Reitox academy for the EMCDDA partner countries

(Armenia, Libya, Tunisia, Ukraine, Kyrgyz Republic)

December 11, 2023

Drug Related Deaths (DRD) – Data collection

National Institute of Legal Medicine and Forensic Sciences

Antonio Castañera

Portugal

- The National Institute of Legal Medicine and Forensic Sciences, I.P. (INMLCF, I.P.), it is considered a national institution of reference in Portugal and has the nature of a State laboratory being.

- Integrated in the indirect administration of the State working under attributions of the Ministry of Justice.

- Administrative and financial autonomy and its own assets.

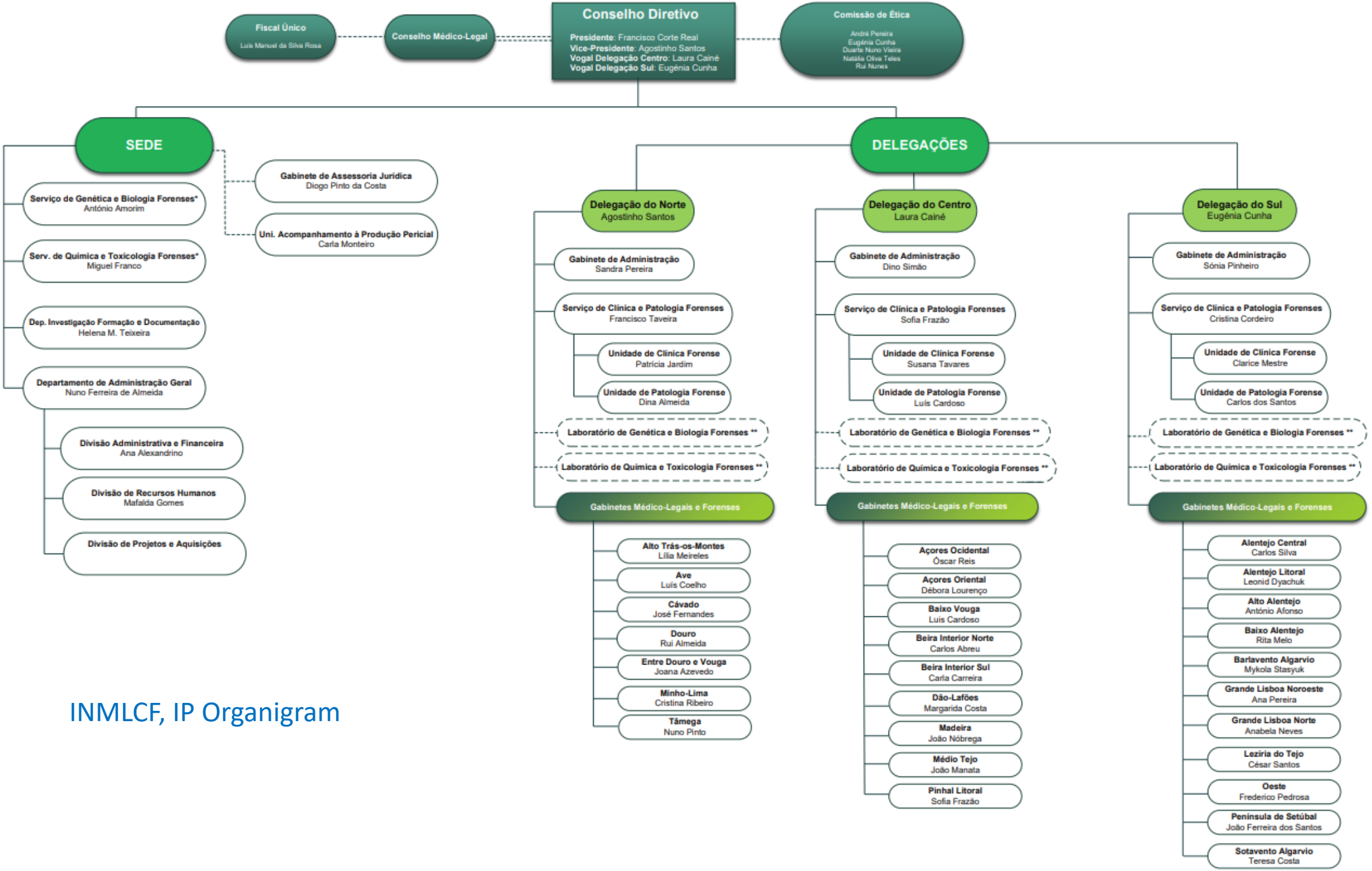
Mission: To cooperate with the courts, the Public Ministry and with the criminal police bodies and other services and entities that intervene in the justice administration system. To carry out the forensic medical examinations requested as well as provide specialized technical and laboratory support.

