



Federal Office for
Radiation Protection

The German National Dose Register ***Strahlenschutzregister (SSR)***

Dr. Uwe Oeh

IAEA Workshop

20–24 March 2023, Bangkok

Content

- **Overview**
- **Monitored sectors**
- **Personal ID number**
- **Data submitting services**
- **Data Content**
- **Interfaces with the SSR**
- **Interface specifications**
- **Technical demonstration**

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Federal Office for
Radiation Protection

Overview

The German National Dose Register *Strahlenschutzregister (SSR)*

Head

Dr. Uwe Oeh

attached to

Federal Office for Radiation Protection

subordinated to

Federal Ministry for Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

located in

Munich

E-Mail: ssr@bfs.de



Radiation Protection Act, § 170

(Implementation of Council Directive 2013/59/Euratom)

- Radiation Protection Ordinance
- General Administrative Directive for Radiation Passbooks
- Guidelines
 - requirements for dosimetry services
 - for person dosimeters
 - for determination of external doses, internal doses, radon doses, aircrew doses

History of the German National Dose Register (SSR)

1989: Foundation of BfS and **SSR**

1992: Collection of issuance data on **radiation passbooks**

1997: Collection of doses from **external exposure**
(transfer of dose records from dose services back to the 1960s)

2001: Collection of doses from **radon and other natural sources**

2002: Collection of doses from **internal exposure**

2003: Collection of doses from **cosmic radiation**

2019: Implementation of **personal number** in the SSR based on the
social security number (by encryption)



