

ANNUAL REPORT 2023

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Foreword

It is my pleasure to present Forensic Science Ireland's Annual Report for 2023 and share FSI's contributions and achievements over the past year – a landmark year for FSI.

FSI's long-awaited purposebuilt facility at the Backweston Laboratory Campus was completed in July 2023. This was a very significant milestone in FSI's history and represents a very significant investment in the future of forensic services in the state. Significant progress has already been made in the transition of services and staff to FSI's new premises.

Given this significant undertaking, and the requirement to maintain services from its current locations, FSI set three priority objectives at the start of 2023:

Support all urgent and critical case work throughout 2023.

Start the phased transition to Backweston, with first accreditations achieved in 2023.

Maintain service levels as much as possible, while acknowledging the disruption due to transition work. Great credit is due to all the staff at FSI for their professionalism, commitment and flexibility in achieving these objectives in 2023, despite the ever-changing landscape. My sincere thanks to all our staff for all you have done in support of the criminal justice system throughout 2023.

The demand for FSI services continues to increase submissions increased by 5% overall in 2023 compared to 2022 levels. Significantly, the complexity & urgency of submissions has also increased – particularly are investigations relating to suspicious deaths, body identifications, drug submissions associated with public health concerns, and Section 15A drugs cases (relating to sale and supply of drugs of high market value). FSI assisted in 171 body identification and Missing Person investigations in 2023 (compared to 142 in 2022 and 102 in 2021). These investigations include those initiated by Coroners, who request scientific identification before the body is released to the families for burial. Eleven Missing Persons were identified in 2023 with FSI's assistance.

The illicit drug trade continues to evolve and submissions into FSI have reflected the scale of seizures, the range of new substances on the market and how they are presented. For example, Section 15A case reports have increased from 45 in 2020 to 180 in 2023 – a four-fold increase that continues to increase in 2024. In November 2023 a cluster of overdoses in heroin users was attributed to Nitazenes – these are a class of synthetic opioid, reported to be at least as potent as fentanyl. Testing for these investigations was supported from FSI's new Backweston facility.

Working with colleagues in the ICT team of An Garda Síochána and the Change, Technology and Innovation team of the Department of Justice, two very significant IT projects have been developed and are in the final phases of testing. An upgraded Automated Fingerprint Identification System (AFIS) is being introduced, which includes improved search algorithms and a more robust IT platform. A new system for automation of DNA processing data has also been developed. Both systems will lead to improved work flows and will enhance the effectiveness of FSI's services.

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With regards to FSI's new laboratory, FSI is undertaking a phased transition of services to the new lab from current laboratories. As an essential service to the criminal justice system, FSI needs to maintain services from current facilities during all stages of the transition process. Commissioning, start-up and validation of analytical instrumentation and support equipment is required before each forensic service is accredited in Backweston by the Irish National Accreditation Body (INAB). At this point, accreditation to the ISO-17025 Standard has been attained for a number of forensic services at Backweston including: Analysis of all drugs types; Fingerprint mark enhancement and comparison; Documents and Handwriting; Blood Pattern Analysis; Footwear and Damage (evaluation of clothing damage in investigation of assaults).

The Drugs and Fingerprint services are now fully operational in Backweston and all staff associated with these services have relocated to their new workplace. Over 100 staff, approx. half of FSI's total staff, including scientists, analysts, managers, ICT and administrative staff, are working from the new building. Other staff are spending time in both locations; supporting live case work as well as start-up activities for other forensic disciplines. There are plans to transfer all remaining services, including trace evidence recovery and analysis to Backweston in 2024 on a phased basis.



Minister McEntee, Secretary General Oonagh McPhillips and FSI's senior management team at the official opening of FSI's new building

FSI issued just over 21,700 forensic reports in 2023 – a reduction on the 23,500 reports issued in 2022. This reflects the necessary dedicated resources required to start-up a new facility and attain accreditation for forensic services. A key focus for FSI in 2024 is to increase capacity for services that have transitioned to Backweston and take full advantage of the new premises.

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Minister McEntee, Minister O'Donovan, Secretary General Oonagh McPhillips, Chairman OPW Maurice Buckley and FSI DG Chris Enright at the official opening of FSI's new building Chris Emget

Chris Enright Director General Forensic Science Ireland



FSI's long-awaited purpose-built facility at the Backweston Laboratory Campus was completed in July 2023. A Year in Numbers

21,703	Forensic Reports
8,550	Drugs & Toxicology cases reported
74,628	DNA Profiles on the National DNA Database
730	Cases assisted by matches on the National DNA Database
23,350	Sirene Transactions for Fingerprints
133	Occasions as witnesses in court
25	International expert working groups contributions
6	Publications in international forensic science journals

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Introduction

Forensic Science Ireland is an associated office of the Department of Justice. We work together to deliver, to best international standards, comprehensive scientific analysis, independent expert opinion, advice and training to support the Irish Criminal Justice system. Originally known as the Forensic Science Laboratory, FSI was established in 1975 to provide a scientific service to the Criminal Justice System by analysing samples submitted from crime scenes and providing expert evidence in criminal trials. In June 2014, President Higgins extended our scope when he signed into law the Criminal Justice (Forensic Evidence and DNA Database System) Act 2014. Under this act, FSI is named as the custodian of that database and our name was changed from Forensic Science Laboratory to Forensic Science Ireland to recognise this broader remit.

In December 2019, the responsibility for the Fingerprints and Documents and Handwriting services transferred from the Garda National Technical Bureau to Forensic Science Ireland. This consolidates most laboratory-based forensic work under Forensic Science Ireland. FSI currently has 215 staff, including seconded Garda members, scientists and analysts trained in forensic testing and reporting techniques, supported by administration professionals.

FSI is moving from laboratories based in Garda Headquarters in the Phoenix Park to a new fit-forpurpose building on the Backweston Laboratory Campus, Celbridge. The transition to this new facility has commenced and is planned to be completed on a phased basis by end 2024.

FSI is a founding member of the European Network of Forensic Science Institutes (ENFSI), as well as the Association of Forensic Service Providers (AFSP). These organisations are focused on developing and sharing best international forensic practices and research within its members. Our staff are active on all the relevant ENFSI and AFSP working groups. This international engagement is important in ensuring that expert evidence presented is grounded in the most recent scientific research and best international practice.

FSI is accredited according to ISO17025 (2017) and holds a Gold Excellence through People certification.

Who Are We and What We Do

Our Staff

Forensic Science Ireland is a knowledge-based organisation and the expertise of our staff is its most valuable attribute. FSI currently has 215 staff, including seconded Garda members and staff. We have recruited a number of new scientific, analytical, ICT and administrative staff over the last year to meet the demands of current and new services in Chemical, DNA & Biological Analysis and Physical Analysis. Forensic science analysis and interpretation are always evolving and consequently FSI places a significant emphasis on ongoing education and development. This is vital in ensuring that the Justice System has the benefit of international best practice.

Our Management Team

Director General Chris Enright

Director of DNA & **Biological Analysis Dr Geraldine O'Donnell**

Director of **Physical Analysis** Dr. Dyan Daly

Director of Science & Development **Dr Martina McBride**

Director of **Corporate Services Dr Dorothy** Ramsbottom

Director of Chemical Analysis **Dr. Yvonne** Kavanagh

Our Services

FSI contributes to both the investigation of crime and the judiciary process within the Irish Justice System. In broad terms, forensic investigations involve the examination of items recovered from crime scenes and the use of various techniques to investigate links between suspects and victims, and between suspects and scenes. This is underpinned by an objective evaluation of context and scientific facts, frequently leading to the elimination of suspects from investigations. There are few major criminal trials that do not feature some contribution from FSI.

The area of most sustained growth is DNA, which is also the discipline of greatest recent developments. In the DNA & Biological Analysis area, DNA profiles are generated from submitted items and compared with DNA profiles obtained from suspects to assist the investigation of crimes ranging from burglaries to sexual assaults and murder. Blood Pattern Analysis (BPA) and the examination of damage to clothing is also carried out. Since the establishment of the National DNA Database, the DNA & Biological Analysis department plays a key role in managing the Database in accordance with the legislation as well as quality and security best practices. This department reports on matches between individual crime stains and suspects as well as cluster matches. This offers on-going intelligence to An Garda Síochána in the investigation of crime. In accordance with the Forensic Evidence and DNA Database, FSI's policies and practices relating to the DNA Database are overseen by an independent DNA Database Oversight Committee. Since 2019, FSI has been exchanging DNA profiles with other European countries through the Prüm Treaty. This treaty allows for the automated anonymous comparison of profiles among participating countries and enables fast information exchange for intelligence purposes.

The analysis of materials thought to contravene the Misuse of Drugs Act constitute the highest number of submissions to FSI and are supported by the Chemical Analysis department. Case submissions vary widely in size, drug mix and complexity. These cases can involve new psychoactive substances as well as new presentations (such as jellies) that pose particular analytical challenges. The drugs team have influenced legislation through the identification and characterisation of drugs in the market place. This team also quantifies drug purity levels in the market and provides trend information to stakeholders in An Garda Síochána as well as the Department of Health. In addition to drugs submissions toxicology samples associated with sexual assault cases are analysed and evaluated. **ANNUAL REPORT 202**

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The Physical Analysis area is the most recently formed department in FSI. This department was formed to take advantage of the overlaps between disciplines moving from the Garda National Technical Bureau (GNTB) and disciplines that existed previously within FSI. This department includes the Fingerprints and Documents & Handwriting disciplines that integrated into FSI over the course of 2019. It also includes a diverse range of examinations where trace evidence recovered from scenes or suspects (e.g. glass, paint, fibres, firearm residue) is compared to reference samples. Physical or digital tachographs and marks/impressions are also examined e.g. footwear or tyre impressions left at crime scenes or manufacturing marks on plastic bags. Debris samples from suspicious fires are analysed for accelerants (e.g. petrol), offensive sprays (such as pepper spray) are evaluated and suspect materials are also analysed for explosives within this department.