Values:

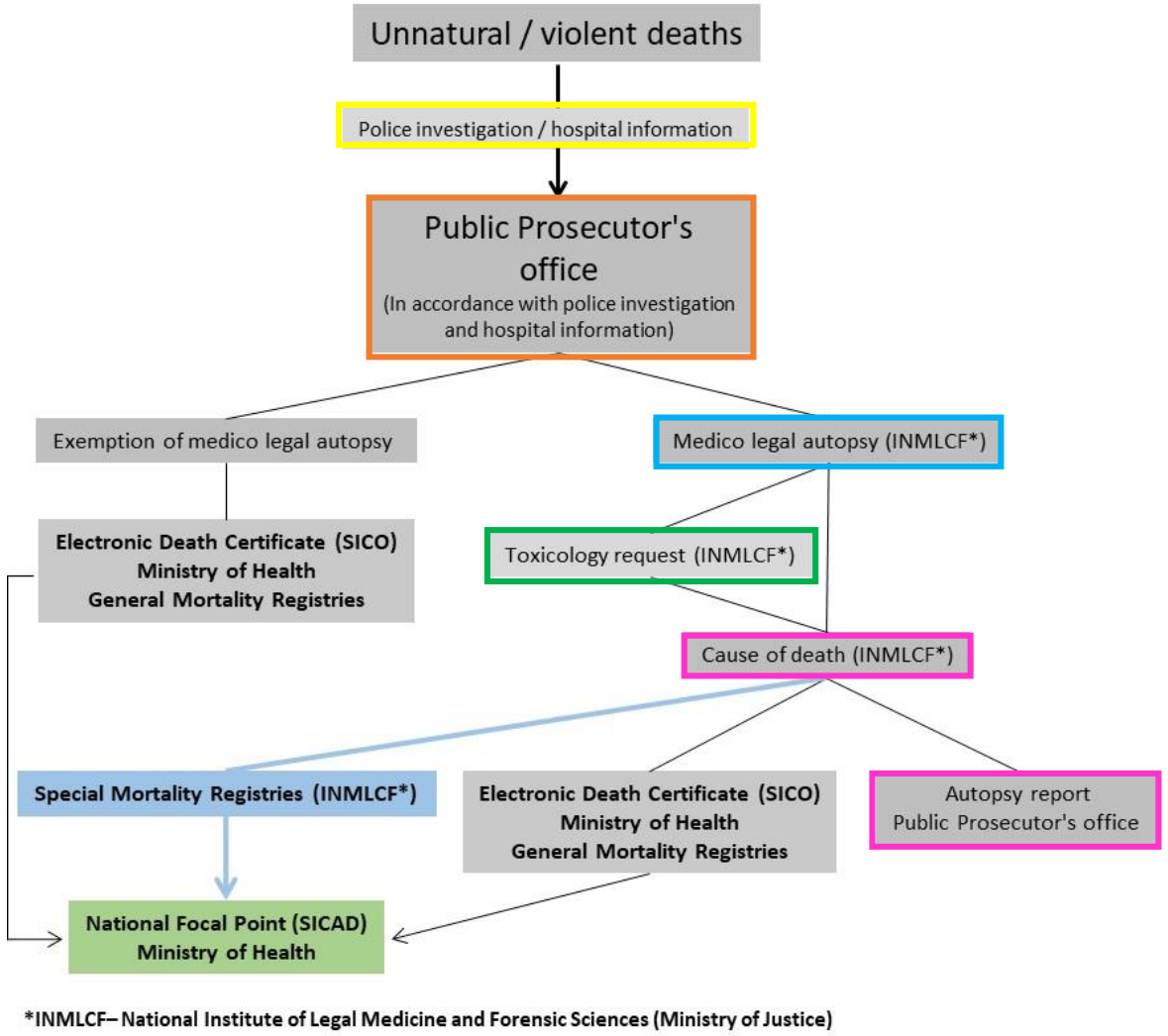
- To pursuit the public interest
- Exemption and Impartiality
- High Standards and Quality

INMLCF, I.P. Quality Standards:

- ✓ Certification: ISO:9001 – Quality Management System
- ✓ Accreditation:ISO:17025 – General requirements for the competence of testing and calibration laboratories.