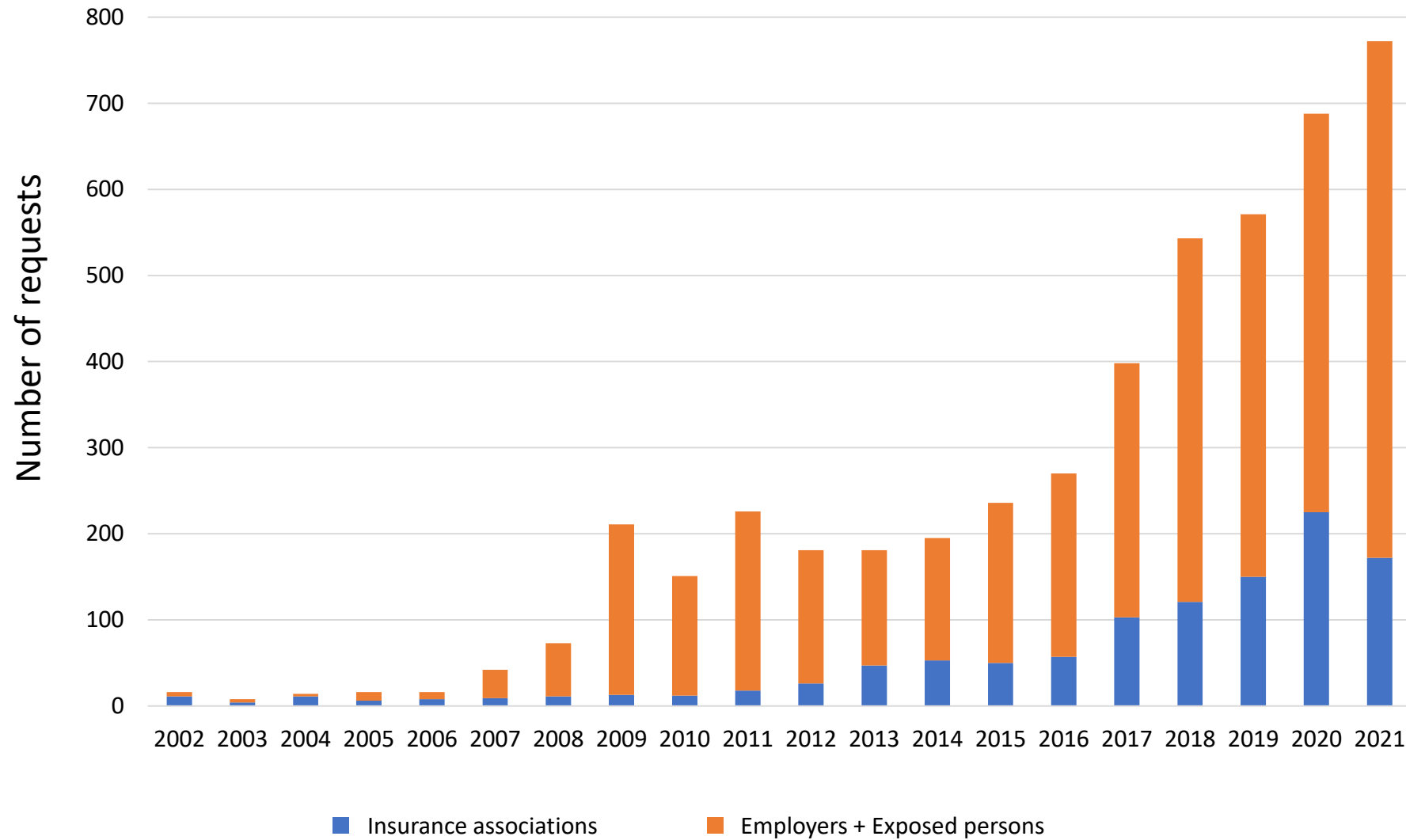


Tasks of the German National Dose Register (SSR)

- **Central recording of**
 - occupational radiation dose
 - radiation passbook issuance data
- **Issuance of a personal ID number**
 - based on the social security number
- **Central surveillance of**
 - dose limits
 - issuance of radiation passbooks
- **Data evaluation and research**
 - using data for optimisations
 - support of radiation epidemiology
- **Provision of dose data for**
 - Employers
 - Exposed persons
 - Insurance associations