The majority of cases for analysis at FSI are submitted by An Garda Síochána, but material is also received from Garda Síochána Ombudsman Commission (GSOC), Customs & Excise, and Military Police. Cases are accepted by FSI reception/case intake staff who ensure that items are safely and securely stored or passed directly to a scientist depending on the situation. In either situation, the chain of custody is carefully recorded.

In addition to analysing samples in the laboratory, staff from FSI provide professional advice and training on the appropriate samples to be taken from crime scenes and individuals and, in some circumstances, attend crime scenes. We also operate an out-of-hours service for situations where investigating Gardaí need access to time-critical analysis or when it is necessary to visit crime scenes, or suspected clandestine drug laboratories.

We liaise directly with the Garda on investigations where we identify there is probative evidential value rather than where scientific findings would not help progress the investigation.

Staff provide expert testimony in criminal trials. There is the potential for this to occur in all cases, but some areas of work are more likely to result in court cases than others. Attendance at court can involve robust defence of scientific findings and/or an outline of routine processes related to continuity or laboratory procedures.

Prüm Power across Europe

In 2003 a burglary was committed in Co. Wexford. While it remained unknown on the National DNA Database System, upon sharing with other European countries through the Prüm Treaty, it matched to a person on the German DNA Database. Additionally it matched to a person on the Austrian Database, and it matched to other crimestains on the Dutch and French Databases. This is an example of the effective power of Database sharing across Europe, which can track international movement of repeat offenders.

On a separate occasion, the National DNA Database linked a cluster of crimestains from 5 burglaries which occurred at the end of 2022. These cases were subsequently solved by a match to a person on the UK Database.

CASE STUDY 3

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Sexual assault case involving breaking and entering into a house

In Cork in March 2022 CCTV showed a male trying to gain entry to numerous houses. He entered one house and a female occupant woke to find him in bed with her. She said he kissed her and was unsure whether further sexual contact occurred while she was asleep. The female went to a sexual assault treatment unit and intimate swabs were taken. Semen was found on the swabs and a DNA profile was generated which matched the DNA reference profile of the male. This case went to court and the FSI case scientist gave evidence. The defendant was found guilty and sentenced to 9 years in prison.

CASE STUDY 2

Old case solved by new Database sample

In 2013 an unknown man entered a house in Co. Tipperary to commit a burglary. During the offence he bled at the scene. The DNA profile of the crimestain had been kept on file and was then uploaded to the DNA Database when it was enacted. Even though a suspect had been nominated in 2013 no DNA reference sample was available; it wasn't until 2023 that a DNA reference sample was taken from him in relation to another matter. Following a search of the DNA Database, a match was found to the 10 year-old burglary.

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Lethal Fake Heroin

The opioid epidemic has been well documented in the USA and new synthetic opioids (NSOs) have contributed to many overdoses and deaths there. Fentanyl is the most well-known synthetic opioid to date and might be considered the leading contributor to problems seen in the United States. Despite much media attention here, Forensic science Ireland (FSI) has not seen much evidence of illicit fentanyl use in the Irish drug market with only six reports of it being detected in samples submitted to FSI since 2015.

In early November 2023, FSI was alerted to an atypical cluster of opioid overdoses within the heroinuser community in Dublin City Centre, triggering a subsequent rapid interagency response. A second overdose cluster was identified in Cork in December. Light brown powder obtained from the overdoses was analysed in FSI and found to contain the synthetic opioid N-pyrrolidino protonitazene (protonitazepyne).

Nitazenes are structurally unrelated to fentanyl or morphine, but are active at the opioid receptors of the central nervous system. They are a relatively new addition to the drug marketplace since 2019 and some are reported to be more potent than fentanyl and fentanyl analogues.

In all the above-mentioned cases, the intended purchase was heroin, highlighting the potentially fatal risk with drug taking. Heroin accounted for only 6% of all cases analysed by FSI in 2023. An anticipated reduction in global heroin production is thought to be a factor driving the evolution of the synthetic opioid market with the unwelcome emergence of these nitazenetype compounds. Therefore the threat to public safety remains high and this situation will continue to be closely monitored for 2024.

Figure 1: Comparison of typical heroin sample (left) versus N-pyrrolidino protonitazene (right).

Figure 2: Chemical structure of N-pyrrolidino protonitazene

Figure 3: Chemical structure of fentany

Strategic Pillars

This annual report is organised under six main headings, corresponding to the strategic themes identified in FSI's strategic plan. One of the pivotal strategic goals within FSI's Strategic Plan 2019 – '22 was to complete the transfer of FSI to a new fit-for-purpose facility on the Backweston Laboratory Campus with fully operational forensic services in place. This key transition has been delayed due to unforeseen circumstances outside of FSI's control. As a result, the strategic plan has been extended until the end of 2024.

01	Service Development and Growth	This section focuses on how we are improving the capacity of services we are delivering today and how we are increasing the breadth of services in support of the justice system in Ireland. This section also includes a report on the DNA Database and Prüm DNA exchange.
02	Science Technology and Innovation	This section focuses on how the organisation is progressing our application of science and technology, innovating to maximise the impact of forensic science and maintaining our standing within the international forensic community.
03	Partnership and Integration	This section focuses on how we are strengthening relationships within the criminal justice system and beyond, to maximise FSI's contribution to society.
<u>ОД</u>	Quality Systems	This section focuses on how we maintain a robust quality-focused forensic science service and operate to the very best international practices.
05	Fit-for-purpose Environment	This section outlines progress in transitioning to a new fit- for-purpose facility at the Backweston scientific campus and how we manage risk in the intervening period.
06	Excellence through People	This section focuses on how we build an inclusive and integrated team within FSI that helps us collectively achieve our mission.

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Service Development and Growth

Service Delivery

Case submissions into FSI have increased by 53% compared to 5 years ago. Submissions remain far in excess of pre-pandemic levels. Crucially, the range and complexity of submissions has continued to increase across FSI's services.

Table 1 below represents the total submissions from all clients, including An Garda Síochána, Customs, GSOC, The Road Safety Authority, Passport Office, Immigration Services Delivery, the International Protection Office and The Department of Social Protection throughout 2023. Submission increased for all services and were 5% higher overall compared to the previous year. The figures below represent the total submissions received by our Case Intake Service. FSI then completes a preliminary assessment on whether forensic science can help progress the investigation, or if further information is required. FSI's Customer Liaison Manager then assigns the cases to the relevant forensic disciplines; just over 24,500 investigations were assigned in this manner over the course of 2023.

Service	2018	2019	2020	2021	2022	2023
Drugs and Toxicology Cases	9,577	10,480	13,184	11,747	10,071	10,688
DNA (including Sexual Assault Cases)	6,190	7,367	8,637	8,007	7,463	7,934
Fingerprint Cases	0	416	5,742	5,275	5,442	5,552
Chemistry, Documents & Physical Method Cases	821	948	1,632	1,408	1,169	1,187
Biometrics - DNA	11,045	16,185	15,515	14,117	13,240	13,945
Biometrics – Fingerprints	-	-	7,928	8,177	8,894	8,511
Total Cases Submitted (excludes biometric samples)	16,588	19,211	29,195	26,437	24,145	25,361

Table 1: Total Case Submissions Into FSI (Demand).

Biometric Samples are DNA or Fingerprint samples of individuals submitted to FSI

Table 2 represents the number of forensic science reports provided by FSI in 2023. It shows a total increase of 68% compared to 2018 - an increase across all forensic disciplines, ranging from 11% in Drugs and Toxicology to 42% in DNA and reflects the integration of the Fingerprint and Documents & Handwriting sections into FSI from 2020.

While all cases are included in the table, the numbers alone do not reflect the range and complexity of cases reported. For example, the number and scale of drug seizures reported has changed; the range of new psychoactive substances has expanded and how those drugs are presented continues to evolve. For example, Section 15A cases processed (relating to supply of drugs with high market value, under the Misuse of Drugs Act) have increased from 45/year in 2020 to 180 in 2023 (a four-fold increase). These cases are critical to An Garda Síochána in their efforts to disrupt the global illicit drug trade and require a proportionate time investment from FSI to support. FSI supported 171 body identification and Missing Person Identifications in 2023, compared to 142 in 2022 and 102 in 2021. This includes 124 cases where a visual identification of the person was not possible and confirmation of the person's identification is needed by the Coroner. FSI also assisted in the identification of 11 Missing Persons in 2023. **ANNUAL REPORT 202**

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The demand for Chemistry services increased by 18% in 2023, with particularly significant increases in firearm residue cases (+56%), explosives (+100%) and glass (+98%) submissions. The change in the profile of cases and the cross-training requirements across many forensic disciplines were challenging in 2023.