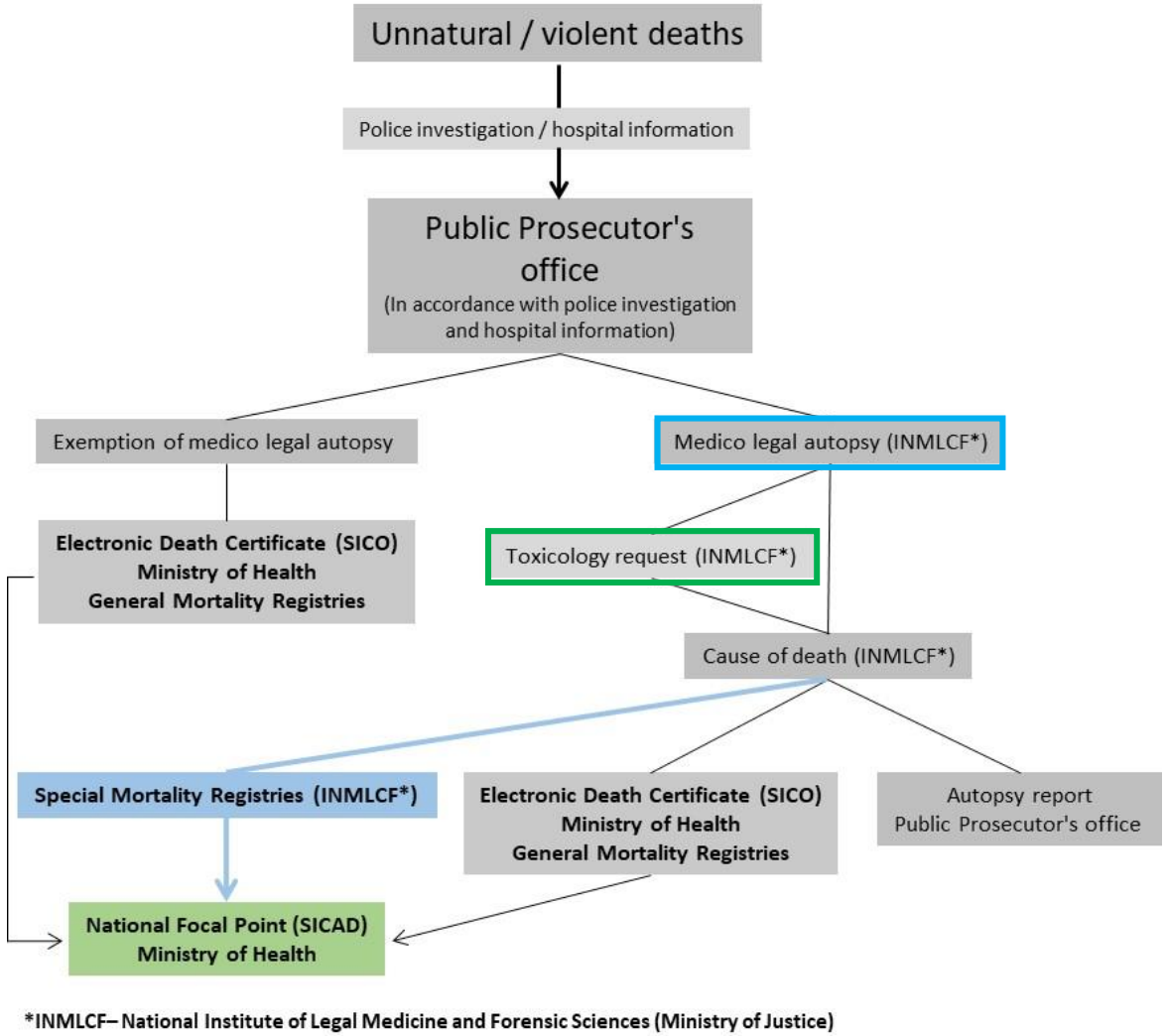
INMLCF, IP Organigram



*INMLCF– National Institute of Legal Medicine and Forensic Sciences (Ministry of Justice)

Key Issues

- **Police investigation** (Forensic doctor: yes / no)
- **Public prosecutor** (medico legal autopsy: yes / no)
- **Forensic pathologist** (toxicological analysis: yes / no)
- **Forensic toxicology** (analytical protocol: screening / confirmation)
- **Forensic pathologist** (final certificate with cause of death: overdose / natural / indeterminate)