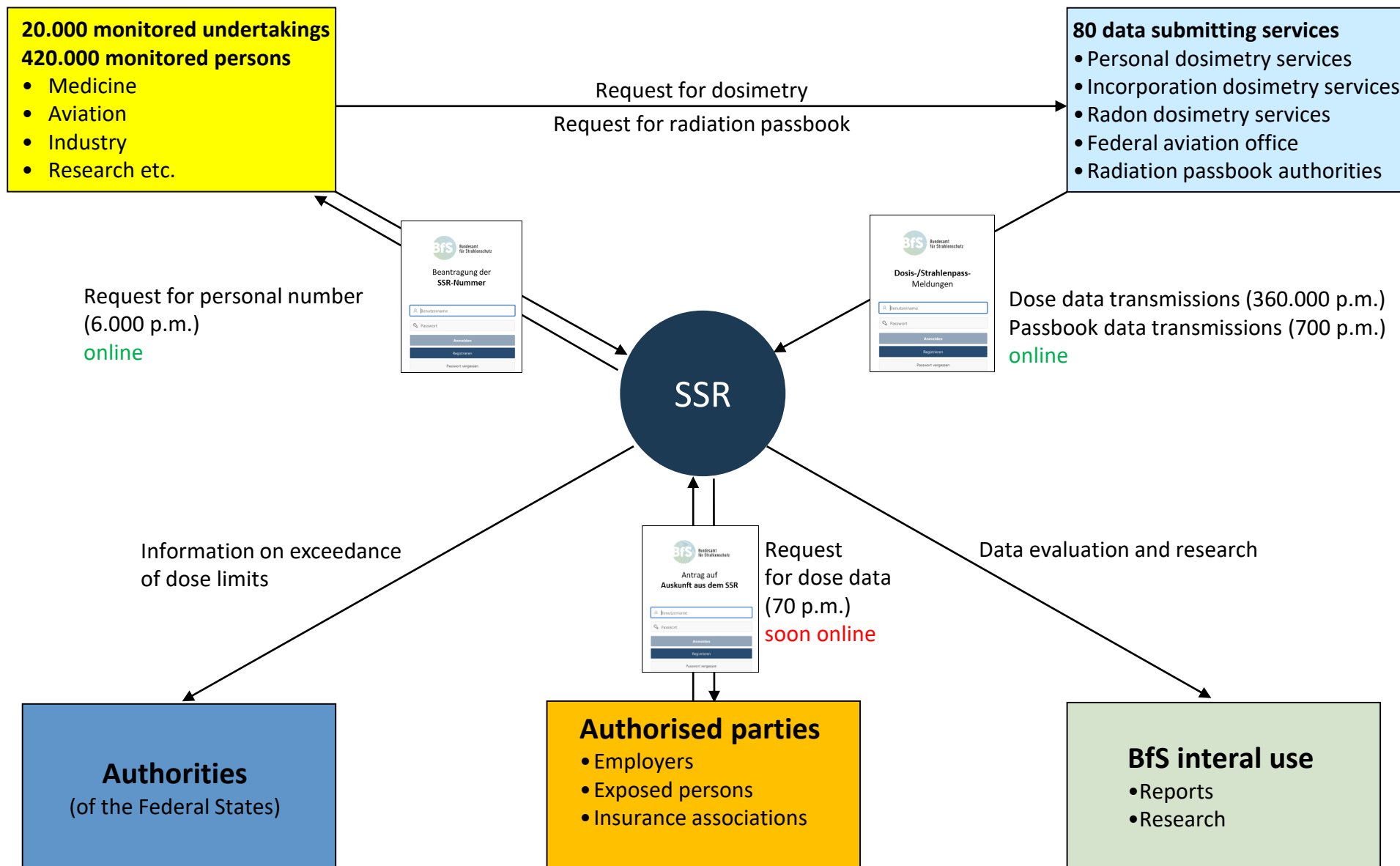


Requests for information from the SSR