The figures below also reflect the necessary resource investment in starting up a new laboratory and attaining accreditation for forensic services. FSI issued just over 21,700 forensic reports in 2023 – a reduction on the 23,500 reports issued in 2022. A key focus for FSI in 2024 is to increase capacity for services that have transitioned to Backweston and take full advantage of the new premises.

Service	2018	2019	2020	2021	2022	2023
Drugs and Toxicology Cases	7,717 (4,845 complex, 2,872 Section 3)	9,667 (5,555 complex, 4,112 Section 3).	8,106 (5,267 Complex, 2,839 Section 3)	10,440 (5,000 Complex, 5,440 Section 3)	11,963 (6,146 Complex, 5,817 Section 3)	8,550 (4,719 Complex, 3,831 Section 3)
DNA (including Sexual Assault Cases)	4,500	5,860	7,237	6,954	5,975	6,391
Fingerprint Cases	-	-	5,601	5,222	4,528	5,834
Chemistry, Documents & Physical Method Cases	675	555	1,095	1,238	1,076	938
Biometrics - DNA	11,045	16,185	15,515	13,541	13,007	13,122
Biometrics - Fingerprints	-	-	8,434	8,077	8,894	8,511
Total Cases Reported (excludes biometric samples)	12,892	16,082	22,039	23,854	23,542	21,703

Table 2: Cases Reported by FSI in 2023

Types of Drugs Analysed in 2023

Figure 1: Types of Drug Analysed in 2023

Drug Quantification Trends 2016-2022

Quantification data is produced for intelligence purposes for cocaine and diamorphine (heroin). Cocaine and diamorphine were the second and fourth most commonly submitted drugs, respectively, in 2022. Commonly identified adulterants are also identified. Two distinct levels of seizure are analysed for quantification of cocaine: street level and importation level. Street level samples are defined as those submitted from seizures less than 30g, primarily between 25 - 30 grams while importation level samples are defined as those submitted from seizures over 500 g. In comparison, for diamorphine al samples above 25g were collected for quantification.

Figure 2: Average Cocaine content a street and importation level

Cocaine

Cocaine was the most commonly identified stimulant in Ireland across the period examined and the second most commonly identified compound after cannabis. In 2022, 26% of all drugs cases analysed in FSI contained cocaine. Figure 2 illustrates the annual average cocaine content with the highest importation level noted over the 7 year period examined. The importation level content is consistently higher than the average at street level. Of all analytes examined, cocaine demonstrates the widest variety in adulterants. Benzocaine and levamisole were the most commonly detected adulterants in 2022 at street level and importation level respectively. The largest cocaine seizure in 2022 was over 42kg seized by Revenue in Dublin Port in January 2022.

2022 showed the highest importation level cocaine in 7 years

Diamorphine (heroin)

Diamorphine is a semi-synthetic product produced by the acetylation of morphine, which occurs as a natural product in opium. Diamorphine is the most commonly encountered opioid in Ireland and throughout the EU and was the fourth most commonly identified case type in FSI in 2022. In 2022, 13% of all drug cases analysed in FSI contained diamorphine. 2022 saw an average diamorphine level of 43% relative to 41% and 35% in 2021 and 2020 respectively. The largest seizure in 2022 was over 5kg seized by DOCB in March 2022.

2022 showed the highest average diamorphine level over a 3 year range (2020-2022) 17

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Chemistry, Documents and Physical Methods Cases

The broad variety of Chemistry and Documents and Physical Methods cases analysed is represented in Figures 3 and 4. Each discipline represents a unique speciality and field of expertise.

Figure 3: Types of chemistry cases reported in 2023

Fingerprints

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Figure 5: Fingerprint Investigations in 2023 (%)

Figure 5 represents the broad range of investigations supported by the Fingerprint section in the detection and comparison of fingermarks over the course of 2023.

The fingerprint section has also been processing Sirene requests since the system went live in 2021, with 23,350 transactions processed in 2023 – this included 19,367 requests and 3,983 searches. The daily transactions have increased from 50/day in 2022 to 64/day in 2023.

DNA & Biological Analysis Cases

Figure 6 represents the types of DNA cases reported from FSI over the course of 2023.

The statistics alone cannot represent the full contribution and impact that FSI staff are having on the justice system in Ireland. DNA evidence from FSI was used extensively in Garda investigations and court cases in many murders, serious assaults, sexual assaults, drug seizures and other offences associated with gangland and organised crime throughout 2023.

Figure 6: DNA Cases Reported in 2023 (%)

Contribution to Cold Case and Missing Person investigations

In 2023, DNA profiling was carried out to assist in the identification of 124 body identifications. These cases include those where a visual identification of the person is not possible and confirmation of the person's identification was needed by the Coroner. A direct comparison can be made to DNA from a personal item such as a toothbrush or identification can also be assisted by kinship matching to biological relatives such as parents, children or siblings of the deceased.

In addition FSI assisted in the identification of 11 missing persons in 2023. Some examples of Missing Persons cases where we assisted with identifications include:

A DNA profile was obtained from the toothbrush of Gerard Taylor who went missing in 2019 and was uploaded to the DNA Database. Remains were subsequently found in a wooded area in County Dublin in February 2023 and a match to the surrogate sample from the toothbrush was obtained.

Briain Holmes was missing since May 2023 and remains were subsequently found near the Cliffs of Moher in October. A DNA profile was obtained and uploaded to the DNA Database and a parent-child match was obtained to his mother whose profile was on the Database.

A surrogate sample was obtained from the toothbrush of Joe Delaney who was reported missing in November 2021. A match was obtained in 2023 with an Unidentified Human Remains found in Cornwall in England via the international exchange of DNA profiles by Interpol. A partial human skull was found in the sea off Howth and a DNA profile generated from it matched the DNA profile of Andrew Finni on the DNA Database who had been missing since May 2022.

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In addition 47 reports were issued for cases where DNA profiling of relatives of a missing person and/ or generating a DNA profile from a surrogate sample (i.e. personal items such as a razor or toothbrush) was carried out. These profiles were then uploaded and searched on the National DNA Database (Missing Persons Index). In addition some of these profiles were sent via Interpol for international searching against unidentified human remains in other jurisdictions.

A number of cold cases were reviewed and worked on in 2023 including the murders of Felix McCann in 1998, Joseph Rafferty in 2005 and Peter Murphy in 2015. A cold case of particular note was the death of Nora Sheehan where following a trial in 2023 Noel Long was found guilty of the murder of Nora Sheehan which occurred 42 years ago.

Service Flexibility

The system to facilitate an Out of Hours service continued in 2023. Each scientist carries an on-call phone for a week at a time and a smaller group are available to attend scenes or to carry out necessary urgent laboratory work. This service is provided by a panel of 32 scientists with two scientists being called in to the laboratory for out of hours services, for capacity and health and safety reasons. This service was availed of on 40 occasions over the course of 2023 – covering the full gamut of case types. FSI attended 4 crime scenes to provide specialist knowledge, particularly for Blood Pattern Analysis (BPA) in murder investigations.

Court Cases

A percentage of the cases examined by FSI result in court attendances each year. Frequently these cases relate to reports issued in earlier years. Staff from FSI attended court as witnesses on 133 occasions in 2023. Court attendances are increasing year-on-year - there were 119 appearances in 2022, 104 appearances in 2021, 50 in 2020 and 108 in 2019. The number of court appearances for each discipline is tabulated in Table 3.

Only 17 of the court appearances in 2023 were virtual, a reduction on the previous year. This is a facility that was put in place during Covid restrictions but that we hope to see continue and grow in the coming years.

Visits from Defence Scientists

Scientists employed by the defence visited FSI on 30 occasions in 2023; compared to 34 occasions in 2022, 24 in 2021, 14 in 2020 and 27 in 2019. Of these, 12 related to Drugs & Toxicology cases, 15 related to DNA & Biological Analysis cases and 3 related to Physical Analysis cases.

Benchmarking

Throughout 2023, FSI engaged in informal benchmarking on several aspects of service delivery with members of the Association of Forensic Science Practitioners (AFSP). These are laboratories, public and private, providing forensic services around the UK and Ireland. This included demand trends and operational matters.

Table 3: Evidence in Court (2023)

DNA Database

The DNA Database commenced operation on the 20th November 2015 and is one of the most important crime fighting tools within the State.

Using the database, information is supplied to the Gardaí about links between people and unsolved crimes. These crimes have ranged from burglary/ criminal damage to crimes against the person, sexual assaults and suspicious deaths. The power of the database as an investigative tool is that it is providing Gardaí with investigative leads in previously unsolved serious crimes. The database can replace more traditional and time consuming police investigative methods and provide more focus to a criminal investigation. It is now also possible to retain samples from relatives of missing persons to aid in the investigation of unknown remains.

Overall 2023 saw an increase in the volume of Database records, as well as an increase in the impact and effectiveness of the system.

Figure 7 displays the overall growth in the National DNA Database since 2015.

