (POPs) and 10th International PCB Workshop : DIOXIN 2018, Krakow, Poland
- ◆ RSC/National Physical Laboratory Symposium on Nanoparticle Concentration, London
- ◆ WHO TobLabNet JRC Conference, Geel
- ◆ Summit on Global Food Integrity, Belfast
- ◆ Young Ireland Programme 2018, Edinburgh
- ◆ Oil and Fuel Theft Conference, Geneva, Switzerland
- ◆ National Facilities Management Conference, Dun Laoghaire
- ◆ PAI Annual HR Conference , Dun Laoghaire

APPENDIX II

MEETINGS AND CONFERENCES ATTENDED BY STATE LABORATORY STAFF

Attended on behalf of Revenue and Department of Business , Enterprise and Innovation

- ◆ Meeting of the Scientific Sub-Committee of the World Customs Organisation in Brussels
- ◆ CLEN steering group meeting, Brussels
- ◆ CLEN meeting re handheld Raman devices, Geel, Belgium
- ◆ CLEN-CDTPG Detection technology network, Dublin
- ◆ Three meetings of the Customs Code Committee, Agri-Chemical Sector in Brussels
- ◆ EU Commission Expert Group meetings on Textiles Names and Labelling
- ◆ Two Project Group meetings dealing with the Chemical Chapters of HS/CN in Brussels
- ◆ Two Duty Suspension meetings in Brussels

Conference & Seminar Presentations by State Laboratory staff

- ◆ Presentation entitled “BFR method development—Practical issues with particular focus on linear ranges and LOQs”—BFR Working Group in Athens
- ◆ Presentation entitled “Overview of the Contaminants Section in the State Laboratory”—Dioxin EURL meeting in Dublin
- ◆ Presentation on “Overview of Pregabalin and Cocaine LCMS analysis in the State Laboratory”- to two OSP students and Deputy State Pathologist
- ◆ Poster entitled “An investigation into elevated dioxin levels in ovine livers in Ireland”, Dioxin 2018, Krakow, Poland
- ◆ Poster entitled “Confirmatory LCMS/MS analysis of more than 100 widely prescribed and abused drugs on the Irish market (60 quantitatively and 43 qualitatively)”
- ◆ Poster entitled “Post Mortem Drug Screening by HR/LCMS”

Conferences and Workshops organised by State Laboratory staff

- ◆ Eurachem General Assembly, Dublin
- ◆ Eurachem workshop on Data—Quality, Analysis, Integrity in Dublin Castle
- ◆ EURL Dioxin meeting, Dublin



APPENDIX III

IRISH NATIONAL ACCREDITATION BOARD ACCREDITED TESTS. SUMMARY OF SCHEDULE OF ACCREDITATION (ISSUE1: 18/06/2018)*

Matrix	Measurand	Test Method	Method ID
Animal Feedstuffs	Crude Protein	EN ISO 16634-1:2008. Nitrogen content by the Dumas Principle.	LSD A032
Animal Feedstuffs	Crude Oils and Fats	EU Commission Regulation 152/2009 Annex III (H).	LSD A023
Animal Feedstuffs	Crude Oils and Fats	NIR Spectroscopy.	LSD A031
Animal Feedstuffs	Crude Fibre	EU Commission Regulation 152/2009 Annex III (I).	LSD A024
Animal Feedstuffs	Crude Fibre	NIR Spectroscopy Screening Method.	LSD A031
Animal Feedstuffs	Crude Ash	In house method based on EU Commission Regulation 152/2009 Annex III (M).	LSD A026
Animal Feedstuffs	Crude Ash	Gravimetric method using a Microwave Furnace.	LSD A030
Animal Feedstuffs	Ash Insoluble in HCl	EU Commission Regulation 152/2009 Annex III (N).	LSD A034
Animal Feedstuffs	Moisture	EU Commission Regulation 152/2009 Annex III (A).	LSD A027
Animal Feedstuffs	Macro and Trace Elements (8)	IS EN 15621:2012. ICP OES with Microwave Digestion.	LSD A060
Animal Feedstuffs	Macro and Trace Elements (15)	ICPMS with microwave digestion, based of EN 17056 (2018)	LSD A067
Animal Feedstuffs	Heavy Metals (6)	ICPMS with Microwave Digestion.	LSD A062
Animal Feedstuffs	Nicarbazin	In House HPLC method with DAD, based on IS EN 15782:2009.	LSD A050
Animal Feedstuffs	Monensin, Narasin and Salinomycin	EN ISO 14183: HPLC with post column derivatisation.	LSD A051
Animal Feedstuffs	Coccidiostats (11)	In house LCMSMS Method	LSD A052
Animal Feedstuffs	Antibiotics (14)	In house method using Q Trap LC-MSMS	LSD A095
Animal Feedstuffs	Chlortetracycline	In House HPLC method with DAD	LSD A072
Animal Feedstuffs	Sulphadiazine	In House HPLC method with DAD	LSD A076
Fertilisers	Nitrogen Content	Nitrogen content by consumption by Dumas Principle. In house method based on AOAC official method 993.13.	LSD A036
Animal Feedstuffs	Iodine	In house ICPMS method based on EN: 17050 (2017)	LSD A066
Animal Feedstuffs	Theobromine	In house method using HPLC UV/PDA	LSD A077
Animal Feedstuffs	Fluoride	In house method using ion-selective electrode based on EN 16279:2012	LSD A099

* For further details, see our schedule of accreditation (Reg. No. 146T) on the INAB website (www.inab.ie).