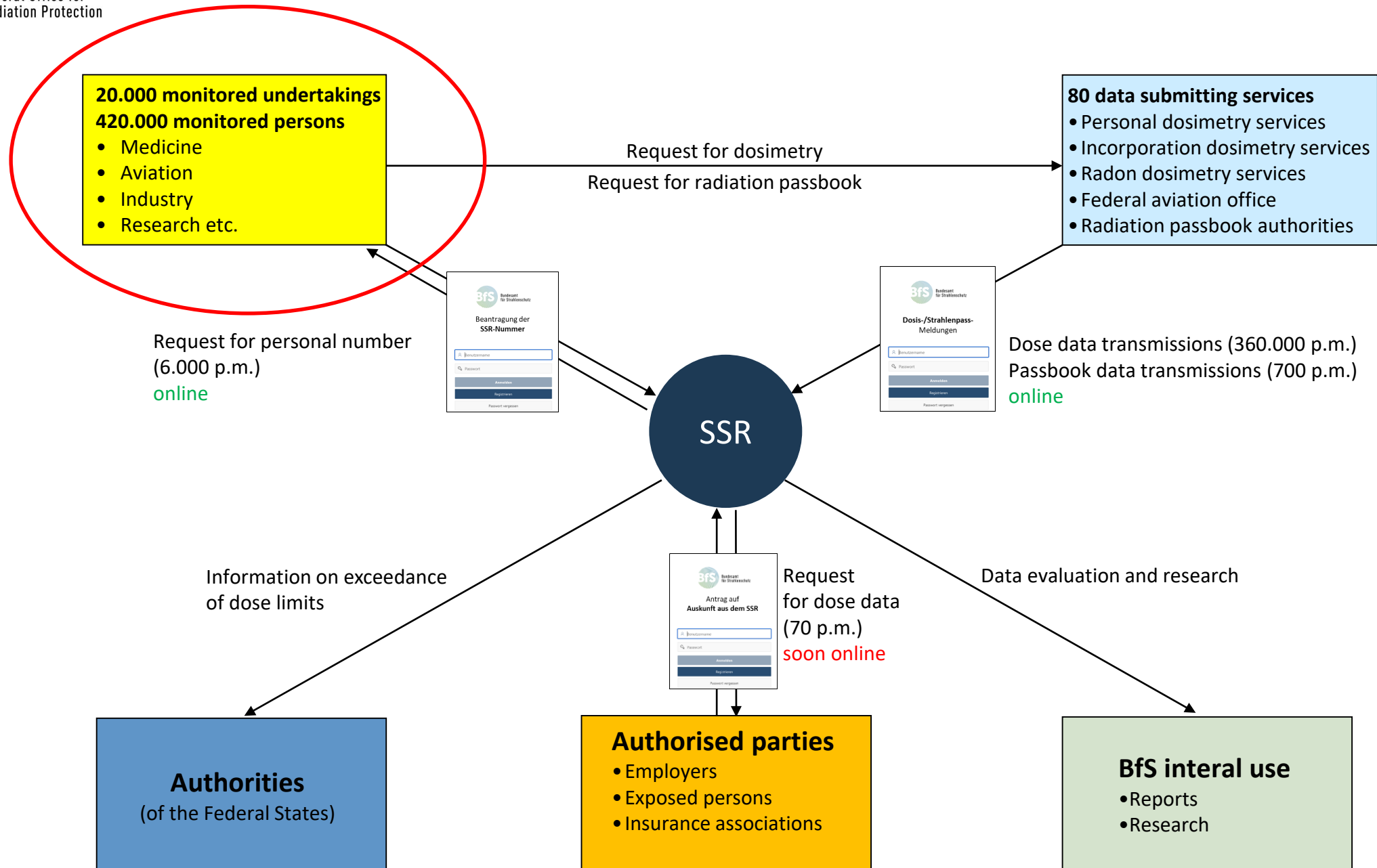
Overview on Occupational Radiation Monitoring in Germany