Total Number of Profiles on the DNA Database System

80000 70000 60000 50000 40000 30000 20000 10000 0 2015 <105 2018 ²⁰²02 202 202 ²023 ²⁰¹9 eore 205 205

Figure 7: Total numbers of individual profiles (person or crime stain) on the database displaying overall growth since 2015. Increase of profiles in 2023: 7,327

Breakdown of profiles on the DNA database system by Index

Figure 8 shows the numbers of DNA profiles held in the four indices of the National DNA Database at the end of December 2023

Profiles on the DNA Database System by Index (31st December 2023)

55,427

12,121

5,878

1,200

Figure 8: DNA Database System by Index

24

Reference Index

Includes the Suspect Known, Convicted Offender and Section 28 Volunteer specimen categories

Crime stain Index Includes the Forensic Unknown and Forensic Mixture specimen categories

Elimination Index

Includes FSI, Garda, Garda CSI, GSOC and S44 Prescribed Person specimen categories

unidentified human remains and relatives

Identification Index Includes profiles from missing persons,

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Number of persons' profiles on the DNA Database System

Figure 9 shows the number of profiles from persons on the DNA Database from the date of commencement to end of December 2023. This figure takes account of the significant numbers of DNA profiles from persons removed from the Database, in compliance with part 10 of the Criminal Justice Act 2014 over this period (as illustrated in figure 12).

Figure 9: Increase in Profiles on Reference Index. Increase of profiles in 2023: 5,355

Number of unsolved crime stains added to the DNA Database System

As of the end of December 2023, there are 12,121 unsolved crime stains in the crime stain index, with 1,133 crime stains added in 2023 (Figure 10).

Increase in Reference Index to 31st December 2023

Figure 10: Cumulative number of crime stains uploaded to the Database to the end of 2023

Sample destruction and profiles removal from the DNA Database System

Figure 11 shows the number of samples destroyed since commencement of the DNA database (87,259 samples destroyed up to 31st December 2023, 10,691 samples destroyed in 2023), while Figure 12 shows the number of profiles removed since commencement of the DNA database (42,118 profiles removed up to 31st December 2023, 6,590 profiles removed in 2023).

Sample Destruction

26

Figure 11: DNA Sample Destruction

Figure 12: DNA Profile Removal

Investigative links

Two potential matches can occur when an additional profile is added to the Database – a crime stain can match another crime stain suggesting a link between crimes or the crime stain can match to a person suggesting a link between the person and the crime. Overall, the DNA Database identified 617 hits in 2023, which assisted 730 cases. The types of hits are detailed below:

(a) Persons linked to crime stains

There were 591 person-to-stain matches in 2023 - 403 of these were person to single case matches providing assistance to 382 investigations, while in 188 cases the person was linked to multiple case matches providing assistance to 282 investigations. In total 664 cases have been aided. The details of the cases involving person to stain matches is available on Figure 13.

Case Type	Number
Assaults	24
Burglary	194
Criminal damage	111
Drugs	30
Firearms	8
Robbery/Theft	63
Sexual Assault	14
Unlawful Taking of Vehicle	67
Other*	153
Total	664

(b) Crime scene samples linked to other crime scene samples

This type of match occurred 26 times in 2023. In 20 such cases, a case-to-case match was reported while in the other 6 cases, there were clusters of cases associated with each other. Overall, this resulted in 66 investigative links ('hits') between unsolved crime stains - see Figure 14 below.

Case Type	Number
Assualt	2
Burglary	33
Criminal damage	6
Robbery/Theft	6
Unlawful Taking of Vehicle	8
Other*	11
Total	66

*Other category includes case types listed as 'other' plus a number of different less frequent case types.

Figure 14: Stain to Stain matches [Types of investigations and the number of each involved in 2023]

*Other category includes case types listed as 'other' plus a number of different less frequent case types.

Figure 13: Person to Stain matches [Types of investigations and the number of each involved in 2023]

Metrics used to assess the effectiveness of databases are available in Figures 15 and 16. These figures were as of the end of December 2023.

H/N: The Number of Person to Stain Matches Relative to the Number of Persons Included in the Database

Figure 15: This figure indicates the appropriateness of the sampling policy (i.e. sampling suspected offenders and convicted offenders).

H/C: The Number of Person to Stain Matches Relative to the Number of Stains Included in the Database

Figure 16: This measures the crime solving capacity and is expected to grow as the database grows (i.e. 50 out of every 100 crime scene samples uploaded onto the database will be linked to a person).

Prüm Treaty

The Prüm treaty includes cross-border cooperation by means of exchanging judicial and police information and by providing mutual assistance. With regards to the exchange of information, each European member state has to make its DNA database available to other Member States for automated searches on a hit/ no hit basis. After a match, personal data and case information are exchanged between countries by existing mutual legal assistance procedures (police or judicial).

On the 2nd of October 2019, FSI began live exchange of DNA data and at the end of 2023 was exchanging data with eleven Member States. Table 4 shows the match results obtained between the Irish DNA database and the DNA databases of the eleven Member States.

Prüm Match Statistics to 31st December 2023

	Irish Crime Stain to Prüm person	Prüm Crime Stain to Person on Irish Database	Prüm Crime Stain to Ireland Crime Stain
Austria	24	27	3
Latvia	5	2	0
Netherlands	20	17	11
United Kingdom	600	424	42
Slovakia	2	2	0
Poland	5	12	1
Sweden	3	18	2
Estonia	1	1	0
Malta	0	0	0
Germany	22	153	17
France	39	98	29
Total	721	754	105

Table 4: 2023 Prüm Match Statistics

Science, Technology 1.0

Science, Technology and Innovation

FSI made strong progress in progressing forensic science technology and practice, developing new ICT systems and contributing to the international knowledge base over the course of 2023.

The transition to a new laboratory necessitated investment in new instrumentation and support equipment so that services could be accredited in a new lab while supporting services from an older laboratory. Over €1m worth of new instrumentation was installed and commissioned last year -including automated liquid handling systems for DNA processing, a compact Scanning Electron Microscope for fire-arm residue characterisation and a suite of new equipment for fingerprint mark enhancement. A new solid-phase microextraction (SPME) method for analysis of fire debris was validated and will assist with the increase in submissions related to suspected arsons. DNA sequencing software has been upgraded and has brought significant benefits to efficiency of the process. Further work was completed in 2023 on method development and training on mitochondrial DNA profiling and evaluation using Next Generation Sequencing technology. FSI expects to use this technology in the coming months in support of the identification programme for the Tuam Mother & Baby Home exhumation, as outlined in the Institutional Burials Act.

The development phase for two major systems was completed in 2023. A significant upgrade of the Automated Fingerprint Identification System (AFIS) was developed during the year. This upgrade includes enhanced match algorithms which will allow for faster and more accurate searching and comparison between reference and latent marks recovered from crime scenes. Development of this system was completed by the ICT team of An Garda Síochána and was co-funded by An Garda Síochána and the Department of Justice. FSI and the Department of Justice also completed the development of a new system for capturing, storing and comparing DNA data generated internally by FSI (DNA Application for Sample Handling (DASH)). This will greatly enhance the efficiency of data processing internally within FSI. Both systems are in their test & validation phases and are expected to go live in 2024.

FSI completed a major upgrade to it's Laboratory Information Management System (LIMS) during 2023. This upgrade provided access to the latest security features and user enhancements and provides a good platform for continued innovation in workflow improvements in FSI. Progress was also made on collaborative ICT projects with other stakeholders within the justice sector. Development commenced on a new system to exchange information dynamically between agencies on court proceedings and the status of forensic investigations. This is being developed on the Criminal Justice Operational Hub (CJOH) platform and, once developed, will greatly enhance prioritisation and communication of forensic investigations.

Further work was completed to stabilise ICT systems over the course of 2023, and this has started to pay dividends, with the increased number of Prüm connections early in 2024.

Our staff were active contributors to 25 working groups over the course of 2023

FSI is a founding member of both the ENFSI and AFSP networks, which are focused on developing and sharing best international forensic practices and research within its members. Our staff were active contributors to 25 working groups over the course of 2023. Last year FSI participated in 2 European-funded programmes to advance the European knowledge-base and competencies in forensic science disciplines. The first project ('UNLOCK') aimed to provide an opportunity for Forensic Scientists in all disciplines to improve their basic forensic knowledge. The work of the project involved putting together a syllabus covering areas considered fundamental to forensic science. This would be particularly useful for scientists who have studied the basic sciences rather than forensic science and will allow them an opportunity to gain a gualification. A 'Reader' will be produced which will be sent to candidates who after a period of time will take an online exam and gain a qualification. The second project ('ReACT') focused on research on the transfer and persistence of DNA. This research enhances the understanding of key topics in the evaluation of scientific evidence and allows FSI to characterise and communicate its findings during the investigative process and in the courts.

Preparations are well underway for the European Academy of Forensic Science (EAFS) in Dublin in May 2025. EAFS is the biggest European forensic science event and occurs once every 3 years. It brings together over 1200 forensic science practitioners, stakeholders and partners from across the forensic science global community to showcase the depth and breadth of developments in forensic science. FSI will also host the Annual Meeting of the European Network of Forensic Science Institutes (ENFSI) at the same time. EAFS 2025 coincides with FSI's 50-year anniversary and it looks forward to celebrating that milestone with the international forensic science community next year.

Publications

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The following papers were co-authored by staff in FSI over the course of the year.

Examining the transfer of male DNA onto female underwear in simulated non sexual social interaction versus digital penetration to assist in the evaluation of results in casework scenarios.

Sharon Doole, Maggie Boyce, Charlotte Hargreaves, Geraldine Davidson, Karen Alexander, Isla Fraser, Charlotte Murphy, Marce Lee-Gorman, Carol Rogers. *Science & Justice* Volume 63, Issue 1, 2023, Pages 90-108.

Illuminating the benefits and limitations of forensic light sources.

