3# DNA FORENSIC SYMPOSIUM
DNAFORAFRICA | 12-14 JUNE 2023 | CAPE TOWN
- WHERE JUSTICE, SCIENCE AND HUMANITY INTERSECT -

South Africa's Forensic DNA Database Experience

BRIGADIER JOE H SMITH
FORENSIC DATABASE MANAGEMENT (FDM)
QUALITY MANAGEMENT
FORENSIC SERVICES
SOUTH AFRICAN POLICE SERVICE

FDM ISO9001:2015 Certification Compliance

OVERVIEW OF THE
NATIONAL FORENSIC DNA DATABASE
OF SOUTH AFRICA (NFDD)

- Criminal (Forensic Procedures) Amendment Act (No. 37 of 2013) – 2015 operational

- Supporting Regulations

- Penalty clause

- National Forensic Oversight & Ethical Board to ensure compliance to the Act

- NFDD is independent from the FSL (DNA testing laboratories)

- QMS with the SOPs

- FDM incorporating the NFDD is ISO9001:2015 Certification Compliance

OVERVIEW: NFDD

❖ NFDD consists of the following Indexes:
- Crime Scene Index
- Arrested Persons Index
- Convicted Persons Index
- Investigative Index
- Elimination Index
- Missing Persons & Unidentified Bodies Index

❖ Only the lab code, laboratory no, sample unique no, Station and CAS no., forensic DNA profile is stored – *no personal details on NFDD*

❖ Uploading to NFDD *is automated* from the FSL DNA testing laboratories based on business rules (html messaging)

❖ Expungement/ Deletion is *mostly automated* according to the retention period of the Act, on receipt of an electronic notification message from the CRIM system (managing the criminal record) at the Local Criminal Record Centres when a case is acquitted, convicted, presidential pardon or withdrawn. Application received is processed through manual deletion.

❖ Only inter-case searches are conducted (ie between different crime scenes/ station & case numbers) – the intra-case (ie matches of reference sample profiles with the same station & case number/ crime scene is conducted by the FSL DNA laboratories.

MATURITY OF THE NFDD
(ACTIVE FORENSIC DNA PROFILES AS ON 9TH JUNE 2023)
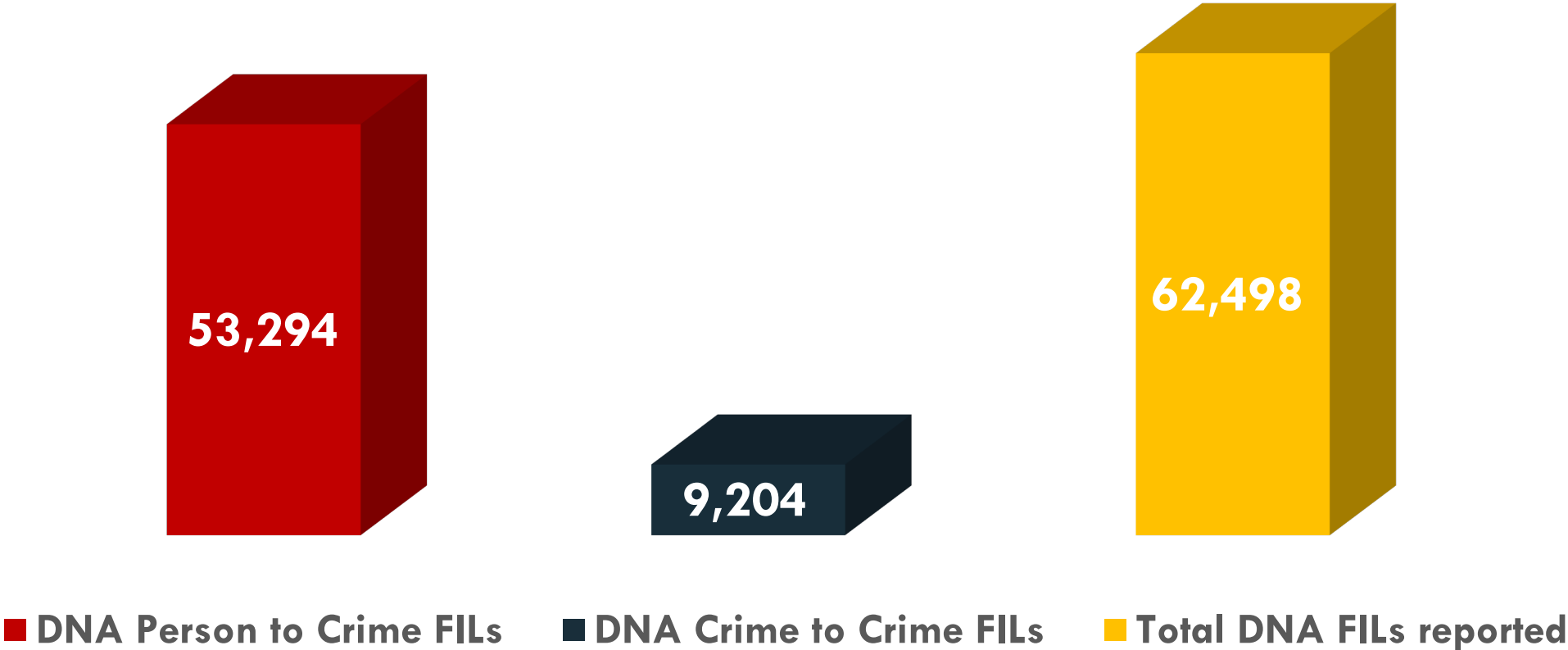
Maturity: **1 210 933**