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Monitored **Sectors**

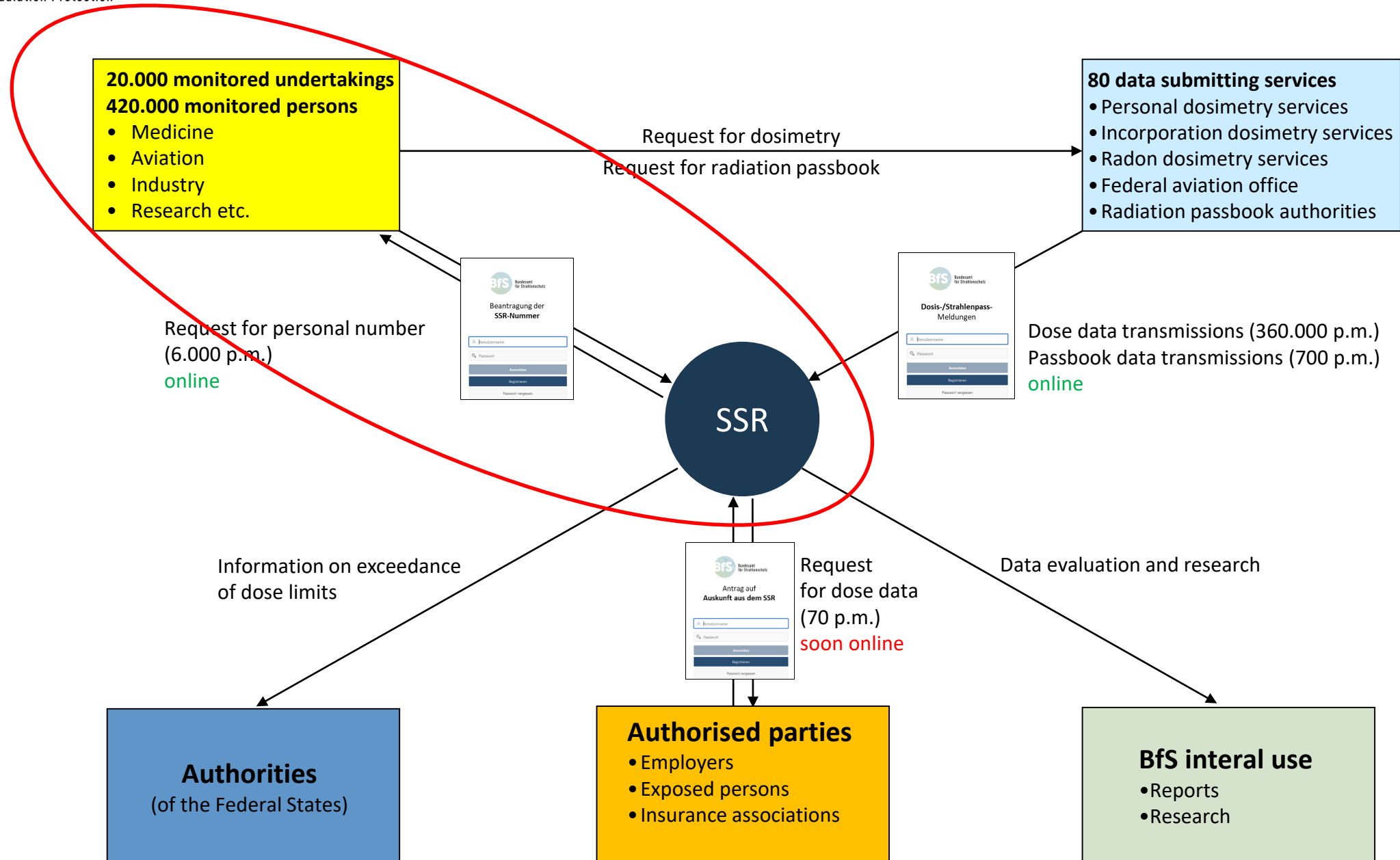
- Medical Sector
- Nuclear Industry
- General Industry
- Research and Education
- Aviation
- Radon Workplaces
- **Emergency Response**