*INMLCF– National Institute of Legal Medicine and Forensic Sciences (Ministry of Justice)

- **Forensic pathologist** (toxicological analysis: yes / no)
- **Forensic toxicology** (analytical protocol: screening / confirmation)

Forensic Pathologist	Forensic Toxicology
- Ethanol	- Quantification of ethanol in blood by GC/HS/FID
- Drugs of abuse	- Screening, confirmation and quantification of drugs of abuse by LC/MSMS
- Medicines	- Screening, confirmation and quantification of medicines by LC/MSMS
- Pesticides	- Screening and confirmation of pesticides by LC/MSMS
- Carbon monoxide	- Detection of carboxihemoglobine by UV/VIS
- Others	- Others

GC/MS
Agilent 5973

LC/MS Waters
Quattro micro

UPLC/MS Waters
TQD

LC/MS Sciex
6500 QTrap

GC/LC TOF Impact II
Bruker

2004

- Complex analytical procedures:
  - SPE extractions
  - Derivatization
- High volume samples (0,5 – 1 mL).
- Low sensitivity.
- Many analytical procedures.
- Not very versatile technology

2005 / 2009

- Easier analytical procedures
- Sample volume reduction (0,2 – 0,5 mL).
- Sensitivity improvement (MS → MSMS)
- Versatile technology

2021 / 2022

- Easier and faster analytical procedures
  - Protein precipitation
- Sample volume reduction (0,1 – 0,2 mL).
- High throughput
- Very versatile technology
- Analysis of unkown substances

Forensic toxicology analytical evolution

2004

GC/MS
Agilent 5973

- Sample volume: 1 mL
- Solid Phase Extraction
- Run time: 35 min
- Detected substances: App 50

Medicine analysis evolution

2021

LC/MS Sciex
6500 QTrap

- Sample volume: 0,2 mL
- Protein precipitation
- Run time: 15 min
- Detected substances: App 200

Reitox Academy for the EMCDDA partner countries

2004

GC/MS
Agilent 5973

- **Opiáceos: Morfina, Codeína, 6-MAM, Metadona, Papaverina**
- **Cocaína: Cocaína, benzoilecgonina, EME, Ketamina, Atropina**
- **Canabinóides: THC, 11-OH-THC; THC-COOH**
- **Anfetaminas: Anfetamina, MDA, MBDB**
- **Metanfetaminas: Metanfetamina, MDMA; MDE**

Drugs of abuse analysis evolution

2022

UPLC/MS Waters
TQD

GC/LC TOF Impact
II Bruker

5-IT
PMA
6-APDB
PMMA
Ketamina
Methoxetime
5-MeO-DALT
4-chloro-2,5-DMA
25C-NBOMe
25B-NBOMe
25I-NBOMe
Methylone
3,4-DMMC
MDPV
AB-CHMINACA met.1MA
5-F PB 22-3 carboxindole
AM2201 6-hydroxyndole
AB-FUBINACA met3
JWH N-pentanoic acid
5-F-APINACA N-(4-hydroxybutyl)
4-MEC, JWH073 butanoic acid
JWH073 N-(4-hydroxybutyl)
JWH250 N-pentanoic acid
MDMB-CHMICA
MDMB-CHMICA O-desmethyl acid
MDA
Metanfetamina
Mephedrone
α-PVP

Pentedrone
JWH250 N-(5-hydroxypentyl)
JWH073 N-(3-hydroxybutyl)
AM2201 N-(4-hydroxypentyl)
JWH018 N-(hydroxypentyl)
JWH122 N(4-hydroxypentyl)
JWH210 N-pentanoic acid
JWH210 N-(4-hydroxypentyl)
4-Methylaminores
α-PVT
4-4-Dimethylaminorex
AH7921
MT-45
JWH018 N-pentanoic acid
Anfetamina
MDMA
JWH210 5-Hydroxyndole
THC-COOH
Morfina
Codeína
6-MAM
Benzoilecgonina
Tramadol
Cocaína
EDDP
Metadona
Fentanil
11-OH-THC
THC

Canabidiol
Canabinol
HMMA
Buprenorfina
M-CPP
Naltrexona
Naloxona
EME

New Psychoactive Substances (NPS)

"Substâncias desconhecidas"