Total Deleted forensic DNA profiles: **785 748**

645093
53%

565840
47%

■ **Crime Scene Index**   ■ **Person Categories**
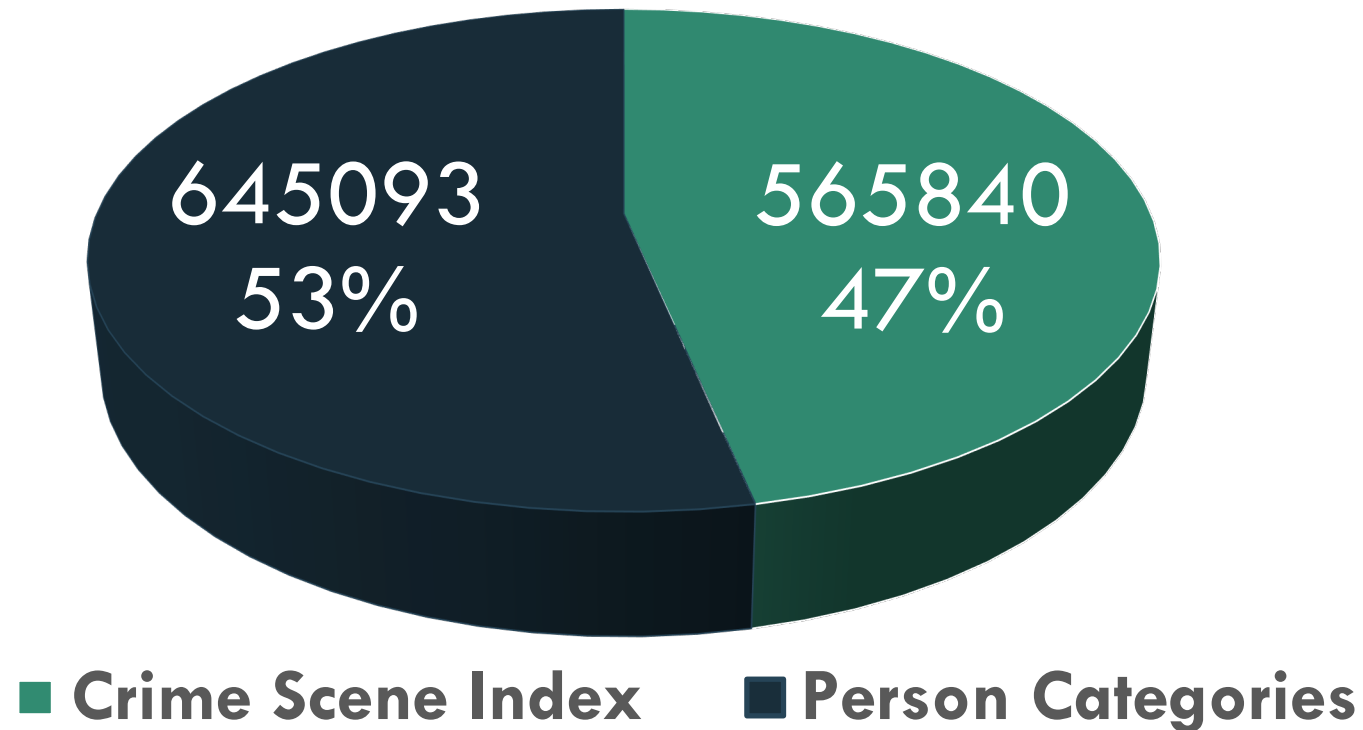
DNA FORENSIC INVESTIGATIVE LEADS (FILs) REPORTED