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IRISH NATIONAL ACCREDITATION BOARD ACCREDITED TESTS. SUMMARY OF SCHEDULE OF ACCREDITATION (ISSUE1: 18/06/2018)

Matrix	Measurand	Test Method	Method ID
Drugs	Flexible Scope (Analyte and Range) Identification and Quantification of pharmaceuticals samples	In house method using HPLC –DAD. Complies with relevant requirements of OJEC 2002/657/EC, ICH guideline Q2 (R1), Q2B and Q6A and monographs from British, European and US Pharmacopoeia.	LSD J014
Drugs	Flexible Scope (Analyte and Range) Identification of Pharmaceutical Samples	In house QTOF LCMS method based on the requirements of Commission Decision 2002/657/EC, ICH guideline Q2 (R1), Q6A and monographs from British, European and US Pharmacopoeia.	LSD J044
Milk (Liquid & Powder)	Aflatoxin M1	Based on ISO 14501:2007 method. Extraction and IA column clean-up. RP HPLC with fluorescence detection.	LSD M125
Animal Feedstuffs	Aflatoxin B1	In house method. Extraction and IA column clean-up. RP HPLC with fluorescence detection.	LSD M124
Liver	Ochratoxin A	In house method using IA column cleanup and RP HPLC with fluorescence detection.	LSD M126
Lettuce, Spinach and Cabbage	Nitrates	In house based on EN12014-2:1997-04. Anion exchange chromatography following extraction and clean-up.	LSD M062
Food and Feed	Dioxins and Dioxin-like PCBs (35)	In House GC/HRMS method.	LSD M252
Animal Feedstuffs	Mycotoxins (11)	In house Multi Analyte LCMSMS method	LSD M138
Fruit Juices	Patulin	In house HPLC UV method	LSD M067
Alcoholic Drinks	Alcoholic Strength by Volume	In house using a density meter following distillation.	LSD B010
Gas Oil	C.I. Solvent Yellow 124	In house method. Determination by HPLC.	LSD H009
Liquid Fuels	Accutrace S10 Fuel Marker (Gasoil)	In house GCMS method	LSD H033
Liquid Fuels	Accutrace S10 Fuel Marker in Hydrocarbon Oil	In house GCMS method	LSD H046
Blood & Urine	Ethanol	In house method. Determination by internal standard quantitation using Headspace GC with FID.	LSD T003
Animal Urine	Flexible Scope (Matrices, Residues and Ranges) Steroids (18)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V031
Animal Serum	Flexible Scope (Matrices, Residues and Ranges) Steroids (14)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V046
Poultry Liver	Flexible Scope (Matrices, Residues and Ranges) Steroids (11)	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V061
Animal Serum	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V038
Eggs	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V049