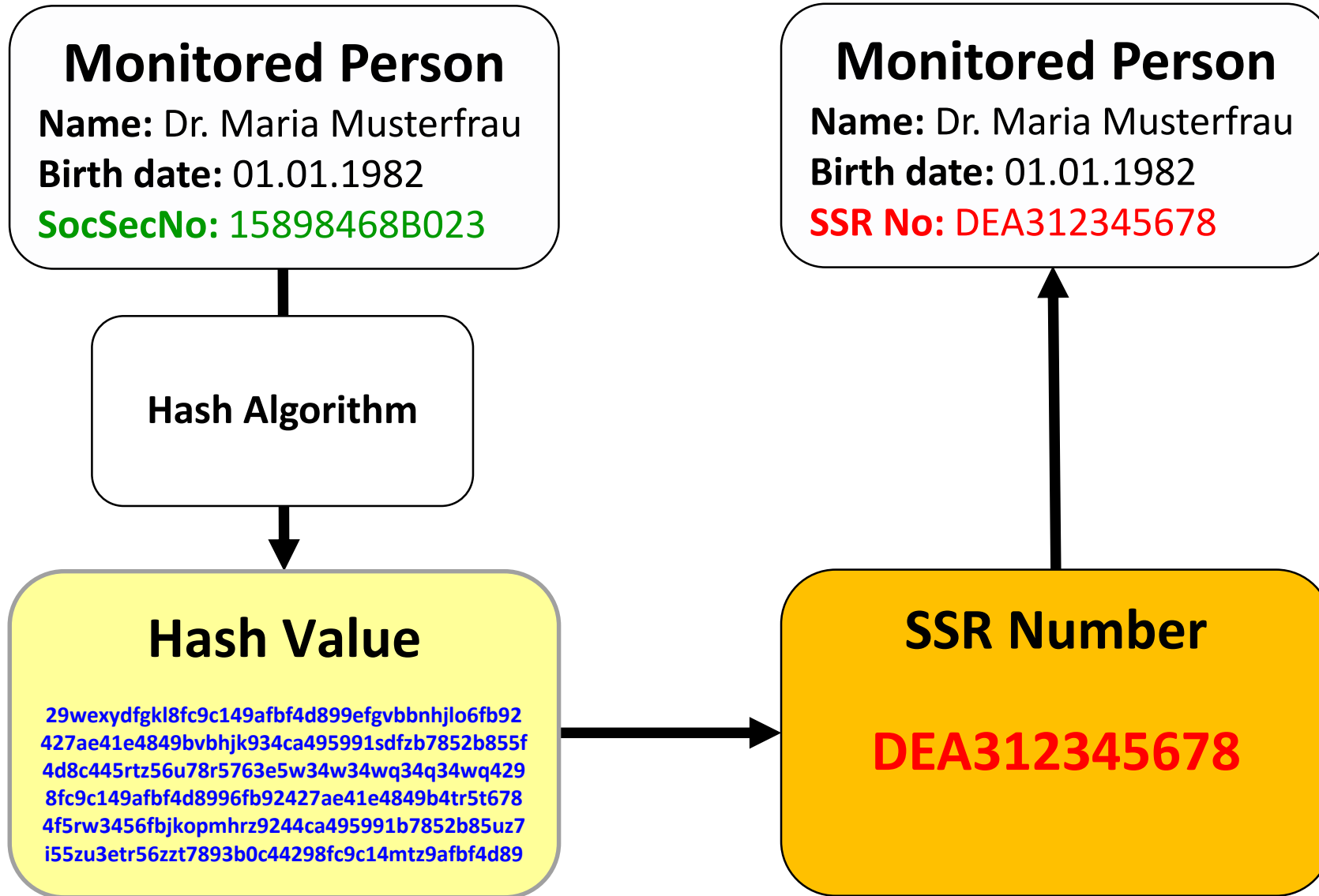
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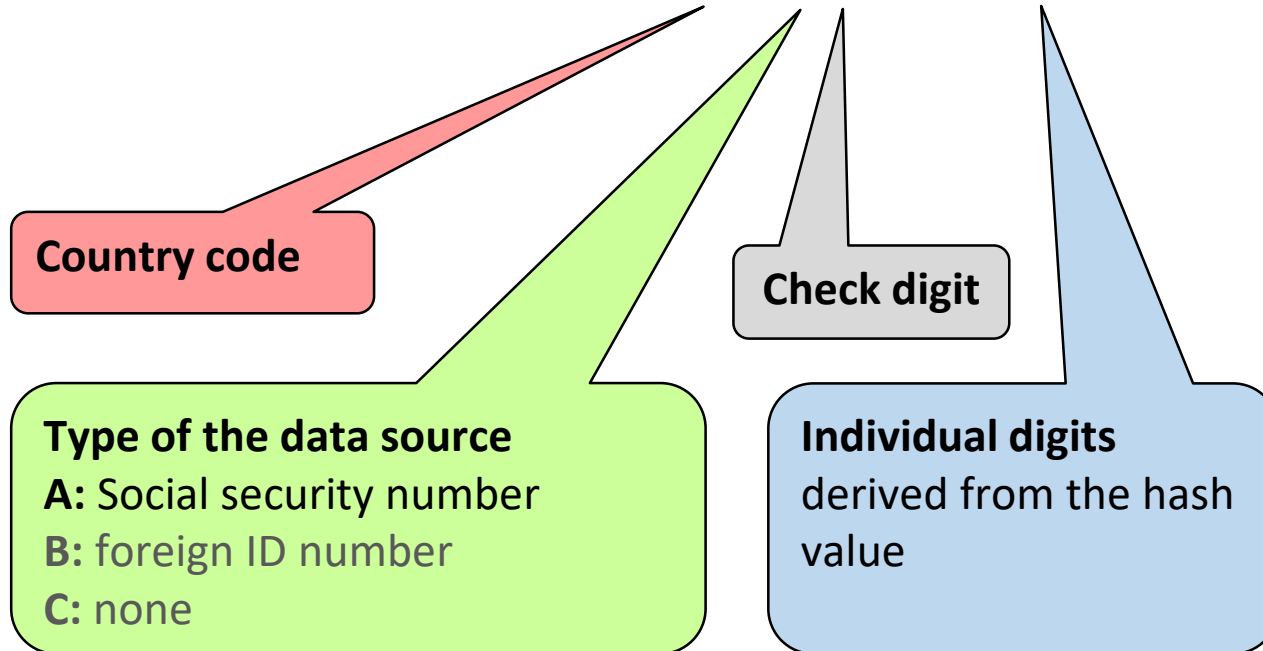