Jonathan Finnis, Geraldine Davidson, Isla Fraser, Charlotte Murphy, Charlotte Hargreaves, Nighean Stevenson, Sharon Doole, Carol Rogers. *Science & Justice* Volume 63, Issue 1, 2023, Pages 127-134.

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ne relevance of false positive acid phosphatase reactions indicative the presence of seminal fluid from oral and vaginal samples.

J.E. Allard, G. Davidson, A. Baird, M. Boyce, S. Jones, J. Lewis, C. Lowrie, B.M. McBride. *Science & Justice* /olume 63, Issue 4, 2023, Pages 477-484.

Assessing the background levels of body fluids on hands.

Hayley Douglas, Isla Fraser, Gerry Davidson, Charlotte Murphy, Marce Lee Gorman, Maggie Boyce, Sharon Doole. *Science* & *Justice Volume* 63, Issue 4, 2023, Pages 493-499.

Background levels of body fluids and DNA on the shaft of the penis and associated underpants in the absence of sexual activity.

A. Taylor, G. Davidson, M. Boyce, C. Murphy, S. Doole, C. Rogers, I. Fraser. *Science & Justice* Volume 63, Issue 4, 2023, Pages 529-536.

nzyme activity, DNA degradation and drying times f semen, saliva and vaginal material.

Jonathan Finnis, Charlotte Murphy, Geraldine Davidson, Karen Alexander, Jennie Lewis, Maggie Boyce, Finlay Kennedy, David Casey, Nicola Clayson, Isla Fraser, Charlotte Hargreaves, Nighean Stevenson, Sharon Doole, Carol Rogers. Science & Justice Volume 63, Issue 6, 2023, Pages 663-670.

The Forensic Science Regulator published guidance for Y-STR analysis: https://www.gov.uk/government/publications/y-str-profiling

FSI's Dr. Charlotte Murphy contributed to this through the Forensic Science Regulator DNA Specialist Group.

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ANNUAL REPORT 2023

Partnership and Integration

This section focuses on how we are strengthening relationships and improving FSI's integration within the criminal justice system and beyond. This was particularly important throughout 2023, given the demands on the criminal justice system and the complex transition process underway by FSI. An Garda Síochána accounts for the vast majority of evidential submissions into FSI. FSI is grateful for the on-going cooperation with An Garda Síochána that was particularly evident throughout 2023 as FSI planned and implemented the transition to its new building. Several policies and practices with regards to submission of exhibits have been refined and protocols refined to account for dual locations during a transition period. FSI is also very appreciative of the expert advice and support from the various specialist units of An Garda Síochána and the Divisional teams, who have supported FSI so well over the course of the year.

FSI is also working closely with the Department of Justice legislation team to develop new legislation that places PDTs on a stronger legislative footing

The challenges of criminal justice capacity and FSI capacity more broadly were recurring themes during 2023. FSI worked closely with An Garda Síochána, and across the justice sector in 2023, to ensure the best use of capacity available in the laboratory and this will remain a strong area of focus for FSI in the months and years ahead. Some 82 Garda members from 16 districts were trained and certified in the use of Presumptive Drugs Testing (PDT). A PDT can be done by a trained Garda member in a Garda station for some drug substances detected under Section 3 of the Misuse of Drugs Act - this can divert some cases away from FSI, allowing it to focus on other cases. FSI is also working closely with the Department of Justice legislation team to develop new legislation that places PDTs on a stronger legislative footing. Direct regular lines of communication between FSI and Court Presenters have been maintained in several court districts and 2 new ones have been established. This direct line of engagement ensures timely reporting of forensic case-work before court hearings.

The established relationships with early warning drugs networks in Ireland and Europe (including the Early Warning and Emerging Trends (EWET) working group, chaired by the Department of Health and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)) were particularly effective in 2023. This allowed for an integrated response when a cluster of drugs overdoses occurred in late 2023. While it was initially suspected that the overdoses were due to a bad batch of heroin, it was identified that the substance was actually a synthetic opioid, a Nitazene. This helped the Department of Health and An Garda Síochána put the appropriate health response and investigation process in place. FSI participated in a cross-sectoral research project, with An Garda Síochána, The Department of Justice and Immigration Service Delivery (ISD), focused on understanding the long-term options for replacing the Automated fingerprint Identification System (AFIS). This project was concluded in 2023 and will inform the requirements of the next generation national AFIS system in years to come.

FSI continued to maintain its strong partnerships with the Missing Persons Bureau, Sexual Assaults Treatment Units (SATUs) and the new Divisional Protective Services Units (DPSU) of An Garda Síochána over the course of the year. FSI also engaged extensively with the Department of Children, Equality, Disability, Integration and Youth (DCEDIY) and the Director of the Authorised Intervention for the Tuam Mother and Babies Home, in preparation for the Identification Programme outlined in the Institutional Burials Act. This legislation confers significant responsibility on FSI for providing an Identification Programme, and associated databases, in support of Institutional Burials such as the Tuam Mother and Baby Home. The scope of ICT, operational and scientific work ahead of FSI will be very significant.

FSI also participated in the first Criminal Justice Strategic Sectoral Plan, particularly in relation to improving collaboration and data integration. This work has helped identify gaps in the system and progress tangible areas of improvement during the year.

Solid working partnerships have been established with partner agencies based in the Backweston Laboratory Campus, including the State Lab and the Department of Agriculture, Food and the Marine (DAFM). FSI is appreciative of the support from these agencies over the past few years during the construction phase of FSI's new building, in particular for providing temporary accommodation for FSI services. These relationships will help FSI solve shared problems on campus and support the long-term strategic development of the campus.

FSI continued its partnership with Forensic Science Northern Ireland (FSNI) over the course of the year. This continues to be a very supportive and productive partnership over the past year, with active knowledge sharing and support.

FSI responded to 21 Freedom of Information (FOI) requests and 35 Parliamentary Questions (PQs) over the course of the year. FSI also responded to a number of media requests, including newspaper, radio and TV to increase public awareness of FSI's new laboratory at Backweston and the work that FSI does on behalf of the criminal justice system.

Cannabis - the Wild West of the Drug Marketplace

Cannabis and related cannabinoid products accounted for 42% of all cases analysed by FSI in 2023. The traditional cannabis market is no longer a homogenous arena and is now a dynamically evolving space with ongoing rapid emergence of a dizzying array of synthetic cannabinoid products – it is truly the Wild West of the drug marketplace.

A review of 114 jelly, sweet and chocolate products analysed in 2023 showed that only 64% contained the assumed intended purchase of tetrahydrocannabinol (THC), the main psychoactive substance in cannabis. The remaining 36% of products included a range of other synthetic cannabinoids including MDMB-4en-Pinaca, ADB-Br-Butinaca, ADB-Butinaca, ADB-Pinaca, 5F-EDMB-Pica and HHC. Hexahydrocannabinol (HHC) is a new semi-synthetic cannabinoid that first emerged in the European drug market in mid-2022. HHC can be synthesised from CBD (Cannabidiol). HHC is chemically similar to THC and appears to have relatively similar physiological effects. Unlike THC, HHC is not a controlled substance in most European countries and worryingly is being sold as a safe or legal replacement in conventional THC products

Typical presentations of edible sweets and a vaping product submitted to FSI

Unfortunately adverse side-effects from the ingestion of attractively packaged & often mislabelled 'cannabisinfused' and 'THC' type products are an increasingly common occurrence. In November 2023 four teenagers became ill and were hospitalised after vaping - analysis of these vapes by FSI identified the presence of HHC. Clearly these products remain a significant risk to the public with ongoing vigilant monitoring of emerging trends required.

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FSI evidence helps secure a conviction at the Ashling Murphy murder trial in November 2023

Ashling Murphy was fatally stabbed on the banks of the Grand Canal in Tullamore on the 12th of January 2022. A male specific DNA profile (Y-DNA profile) match between Jozef Puska and samples from Ashling Murphy's were obtained between Jozef Puska and a bicycle left

CASE STUDY 7

Two murders and a serious assault in Sligo in April 2022

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In October 2023, Yousef Palani pleaded guilty to occurred in Sligo during a four day period in April 2022. gave a DNA profile matching that of Aidan Moffitt. In addition, blood found on a tracksuit bottoms matched the profile of Michael Snee. Wearer DNA recovered from the tracksuit bottoms matched the DNA profile of Yousef Palani.

from a condom also contained the elements of Yousef

Serious assault in Strokestown, Co. Roscommon in 2018

In the early hours of the 16th December 2018 a group of in the month and was being guarded by a number of security personnel, employed by the possessing bank. The security personnel were seriously assaulted, a guard dog was fatally attacked and a number of vehicles were set alight. In the early stages of the investigation a truck was identified as possibly used to ferry the men downloaded and examined by the chemistry team in assisted the Gardaí during interviews with the suspects. FSI scientists also examined multiple items for DNA, including the steering wheel of this truck which matched the driver and owner of the truck. Canisters of liquids were recovered from within the boundary walls of the property and FSI scientists confirmed they contained accelerants that can be used to start a fire. The tachograph evidence was presented in court during the

Three men were found guilty of multiple charges and were sentenced to 15 year jail terms for the attacks.

CASE STUDY 9

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Waterford school teacher jailed for harassment against members of An Garda Síochána

Between May and September 2018, Lee Hutchinson, a former secondary school teacher sent handwritten anonymous letters containing spurious allegations about officers to their families, colleague and superiors including the then Garda Commissioner Nóirín O'Sullivan. The claims in the letters were forwarded to the Garda Síochána Ombudsman Commission whom deemed them "unfounded".