22.3% DNA Person to Crime FILs are linked to **5** and more crime scenes/CAS no's

40.1% DNA Person to Crime FILs are linked to **3** and more crime scenes/CAS no's

- DNA Person to Crime FILs: 53,294
- DNA Crime to Crime FILs: 9,204
- Total DNA FILs reported: 62,498

HIGH LEVEL WORKFLOW OF DNA FILs

Crime Scene/ Buccal Sample Collection → Forensic DNA Testing → Upload of forensic DNA profiles & Comparative searching on the DNA database → Verification of the candidate DNA forensic investigative leads (FILs) → Reporting of the DNA FILs → Follow-up & investigation of the DNA FIL → Exclusion or finalization or submission to prosecuting authority

OVERVIEW OF EXTERNAL PROCESSES TO NFDD

- Buccal sample is taken by authorised person (trained police official) when the fingerprints are taken from an arrested and charged person

- The unique DB number of the buccal samples and fingerprint number is captured against the Station and CAS no. and the person particulars on the CAS/ICDMS system used at the Station.

- FSL Admin system from the testing laboratories & CRIM system used by the LCRC (responsible for managing the criminal record & the fingerprint database) interfaces with the CAS / CRIM system

- FSLAdmin sends a notification to CAS/ICDMS:
  - All receipts at the laboratory
  - Profile obtained or not obtain on buccal samples and if a retake is required
  - Forensic DNA match report or outcome report is submitted electronically from the forensic system to the CAS/ICDMS system

- CRIM electronically system sends NFDD updated information on court outcomes (acquitted, convicted, withdrawn and also presidential pardon) and this is linked to the DB number in order that NFDD can manage the expunge

NFDD SYSTEM

❖ NFDD system solution was developed locally by SITA according to our specification

- Interfaces with the DNA testing labs and Automated uploading of the forensic DNA profiles
- High Stringency comparative searches
- Each comparison outcome is assigned a unique reference number (distinguish between DNA Person to Crime FILs and DNA Crime to Crime FILs – candidate FILs
- The candidate FILs are assigned to a forensic examiner to perform QC & verify the candidate lead and then a report is compiled
- All FIL are technically reviewed before electronically communicated to the IO (via forensic system to the CAS/ICDMS system)
- The case is automatically opened on the CAS / ICDMS system for follow-up and investigation by the detective
- Detective must capture the follow-up and investigation on the CAS/ICDMS system

ESTABLISHING A FORENSIC DNA DATABASE

- **Taken the decision**

DEFINE THE PURPOSE OF THE FORENSIC DNA DATABASE

Example: To establish and maintain a forensic DNA database in order to perform comparative searches for the following purpose:

❖ To serve as a criminal investigative tool to fight crime

❖ To prove the innocence or guilt of an accused persons in the defence or prosecution of that persons

❖ To exonerate a person convicted of a crime

❖ To identify persons who might have been involved in the commission of offences, including before the operational date of the Act

❖ To assist with the identification of missing persons and unidentified persons or unidentified human remains

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TAKE A STEP BACK AND LOOK AT THE BIGGER PICTURE
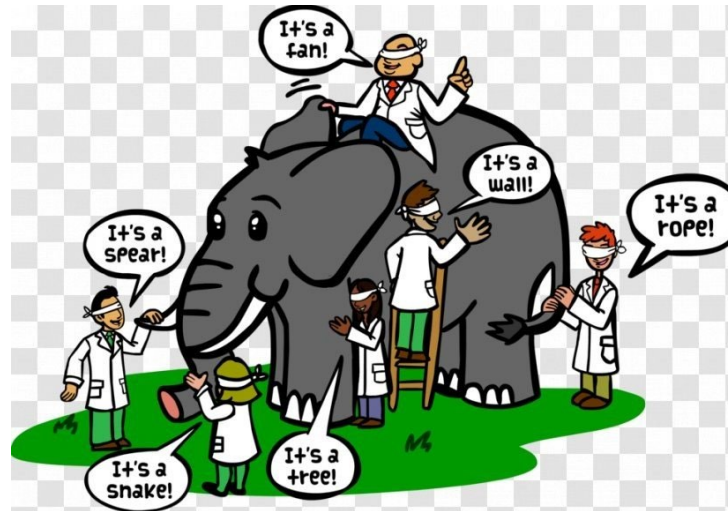
Source: https://www.emmanuel.tas.edu.au/big-picture/2022/taking-a-step-back-and-seeing-the-bigger-picture