Personal ID Number (SSR Number)




Personal ID Number (SSR Number)

Structure of the SSR Number: **DE** **A**3 1234 5678




Online portal to apply for SSR Number




Bundesamt für Strahlenschutz

SSR-Portal

Application for SSR Number

 Username


 Password

Login

Register

Forgot password

Please draw the shape in one go in the field. After that, you can send the form.



German

English



Online portal to apply for SSR Number

☰

SSR-Portal - Beantragung der Strahlenschutzregisternummer

UWE.OEH

Feedback

Logout

↑ Data Entry

↓ Data Output

Input of personal data to generate the SSR Number

Attention! Consider the [GUIDELINES](#) for filling in the mask.

i

Note that for now the information is only available in German.

All personal data are mandatory except for "Academic degree".

Mit Sozialversicherungsnummer (§ 147 SGB VI)

+ Add Row

🗑 Delete Rows

📄 CSV/TXT-file upload

⬇ Download

🔍 Help

↺ Reset form

| <input checked="" type="checkbox"/> | Sozialversicherungs-Nr. (§ 147 SGB VI) | Surname | Given name(s) | Birth Name | Akademischer Grad (optional) | Date of birth | Place of birth |
|-------------------------------------|--|---------|---------------|------------|------------------------------|---------------|----------------|
| <input checked="" type="checkbox"/> | | | | | | | |

1 rows selected

Total 1

Special cases

Generate

German

English



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Certificate for SSR Number



Bundesamt für Strahlenschutz

Zertifikat

Frau Dr. Maria Musterfrau

(geb. **Musterfrau**)

geboren am **02.02.1981** in **München**

erhält folgende

Strahlenschutzregisternummer (SSR-Nummer)

DEA912345678

ausgestellt am **31.12.2018**

Bitte bewahren Sie dieses Dokument sorgfältig auf!

