The national occupational doses registry in France: SISERI

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I. Objectives of national dose registry in France

They are set in the French regulation

To centralize, to consolidate and to store all dosimetric results of the individual monitoring of each worker exposed to ionising radiation in order to constitute the national register of individual occupational doses with 3 major purposes:

- To control individual occupational exposures and to check the respect of dose limits
- To optimize radiation protection of workers
- To produce statistics of occupational exposure and data for epidemiological studies

Give access to the data to control agents, occupational physicians, radiation protection experts and officers and workers, according to the rules defined by the legislation

Implemented in 2005, the information system for occupational dosimetry registration (SISERI) was developed at the request of the Ministry of Labour (authority) and its management was entrusted to IRSN (TSO)
II. Which workers?

- Categories A and B workers (and non classified workers being monitored)

- Employees and others whatever their employment status
  - Permanent workers
  - Outside workers
  - Temporary workers
  - Trainers,…

- Some crossborderer workers

- Activity fields: medical and veterinary activities, nuclear field, industrial field, research and education, aircrew, NORM activities, workers exposed to radon.
Number of monitored workers in 2018 (external dosimetry)

390 363 workers

Civilian and military activities using artificial sources of ionising radiation (365 980)

Medical 221 875 57 %

Nuclear 86 702 22 %

ND¹ 20 027 5 %

Industry 15 722 4 %

Research and education 12 414 3 %

Aircrew 23 356 6 %

Others² 9 190 3 %

Natural radioactivity

¹ ND = undetermined activities
² Others = crisis management, control activities, …
III. Which data?

- III.1 Administrativ data
- III.2 Dosimetric data
- III.3 Status of data
III.1 Administrativ data

- Worker’s identification
- Employer’s identification
- Context of exposure:
  - Activity field and activity sector, according to the national classification
  - Occupation
  - Status of employment
  - Work duration
III.2 Dosimetric data (1/2)

- EXTERNAL DOSIMETRY

- External passive dosimetry results
  - Whole body (Hp 10, X+g, neutrons) + corresponding Hp 0.07 (mSv)
  - Extremities (Hp 0.07, X+g, neutrons, wrist or finger) (mSv)
  - Eye lens (Hp 3)
  - Period (quaterly or monthly)

- For each operation in a controlled area: external operational dosimetry results
  - Whole body (Hp 10, X+g, neutrons) + corresponding Hp 0.07 (mSv)
  - Transmission to SISERI is mandatory only for activities in nuclear facilities
III.2 Dosimetric data (2/2)

- **INTERNAL EXPOSURE SURVEILLANCE**
  - Results of radioactivity measurement of each radionuclide targeted in vivo or in vitro in biological samples (Bq)
  - Results of committed effective dose assessment performed by the occupational physician when a contamination has been found (mSv)

- **AIRCREW DOSES**
  - Calculated from each flight dose value (SIEVERT-PN system) (mSv)

- **DOSES RESULTING FROM INDIVIDUAL MONITORING OF OCCUPATIONAL EXPOSURE TO RADON** (mSv)
Registered data: evolution over the time

- Annual dose
- Results per period (monthly, quarterly)
- Passive doses: global then distinction between photons and neutrons
- Operational doses
- Aircrew doses
- Internal exposure
  Activity and doses

Population = 1,6 \times 10^6 travailleurs
III.3 Status of personal data

- External dosimetry results and administrative data: sensitiv data

- Internal exposure surveillance data: medical data

- Specific procedure of securisation consisting in:
  - Declaration of employers in the system (numerically signed protocol)
  - Declaration by the employer of persons having an access for its monitored workers (occupational physician, RPO and RPE)
  - High authentication level (personal numerical certificate instead of login/password)
IV. Which actors?

Transmission:
- Employer
- Accredited service
- RPO, RPE

Restitution - Consultation:
- Control agent
- Employer
- RPO, RPE
- Occupational doctor

National dose register = SISERI information system
IV.1 Data transmission

- Administrativ data (worker’s identification, context of exposure: occupation,...) are sent by the employer.

- Dosimetric data (excepted operational doses) are sent by:
  - 7 passiv dosimetry services
  - 15 medical laboratories or occupational health services accredited for in vitro or in vivo assessment of internal exposure
  - SIEVERT-PN (aircrew doses)
## IV.2 Data consultation

<table>
<thead>
<tr>
<th>Worker</th>
<th>Dosimetry results over professional life on (e-)mail demand (no web access)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occupational doctor</strong></td>
<td>Web access over the last 48 months (including global life occupational dose), detailed results over professional life on (e-)mail demand</td>
</tr>
<tr>
<td>RPO, RPE</td>
<td>Web access over the last 24 months</td>
</tr>
<tr>
<td>Control agent</td>
<td>Web access over the last 24 months</td>
</tr>
<tr>
<td>Research institut</td>
<td>Only aggregated data</td>
</tr>
</tbody>
</table>
V. Which use of the registered data?

- V.1 Management of overexposure
- V.2 Production of statistics
- V.3 Epidemiological studies
- V.4 Other use
V.1 Management of overexposure

- The dosimetry service sends an alert to the occupational doctor, the employer, and IRSN.

- The occupational doctor investigates to determine if the dose was or not received by the worker.

- The occupational doctor only has the possibility to modify the dose.

- The conclusion of investigation has to be sent to IRSN so that the national registry is kept up to date, by the way of a paper questionnaire.
V.2 Production of statistics

- IRSN is in charge of the annual report on occupational exposure in France.
- The data for external exposure is directly extracted from the national register.
- This report is sent to national authorities and also published on the web (in French).
- This report’s data are also registered on ESOREX-platform and used to answer UNSCEAR’s collection for global survey.

https://esorex-platform.org/
V.3 Epidemiological studies

- Access to aggregated data extracted from the national dose register

- Access to IRSN’s epidemiologist or to researchers from other institutes

Different populations of workers have been or are focused on:

- Nuclear workers (permanent, contractors)
- Medical staff
- Aircrew
- ...

V.4 Other use

- Data extraction and analyse for/by IRSN RP experts
  - Authorization’s instruction for one specific facility
  - Specific studies on relevant RP topics
    - Extremity dosimetry in interventional radiology
    - Occupational exposure in gammagraphy
    - ...

- Data extraction and analyse for French authorities