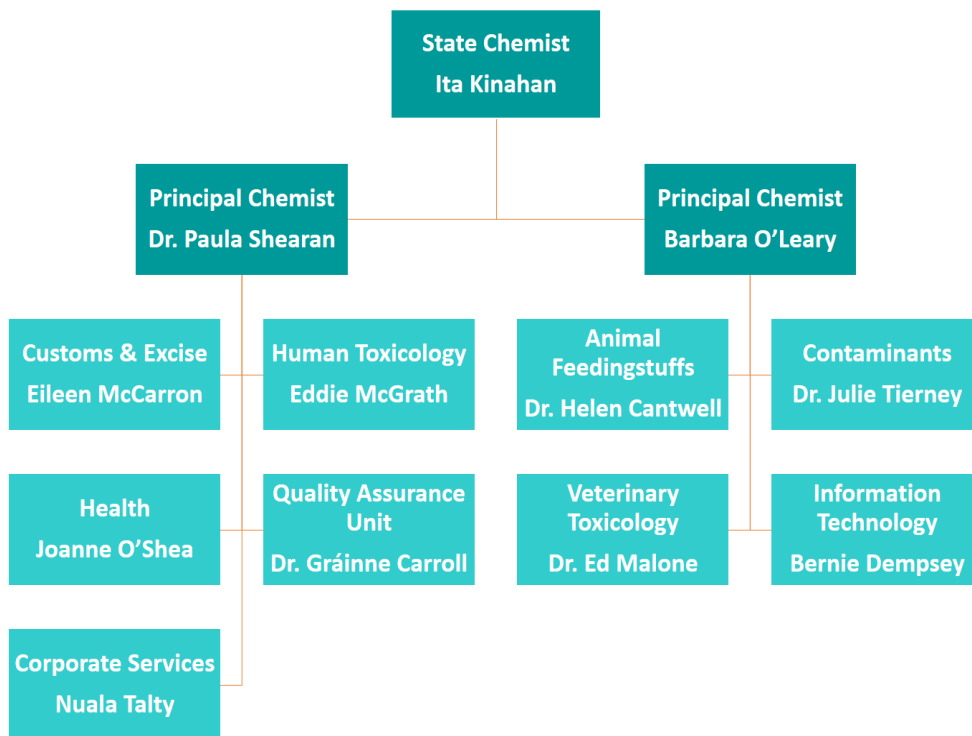
APPENDIX III

IRISH NATIONAL ACCREDITATION BOARD ACCREDITED TESTS. SUMMARY OF SCHEDULE OF ACCREDITATION (ISSUE1: 18/06/2018)*

Matrix	Measurand	Test Method	Method ID
Honey	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V063
Milk	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V064
Animal Plasma and Milk	Flexible Scope (Matrices, Residues and Ranges) Non Steroidal Anti Inflammatory Drugs (10, 12)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V039
Animal Kidney	Flexible Scope (Matrices, Residues and Ranges) Non Steroidal Anti Inflammatory Drugs (12)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC)	LSD V068
Animal Kidney Fat	Flexible Scope (Matrices, Residues and Ranges) Gestagens (5)	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V033
Urine	Flexible Scope (Matrices, Residues and Ranges) Corticosteroids (5)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V058
Animal Kidney	Flexible Scope (Matrices, Residues and Ranges) Sedatives (8)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V067
Animal Liver	Flexible Scope (Matrices, Residues and Ranges) Toxicants (20)	In house method. By LCMSMS	LSD V077
Milk	Flexible Scope (Matrices, Residues and Ranges) Corticosteroids (6)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V078

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APPENDIX IV ORGANISATION CHART (AS OF 31-DEC-2018)



APPENDIX V STAFF LIST—BY GRADE (AS OF 31-DEC-2018)

State Chemist			
Ita Kinahan			
Principal Chemist			
Barbara O’Leary		Dr. Paula Shearan	
Senior Chemist			
Dr. Helen Cantwell	Eddie McGrath	Eileen McCarron	Dr. Julie Tierney
Dr. Gráinne Carroll	Dr. Ed Malone	Joanne O’Shea	
Chemist Grade II			
Dr. Jonathan Carroll	Dr. John Fields	Myra Keogh	Ruth Reilly
Dr. Eleanor Dixon	Niamh Fitzgerald	Dr. Sean McGowan	Claire Timbs
Dr. Pierrick Fevrier	Lynda Harman	Audrey Nugent	Mairéad Webster
Technical Information Manager Grade II			
Dr. Michael O’Gorman			
Chemist			
Sinead Bermingham	Michael Doyle	Ray Kelly	Olivia O’Connor
Ann Marie Bragason	Sinead Dunlop	Shonagh Masterson	Dr. Colmán Ó Riordáin
Dr. Helen Burke	Joe Fitzsimons	Vicky MacEoin	John Reilly
David Canny	Carol Gleeson	Úna McArdle	Dr. Hannah Smith
Paula Clarke	Margarete Houlihan	Dr. Mark McDonald	
Dr. Mark Cronly	John Judge	Dr. Amy Nagle	
Senior Laboratory Analyst			
Sheevaun Cody	Fiona Gallagher	Tom Harbison	Aengus Ó Briain
Angela Cunningham	Marella Gallagher	Ciara Keane	Dennis Sheehan
Laura Flynn	Bernard Hanratty	Sheila Martin	
Laboratory Analyst			
Patricia Carter	Veronica Gubarkova	Laura McGloin	Sinéad Ryan
Joanne Creedon	Ian Kelleher	Conor Noone	Niall Stanford
Simon Daly	Emma Kelly	Dr Tony O’Hara	Emma Jane Walsh
Aisling Dooley	Roisin Latham	Niamh O’Shea	Fiona White
Klaudia Dyrda	Stephen Leech	Colm Reid	Gavan White
Madeleine Gibbons	Alan Murphy	Cathy Rooney	
Laboratory Attendant			
Tom Gaule		John Moylan	
Caroline Manning		Emma Smith	
Corporate Services			
Nuala Talty - Assistant Principal		Angelina O’Shea - Clerical Officer	
Judy Conway - Higher Executive Officer		Geraldine Gaffney - Clerical Officer	
Mary Quine - Higher Executive Officer		Éamonn Hoban - Clerical Officer	
Phyllis Barry - Executive Officer		Niamh Stafford - Clerical Officer	
Damien Duffy - Executive Officer		Declan Powell - Storekeeper	
ICT			
Bernadette Dempsey– Assistant Principal		Anton Bennett - Higher Executive Officer	
Gerard O’ Brien - Executive Officer			



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