Toxicology ID	Requested by:	Substances Detected	Gender	Age	Pathology ID	Etiology	Death Type 1	Death Type 2	Death Type 3	Death Type 4	(A) Intoxication (B1) Natural (B2) Accident (B3) Suicide (B4) Homicide (B5 Undetermined
2022/001627/LX-T	GML Grande Lisboa	Methadone EDDP Tramadol N-Desmethyl-Tramadol O-Desmethyl Tramadol	Male	44	2022/000078/VX-P-TF	Accident	Violent	Intoxication	Medicines	Others	A
2022/002077/LX-T	SCPF	Ethanol Cocaine Benzoilecgonine	Male	35	2022/000788/LX-P-TF	Homicide	Violent	Trauma Injuries	Mechanical agent	Others	B4
2022/000051//LX-T	GML Grande Lisboa	Ethanol	Male	68	2021/000317/LX-P-TF	Suicide	Violent	Asphyxia	Hanging	Null	B3

- **Forensic toxicology**

STARLIMS

- **Forensic pathologist**

MedLeg

STAR LIMS

MedLeg

2023

2023

SIMIP
SISTEMA INTEGRADO DE INFORMAÇÃO MÉDICO PERICIAL

INMLCF Integrated Database
(in force since October 2023)

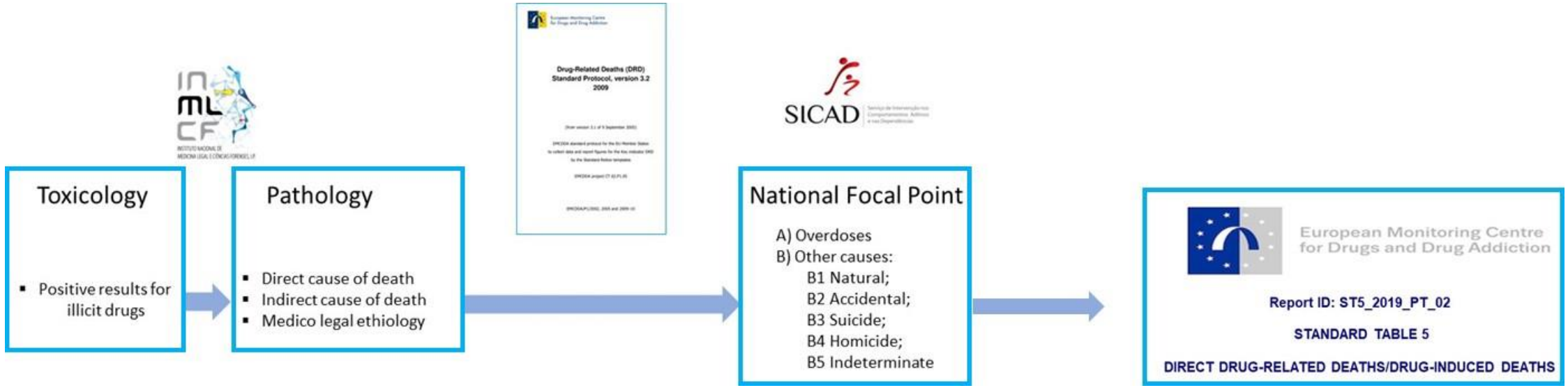
Reitox is the European information network on drugs and drug addiction created at the same time as the EMCDDA.

Members of the Reitox network are designated national institutions or agencies responsible for data collection and reporting on drugs and drug addiction. These institutions are called 'national focal points' or 'national drug observatories'.

SICAD
Serviço de Intervenção nos Comportamentos Aditivos e nas Dependências

National focal points

- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czechia
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Ireland
- Italy
- Latvia
- Lithuania
- Luxembourg
- Malta
- Netherlands
- Norway
- Poland
- Portugal
- Romania
- Slovakia
- Slovenia
- Spain
- Sweden
- Türkiye



- The **number of DRD is dependent** of:

  - The autopsies in which it was requested toxicological analysis by the forensic pathologist
  - The autopsies in which it was possible to obtain information about the cause of death
  - The cause of death by overdose is dependent on the criteria of each forensic pathologist
  - The toxicological analytical protocols.

European Challenges:

- Collecting data from mortality register data and/or from special registries.
- High variability in structures and processes across EU countries (e.g. institutions, laboratories equipment's).
- Toxicology scope.
- Quality standards: analytical method validations or/and ISO accreditation system.

National Challenges:

- Interaction and communication between Pathology and Toxicological services
- Missing key information (case details)
- Result interpretations
- Keep up new challenges (new tendencies: New Psychoactives Substances, nitazines, sodium nitrite….)