A number of the letters and the envelopes were submitted to Forensic Science Ireland for DNA and handwriting analysis. A DNA profile matching Mr. Hutchinson's DNA profile was obtained from one of the letters. The handwriting present in this letter, along with that of a number of the other anonymous letters and their envelopes, were compared to a specimen of handwriting from Lee Hutchinson by the Handwriting experts of FSI. Their findings offered "strong handwriting evidence" that Lee Hutchinson wrote these envelopes and letters. In November 2023 Mr. Hutchinson was sentenced to six years in prison, with one year suspended. He was also ordered not to contact any of the victims for 10 years.

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Murder of Nora Sheehan in 1981: a cold case review and advances in technology help secure conviction forty years after her death

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of Nora Sheehan in 1981 in Cork was re-examined to assist in bringing a suspect to court, forty years after the event. Nora Sheehan was last seen alive on the 6th of Her body was discovered in undergrowth at Shippool been transported in a vehicle to this location. In 1981, Noel Long was a nominated suspect for this incident and was seen in the area at the time of her disappearance. At the time, several locations including Noel Long's car, were technically examined. Paint samples, fibre lifts and

In 2022, the examination of fibre and paint samples was repeated and where applicable, new technologies applied to determine whether fibres and paint found on Nora Sheehan's clothing matched the fibres and paint from Noel Long's car. These examination confirmed the findings of the original reports and assisted in providing a weight to the significance of the findings, given what was alleged. Overall, the trace evidence findings offered very strong support for the view that Nora Sheehan was in Noel Long's motorcar rather than she was not. Noel Longs clothing taken in 2021. In 2023, Noel Long was convicted by a unanimous Jury decision and as it stands is the oldest murder prosecution in Irish History.

Suspicious death of Alan Hall in Bluebell D22

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Dublin Fire Brigade were called to a house fire around dawn in 2020 and when entering the house they found suffered injuries in line with an assault. Attempts had been made to set the house on fire but fire retardant during the strictest of the COVID lockdowns when socialising was not permitted and initially no suspects at the house the previous night delivering takeaway drinks. Among many items recovered from the scene were a bottle of vodka and two bottles of mineral mixers. FSI scientists examined liquids and fire debris from the scene and found one contained a light petroleum distillate matched a commercially available lighter fluid. the examinations on the drinks bottles and blood stained items. On one of the bottles of a lemon and lime mineral mixer, finger marks were recovered and identified to the clothing were worn by Conor Curran and the blood match. A co-accused, Mr Derek Coady previously charged with the murder of Alan Hall pleaded guilty to Central Criminal Court.

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ANNUAL REPORT 2023

Quality Systems

It is imperative that FSI maintains a robust quality system so that all our stakeholders have confidence in our services and our findings.

In 2023 FSI continued to refine its quality system while including new forensic techniques and a new facility in its scope of accreditation. Accreditation to international standards, and specifically compliance to the ISO-17025 (2017) standard, is an important validation of FSI's quality system.

FSI completed a full review of the quality system and quality manual to account for the new facility at Backweston. FSI's new facility was successfully added to its scope of accreditation in October, as well its drugs service, with no non-conformances. FSI also had a successful surveillance assessment to the same standard in November and December last year. By the end of 2023 FSI's scope of accreditation was extended to include Fingerprint mark enhancement and comparison, Documents and Handwriting, Blood Pattern Analysis and Damage (evaluation of clothing damage in investigation of assaults).

There were two new services extended to FSI's scope of accreditation in 2023. These were for Mitochondrial DNA and Blood on FTA extraction. The accreditation of Mitochondrial DNA gives additional assurance on the robustness of the technology, process and validation in advance of the Tuam Mother & Baby Home exhumation process. The accreditation of Blood on FTA extraction follows a collaborative research project with the Office of the State Pathologist and allows for safe, efficient and robust storage of DNA blood samples. Our successful accreditation and continuous extensions to the scope of our accreditation each year, are underpinned by a robust quality system that is embraced by all our staff. Over the course of 2023 FSI participated in 53 internal audits that assessed all aspects of FSI's management systems, including Quality Management audits, vertical audits, witness audits, extension to scope audits and training audits. FSI also participated in 59 collaborative/proficiency trials in 2023. These trials are designed by European forensic laboratories and 3rd party companies with a view to continuously assessing and calibrating proficiency levels in forensic disciplines across Europe. FSI also assisted in the design of some European trials and our proficiency is highly regarded among our European peers.

• ÷. Fit-for-purpose Environment Ċ

ANNUAL REPORT 2023

Fit-for-purpose Environment

FSI has two primary goals with regards to our work environment – transition to a new fit-for-purpose building at the Backweston Laboratory Campus in County Kildare, and managing the risks to our staff and services in the meantime.

A very significant milestone was reached on the 3rd July 2023, with Substantial completion of FSI's new building. This new laboratory, designed by the Office of Public Works (OPW), provides FSI with a functional, purposebuilt facility, supporting best international practice in evidence recovery, processing and storage. It represents a significant commitment to the future of forensic services in the state and addresses a long-standing goal within successive strategic plans in FSI over many years. FSI is very appreciate of the funding and support from the Department of Justice, the commitment from the OPW and the support from many stakeholders over the last several years to enable this new building. FSI took possession of the new building on 3rd July 2023 and completed the first phase of staff inductions and transitions on the 4th July. Prior to Substantial Completion and during the extended building commissioning phase, FSI was able to progress the office and ICT fit-out of the building so that FSI could immediately start the transition process. Advance teams for some of FSI's forensic services as well as support staff relocated to the new building from that date. The role of these advance teams was to set-up & prepare the facility for operations and commission the first set of instrumentation and support equipment for services. The Facilities Management team was mobilised and various procedures, including security & access control have been put in place. FSI embraced the challenge of starting up a new facility while maintaining services at a high level from its current facilities. Great credit is due to the staff at FSI for doing so in an environment where submissions have increased, cases have grown in complexity and demands for court attendance have increased even more over the course of the year.

FSI is undertaking a phased transition of services to Backweston from current laboratories. As an essential service to the criminal justice system, FSI needs to maintain services from current facilities during all stages of the transition process. Commissioning, start-up and validation of analytical instrumentation and support equipment is required before each forensic service is accredited in Backweston by the Irish National Accreditation Body (INAB). FSI's first accreditation assessment in October, which focused on the drugs service as well as all the FSI-wide support functions and systems to receive, process and return cases to our customers was successful. On Monday 9th October Ciara McNamee from FSI's Chemical Analysis Department completed the analysis and issued the first forensic report from the new facility. This was a very significant event in FSI's history and a major milestone in the transition process. Accreditation to the ISO-17025 Standard has been attained for several additional services at Backweston in 2023:

FSI Drug Scientist Ciara McNamee, reporting the first case from Backweston in 2023.

The Drugs and Fingerprint services are now fully operational in Backweston and all staff associated with these services have relocated to their new workplace. Approx. half of FSI's total staff, including scientists, analysts, managers, ICT and administrative staff, are working from the new building. Other staff are spending time in both locations; supporting live case work as well as start-up activities for other forensic disciplines.

There are plans to transfer all remaining services, including trace evidence recovery and analysis to Backweston in 2024 on a phased basis. FSI is working closely with OPW and the contractors to address snags and any outstanding issues with the building so that all services are fully operation in Backweston by the end of the year.

FSI looks forward to being fully operational at the new facility and continuing to growing its contribution to the criminal justice system from its new base.

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A key focus for FSI in 2024 is to increase capacity for services that have transitioned to Backweston and take full advantage of the new premises •

÷ Excellence hrough People

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Excellence through People

The goals of this strategic theme are to build an inclusive, integrated team within FSI that focuses on continuously improving our services and to promote an open, collaborative and respectful climate across the organisation.

Particular focus areas for us in 2023 related to this strategic theme included recruitment, training and development and the transition to the new building at Backweston.

Recruitment of scientific, analytical, ICT and support staff remains a significant challenge for FSI. There was a significant investment made in recruitment over the course of the year, including direct engagement with universities around the country. This investment in effort has paid dividends as FSI recruited 33 staff in total over the course of the year (including 10 scientists, 10 analysts, 10 administration staff and 3 ICT professionals). However, 28 staff left FSI over the same period, due to retirements, resignations and movement to other roles through the Civil Service mobility programme. FSI is also a benefactor of the Civil Service mobility programme and the Backweston campus is an attractive location that is drawing staff from other civil service organisations. Recruitment remains a continued area of focus for FSI and its goal is to reach at least 230 staff once the transition is completed.

Given the level of recruitment underway, on-going training and development of staff is a significant focus for FSI. This consists of forensic discipline-specific training and mentorship as well as broader training in forensic practice. Training programmes in Court-Room Skills and Expert Witness Training were provided over the course of 2023. Management courses were also developed and provided through the Institute of Public Administration for scientific, analytical and support management roles. FSI completed a review of its blended working approach in 2023; which included staff and management surveys and a review of practices. FSI continues to have an active and committed Staff Development Group and a social committee focused on developing our staff professionally, creating a healthy work environment and working through changes collectively. Additional 'peer supporters' were identified in 2023; this is a confidential internal support network that provides guidance and support for staff at all levels in the organisation. FSI launched its Wellness Programme with Spectrum in 2023. FSI continued to provide professional counselling and trauma counselling services for staff throughout the year; 2 vicarious trauma workshops were held during the year for staff working in the sexual assaults and case-intake teams.