❖ Do not focus only on establishing & setting-up the database (eg database solution/ software) only

❖ Adopt the ISO process approach where you look at the inputs and outputs of the database and map the value chain from crime scene processing, transporting of exhibit material / samples & submission for forensic DNA testing, uploading of the profiles to the database, retention period of samples and profiles, expungement process, communication back to the submitting agencies and reporting of the forensic investigative leads (FILs).

❖ Identify the interested parties in the value chain and the governances

❖ Have a clear picture of the roadmap that needs to be done and ensure am integrated process is developed

DO RESEARCH & COLLECT INFORMATION

https://www.google.com/search?q=research&tbm=isch&sa=X&ved=2ahUKEwjs-cbD37X_AhXRg1wKHdFUB7UQ0pQJegQIDRAB#imgrc=OkOCqFmHXay9wM

- ❖ Collect information on the legislative framework of different countries (also consider case law such as the *Marper* case)
- ❖ Consider the human right & ethical issues – you need to strike a balance?
- ❖ What lessons were learnt by other countries
- ❖ What is your country's current legislation framework iro collection of bodily samples, storing of profiles & performing comparison searches on a DNA database. What is the gap? What needs to be legislated.
- ❖ What is the readiness of the citizens for a forensic DNA database? Awareness programs?

RESEARCH & PLANNING

❖ Analyse you crime stats and court outcomes in particular crime scenes/ exhibit material that has potential DNA

❖ What needs to be optimised in the value chain from crime scene to analysis to DNA database to detective to court processes

❖ What gaps must be addressed in Quality Management System supporting the value chain

❖ Identify the resource gaps in the value chain (people/ forensic examiners/ detectives/ court officials/ correctional service officials, equipment, collection kits, laboratory processes & specialised equipment, gaps in the LIMS and software solutions, DNA database solution, interfacing of the systems, management of follow-up and investigation of the DNA FILs

❖ What are the financial implications? Affordability? Feasibility

CONSULTATION WITH INTERESTED PARTIES

Liaise with different interested parties
- ❖ Other forensic experts/ testing laboratories
- ❖ Legal experts/Judicial officers/ prosecuting authorities/ defence/ state law advisors,
- ❖ Medical practitioners
- ❖ Professional oversight bodies (eg Health Professional Council & Medical Board)
- ❖ Police officials/ Detectives
- ❖ Correctional Service officials
- ❖ IT department and developers
- ❖ NGOs that will take care on educating the Public

Identify champions and obtain their buy in that will support the establishing of the DNA database and implement an integrated value chain process

DNA DATABASE SYSTEM SOLUTION

The DNA database should be configured to:

- With different indices and configured with retention period for each index automated deletion according to the regulatory framework
- Interfacing/ interoperability between the DNA lab LIMS and the DNA database for automated upload
- Different stringency settings (eg high of normal direct comparison searching and medium for familial searching)
- Must be able to interface the DNA database with a system solution to manage the verification of the candidate DNA FILs and communication to the system solution used by the detective to manage the investigation of criminal casework
  - A unique system number should be allocated to the DNA FIL
  - Should be able to allocate the DNA FIL to a forensic examiner to perform the configuration
  - Ideally the system should compile a draft DNA FILs report that can be updated by the forensic examiner and preferably electronically signed
  - The verified lead should be reviewed independently on the system (ie assigned to the reviewer)
  - Thereafter it should be able to submit the DNA FILs report to detective and an electronic message to each of the linked cases
- Ensure that the system solution of the detective is configured to manage the status of investigation of the FILs
- Ideally, the DNA FIL reports must also be communicated to the prosecuting authority

THANK YOU