FSI's transition to Backweston represents a significant change for its staff. There is a long history of contribution and impact on the criminal justice system from FSI's current building in Garda Headquarters for almost 50 years and the transition to a new building is the end of an era in many ways. The transition to Backweston would not have been possible without the professionalism, support and commitment from FSI's staff. At many levels they helped design the new workspaces so that FSI can be effective and efficient at its new location. Great credit is due to the cross-functional transition team, the advance teams and functional teams who have developed new systems, processes and work practices for the new building. The level of support and engagement from staff in 2023 provides a strong basis for FSI to make the most of this significant capital investment.

FSI participates in the 'Excellence Through People' programme (managed by the National Standards Authority of Ireland) maintained its Gold accreditation with improvements registered in all areas audited in 2023.

The transition to Backweston would not have been possible without the professionalism, support and commitment from FSI's staff

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FSI's Transition Team at the Official Opening Event in Backweston

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Corporate Governance

The 'Code of Practice for the Governance of State Bodies' outlines that Corporate Governance comprises the systems and procedures by which organisations are directed, controlled and managed. State bodies should serve the interests of Government as shareholder, the taxpayer, and all other stakeholders, and pursue value for money in their endeavours, including managing risk appropriately. State bodies should act prudently, ethically and with transparency as public entities and should conduct their activities consistent with their statutory responsibilities.

As described in the document 'Corporate Governance Standard for the Civil Service', good governance is central to the effective operation of a State Body. It is vitally important in effectively discharging statutory and policy objectives. It ensures that a framework of structures, policies and processes are in place to deliver on these obligations and it allows for an objective assessment of management and corporate performance.

2 Oversight Agreement

FSI is an Executive Agency of the Department of Justice (DOJ). It has an oversight agreement in place from 2023-2025 inclusive with the DOJ which is published on the DOJ website. The scope of the agreement is as follows:

'This Oversight Agreement sets out the broad governance and accountability framework within which Forensic Science Ireland (FSI) operates, and defines the key roles, responsibilities and commitments that underpin its relationship with the Department of Justice ("the Department"). The Agreement has been drawn up by the Department in consultation with FSI, in accordance with the Code of Practice for the Governance of State Bodies ("the Code of Practice"). It succeeds the previous Oversight Agreement 2020-2022 between the two parties, and will, in turn, be subject to a formal review approximately midway through its operation. A separate Performance Delivery Agreement ("PDA") is agreed annually under the governance architecture provided by this Oversight Agreement.'

3 Performance Delivery Agreement As described above and as part of our governance practice, FSI agreed a Performance Delivery Agreement (PDA) for 2023. This Agreement is also published on the Department of Justice website. A summary of how FSI performed in its PDA for 2023 is outlined below.

FSI's PDA contains quantitative targets relating to forensic services and other targets. These are represented in Figures 17 and 18 below, respectively.

Output area or initiative	Metric	Associated Strategic Objective	2023 Target	Performance
Chemical analysis	Complex drugs/ toxicology cases reported	1.2 ²	5,250	4,719 (90%)
DNA - Identifications	Missing person case investigations or body identifications	1.2	80	171 (214%)
DNA – Information sharing	Member States with active Prüm connectivity & exchange	1.5 ³	17	11
Case reports under Service Level Agreement between FSI and An Garda Síochána	Total FSI cases reported	1.3 ⁴	21,000	21,713 (103%)
Representation on International Working Groups	Number of working groups where FSI staff are active contributors	2.85	14	25

Figure 17: Quantitative Targets

FSI did not commence DNA exchange under the Prüm agreement with any new country in 2023, but did maintain exchanges with the 11 countries that were connected in previous years. There were substantial upgrades to the FSI ICT infrastructure during 2022, including domain integration and new CODIS software. An extended period of integration and stabilisation was required throughout 2023 before any new countries could be added. This work was completed by the end of 2023.

Output area or initiative	Target	Outcome
Transition to new facility at the Backweston Laboratory Campus	Transfer of services to BLC	Partially Achieved
	Deep clean, installation of	Substantial Completion
Note: Backweston transition goals are based on latest understanding of	verification of processes in Q2-2023	achieved on 3rd July.
Substantial completion date (end Feb'23)		 1st Accreditation assessment on 2nd
	 Accreditation from the Irish National Accreditation Board (INAB) begins in Q2 on a phased basis. 	October; drugs service accredited and first reports issued in October.
		Transition will continue
	First accredited reports Q3	throughout 2024
	• Complete transfer of services by Q4	
	• Shut down of Garda HQ laboratory in Q4	
Enabling successful start-up and	Successfully complete the	Partially Achieved
robust operational performance	Backweston transition in Q2	Both projects have been substantially
in new location	-	developed and were in testing
	AFIS Stabilisation	phase by end of 2023.
	• New Hamilton App	• Expected deployment in Q2 2024
Accreditation	Secure accreditation to ISO:2017	Achieved
	1/025 Quality Standard for drugs	A second that they found a second second second
		Accreditation for drugs service achieved in Q4-2023.

Figure 18: Other Targets

1 From FSI Strategic Plan 2019 – 2024

- 2 Strategic Plan 1.2: Increase the capacity of services offered today, through a focus on
- instrumentation, automation, process improvement, productivity and staffing
- 3 Strategic Plan 1.5: Expand the number of member states with active Prüm connectivity and exchange to all participating countries
- 4 Strategic Plan 1.3: Maximise the impact and effectiveness of resources to the Justice System and to society
- 5 Strategic Plan 2.8: Active participation in expert working groups e.g. ENFSI, UK and Ireland Association of Forensic Toxicologists (UKIAFT) and AFSP

(4) Climate Action

FSI's first climate action roadmap was developed in March 2023 and was revised in September 2023. FSI received the keys to its new fit for purpose, modern building in July 2023. The revised climate action roadmap acknowledges that FSI's main priority for 2023 and 2024 is the effective and efficient transition to its new building while maintaining services. This transition is crucial for many reasons, including meeting long-term Climate Change objectives. The rampingup of Climate Change interventions across the organisation, will be gradually and consistently reflected in subsequent revisions of the Climate Action Roadmap.

Full engagement with the requirements of the Climate Action Roadmap will not be seen until some stage in 2025, given the absolute priority that FSI has in dealing with the transition of Staff, Equipment and ancillaries to our new, fit-for-purpose, modern, brand new building.

From a Climate perspective, there are many positives in relation to the move by FSI to its new modern and fit-for-purpose building. One is the fact that all FSI Staff will be located in the same place. Therefore, FSI does not have to concern itself with initiating Climate Change interventions across multiple locations. Another is that the new fit-for-purpose building has modern, energy efficient lighting and heating systems. For example, there are currently approximately 460 Solar Panels on the roof of the new building. Initial discussions have taken place for more to be installed, over time.

It's important to reiterate that in relation to calculating the Public Sector Emissions, and Public Sector Energy Targets, contained in the Public Sector Climate Action Mandate, whilst the new fit-for-purpose building has modern, energy efficient systems, the overall Energy Efficiency Target, and the Emissions Reduction Target for FSI in the new fit-for-purpose building will not be fully known until 2026. This is due to the fact that the movement of Staff, Equipment and ancillaries to the new, modern, fit-for-purpose building is taking place on a gradual and coordinated basis in 2023 and 2024. Therefore, 2025 will be the first full year that FSI will have all its Staff in its new location.

A cross-functional Green team has been established with the responsibility to implement FSI's Climate Roadmap. This was initiated in November 2023 with some initial planning on Carbon Emissions reduction; Energy Efficiency; Sustainability; Water Use; and Waste Management.

However, Green team initiatives will wait until after the new FSI building is fully occupied with Staff and Equipment. Otherwise, if initiatives are brought forward whilst the new building is in transition, the fruits of the initiatives will be practically impossible to measure with any element of accuracy.

FSI currently provides data annually to the Sustainable Energy Authority of Ireland's (SEAI) Monitoring and Reporting (M&R) system, in order to determine FSI's trajectory towards its 2030 Climate Change Emissions, and Climate Change Energy Efficiency Targets. In future, progress on the implementation of the Climate Action Mandate will also be tracked through the SEAI M&R system.

5 Other Governance Items

FSI confirms its compliance with the relevant requirements of the Code of Practice for the Governance of State Bodies. In particular, FSI confirms that:

- 1. The Oversight Agreement for 2023 has been reached with the Department of Justice and that, as a non-statutory body without a Board, FSI is compliant with the relevant requirements of the Code of Practice for the Governance of State Bodies.
- 2. There were no Protected Disclosures relevant to FSI in 2023. FSI's Senior management received refresher training from the Department of Justice in 2023.
- 3. Public Sector Duty Action Plan. In 2023, FSI published a Public Sector Duty action plan. This document is prepared in accordance with Section 42 of the Irish Human Rights and Equality Commission Act 2014. The document outlines the human rights and equality issues of relevance to the functions and policies of FSI and outlines the actions to address these issues. A pre-existing cross-functional team within FSI, the Staff Development Group, has been tasked with implementing the actions identified for FSI.
- 4. FSI has implemented a risk management system which identifies and reports key risks and the management actions being taken to address and, to the greatest extent possible, to mitigate those risks. A risk register is in place which identifies the key risks facing FSI and these have been identified, evaluated and graded according to their significance. The principal risks identified for FSI in 2023, and associated mitigation strategies are summarised below:
 - a. Staffing plan insufficient to maintain case targets, transition work and other commitments (due to delays in recruitment and not attracting sufficient candidates). Loss of experience across disciplines (e.g. due to retirements) places additional burden on remaining staff. FSI has a workforce plan that is funded and is hopeful of recruiting more staff in 2024. This risk is also being managed through a prioritisation process agreed with An Garda Síochána and reflected in the Service Level Agreement between both organisations.
 - b. Service Disruption or suspension due to facilities fault or issue. There was on-going refurbishment in GHQ, including roof repairs and repurposing of internal spaces. This work has been largely completed.
 - c. Inadequate space for receipt and storage of exhibits, staff accommodation and laboratory work. This risk will be substantially reduced once the transition to the new Backweston facility is completed.
 - d. Contamination risks based on building/facility design are being mitigated through contamination control and workflow processes. The new building design offers a robust mitigation of this risk.
 - e. Instability of ICT systems, including Automated Fingerprint Identification System (AFIS) will lead to reduced productivity and may lead to service disruptions. To mitigate these risks, a roadmap of ICT improvements has been defined, including the stabilisation of the AFIS system.
 - f. Critical ICT Project delays impacting on transition to Backweston facility and other business plans (Prüm expansion, LIMS upgrades, BRN expansion to DNA....). Several projects progressed well over the course of 2023 and are expected to be closed out in 2024.

Other Governance Items

(continued)

5. Financial Aspects: FSI forms part of the Department of Justice Vote (Vote 24). FSI is included as Number A21 under the 'Criminal Justice Pillar' of the Justice Vote. As such, FSI is subject to the Public Financial Procedures, the Public Spending Code, and the Appropriation Account process.

The Public Financial Procedures (PFP) set out the principles of Government accounting as well as the more important ways in which they are applied in the day-to-day operations of Government Departments and Offices. The Procedures also outline the essential features of financial management.

All Irish public bodies are obliged to treat public funds with care, and to ensure that the best possible value for money is obtained whenever public money is being spent or invested. The Public Spending Code is the set of rules and procedures that apply to ensure that these standards are upheld across the Irish public service. The Code brings together in one place all of the elements of the value for money framework that has been in force up to now, updated and reformed in some respects. The Code is maintained under the management of Government Accounting Unit in the Department of Public Expenditure, NDP Delivery and Reform as a resource for the entire Irish public service.

The Annual Appropriation accounts show the financial transactions of Government Departments and Offices. The accounts are prepared in accordance with the Exchequer and Audit Departments Act, 1866 (as amended by the Comptroller and Auditor General (Amendment) Act, 1993) and with accounting rules and procedures laid down by the Minister for Public Expenditure, NDP Delivery and Reform. The accounts are a cash-based record of the receipts and payments in the year compared with the amounts provided under the Appropriation Act. The accounts also show prior year figures for comparison purposes. Some information of an accruals nature is included in the notes to the accounts. The Appropriation accounts are subject to scrutiny by the Office of the Comptroller and Auditor General (OCAG).

In early 2024, FSI was subject to an Audit, including financial aspects, by the Department of Justice's Internal Control Unit, in relation to 2023. The findings of the Audit were satisfactory.

6. Freedom of Information. PART 1 of Schedule 1 of the Freedom of Information Act 2014 provides details of Partially Included Agencies under the Act. Forensic Science Ireland does not come under the auspices of the Act insofar as it relates to records concerning, or arising from, the forensic criminal investigation functions performed by FSI, including the analysis of specimens or in connection with an investigation being undertaken by the Gardaí or the Garda Síochána Ombudsman Commission and the approval, supply, testing and maintenance of apparatus and of equipment. Dr. Dorothy Ramsbottom, the FSI Director of Corporate Services, is the FSI Freedom of Information Officer. 7. Data Protection. In relation to the vast majority of FSI's work, where personal data is processed, it is processed for the purposes of the prevention, investigation, detection or prosecution of criminal offences, or the execution of criminal penalties in the State, including the safeguarding against, and the prevention of threats to public security.

Consequently, the applicable data protection regime, for the majority of the work of FSI, is the Law Enforcement Directive (LED) which was transposed into Irish Law by Part 5 of the Data Protection Act 2018. In some instances, such as for example, recruitment, internal HR and employment matters, the General Data Protection Regulation (GDPR) applies to such processing of personal data. In the policy documents that FSI maintains and implements, it has been made clear whether the processing of certain personal data falls under the LED regime or the GDPR. The FSI Data Protection Officer is Dr. Dorothy Ramsbottom, who is the FSI Director of Corporate Services.

- 8. Ethics. Under the Ethics Acts, the FSI Directorate (i.e. the FSI Director General and the 5 FSI Directors) are required to complete Annual Ethics Returns.
- 9. FSI Quality System. Due to the nature of the work that FSI engages in on behalf of the State and on behalf of the Irish Criminal Justice system, FSI ensures that it has a Quality Procedures system to ensure that its work output is of the highest standard. FSI is accredited under the ISO 17025 (2017) standard. It is the policy of Forensic Science Ireland to achieve and maintain a high standard of quality and to carry out and report the results of its work in an objective manner using good professional practice. These Quality Procedures apply to all cases that FSI receives for analysis.
- 10. Audits. FSI is regularly audited to ensure that it maintains the standards required for the Irish Criminal Justice system.

Statement of Internal Control

Scope of Responsibility

On behalf of Forensic Science Ireland, I acknowledge responsibility for ensuring that an effective system of internal control is maintained and operated. This responsibility takes account of the requirements of the Code of Practice for the Governance of State Bodies (2016).

Purpose of the System of Internal Control

The system of internal control is designed to manage risk to a tolerable level rather than to eliminate it. The system can therefore only provide reasonable and not absolute assurance that assets are safeguarded, transactions are authorised and properly recorded and that material errors or irregularities are either prevented or detected in a timely way. The system of internal control, which accords with guidance issued by the Department of Public Expenditure and Reform has been in place in Forensic Science Ireland for the year ended 31 December 2023.

Capacity to Handle Risk

Forensic Science Ireland reports on all audit matters to the Audit Committee in the Department of Justice. Forensic Science Ireland's senior management team acts as the Risk Committee for the body. Senior managers from Forensic Science Ireland completed a risk register in 2023 and shared the findings with the Department of Justice. The Internal Audit Unit of the Department of Justice carry out audits on financial and other controls in Forensic Science Ireland. Forensic Science Ireland's senior management team has developed a risk management policy which sets out its risk appetite, the risk management processes in place and details the roles and responsibilities of staff in relation to risk. The policy has been issued to all staff who are expected to work within Forensic Science Ireland's risk management policies, to alert management on emerging risks and control weaknesses and assume responsibility for risks and controls within their own area of work.

Risk and Control Framework

Forensic Science Ireland 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 Forensic Science Ireland and these have been identified, evaluated and graded according to their significance. The register is reviewed and updated by the senior management team on a regular 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 responsibility for operation of controls assigned to specific staff.

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

- procedures for all key business processes have been documented;
- financial responsibilities have been assigned at management level with corresponding accountability;
- there is an appropriate budgeting system with an annual budget which is kept under review by senior management;
- there are systems aimed at ensuring the security of the information and communication technology systems, The ICT division of the Department of Justice provide Forensic Science Ireland with some ICT services. They have provided an assurance statement outlining the control processes in place;
- there are systems in place to safeguard Forensic Science Ireland's assets. Control procedures over grant funding to outside agencies ensure adequate control over approval of grants and monitoring and review of grantees to ensure grant funding has been applied for the purpose intended;

• The National Shared Services Office provide Human Resource and Payroll Shared services. The National Shared Services Office provide an annual assurance over the services provided. They are audited under the ISAE 3402 certification processes.

Ongoing Monitoring and Review

Formal procedures have been established for monitoring control processes and control deficiencies are communicated to those responsible for taking corrective action and to management, where relevant, in a timely way. I confirm that the following ongoing monitoring systems are in place:

- 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;
- An audit of financial and other controls is carried out by the Department of Justice Internal Audit Unit every 2 years;
- Reporting arrangements have been established at all levels where responsibility for financial management has been assigned; and
- There are regular reviews by senior management of periodic and annual performance and financial reports which indicate performance against budgets/forecasts.

Procurement

I confirm that Forensic Science Ireland has procedures in place to ensure compliance with current procurement rules and guidelines and that during 2023 Forensic Science Ireland complied with those procedures.

Review of Effectiveness

I confirm that Forensic Science Ireland has procedures in place to monitor the effectiveness of its risk management and control procedures. Forensic Science Ireland'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, the Audit Committee, and the senior management team. The senior management within Forensic Science Ireland is responsible for the development and maintenance of the internal financial control framework. I confirm that Forensic Science Ireland conducted an annual review of the effectiveness of the internal controls for 2023 as part of FSI's management review processes. It should be noted that this extended beyond financial controls and examined ICT controls, management practices and other governance processes.

Internal Control Issues

No weaknesses in internal control were identified in relation to 2023 that require disclosure in the financial statements.

Chris Empt

Chris Enright Director General Forensic Science Ireland

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