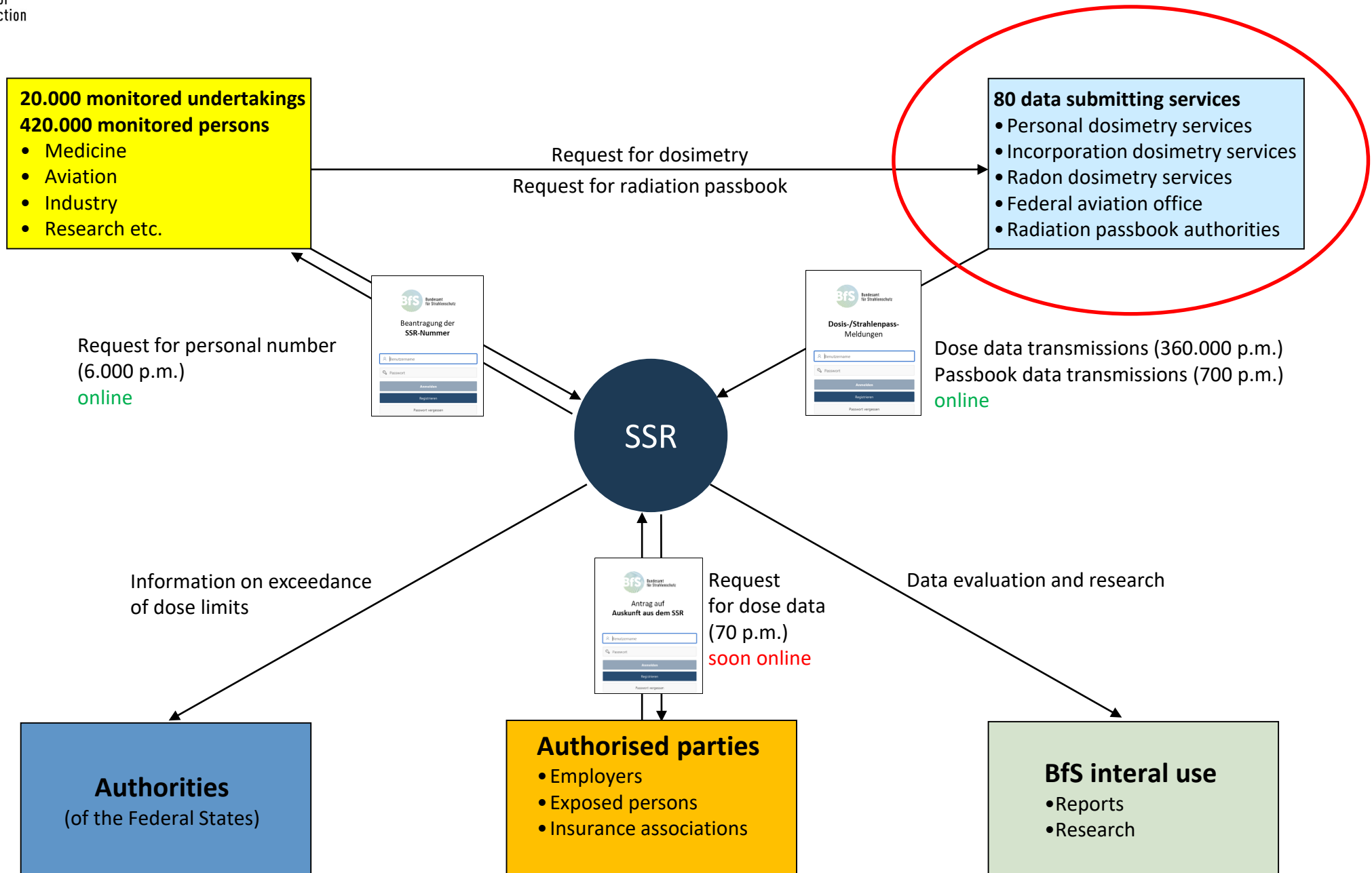
Die Strahlenschutzregisternummer (SSR-Nummer) ist Ihre persönliche Kennnummer nach §170 Strahlenschutzgesetz und für die zentrale Überwachung der beruflichen Strahlenexposition erforderlich. Über die SSR-Nummer sind Sie im Strahlenschutzregister eindeutig identifiziert. Mithilfe dieser Nummer können sowohl Dosisfeststellungen aus Ihrer beruflichen Strahlenexposition als auch Strahlenpassdaten korrekt Ihrer Person zugeordnet werden. Ihre Strahlenschutzregisternummer bleibt stets gleich, auch bei Änderung Ihres Familiennamens.

Dieses Dokument ist maschinell erstellt und auch ohne Unterschrift gültig.

Bundesamt für Strahlenschutz, Strahlenschutzregister, Ingolstädter Landstr. 1, 85764 Neuherberg, www.bfs.de/ssr, ssr@bfs.de

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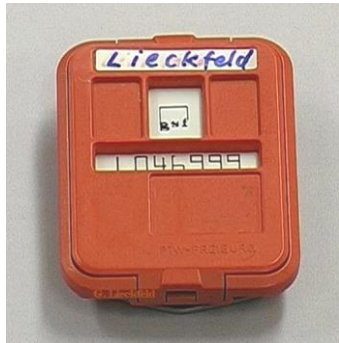
Data submitting services

- Personal dosimetry services
- Internal dosimetry services
- Federal aviation office
- Radon dosimetry services
- Radiation passbook authorities



Personal dosimetry

$H_p(10)$



$H_p(0.07)$



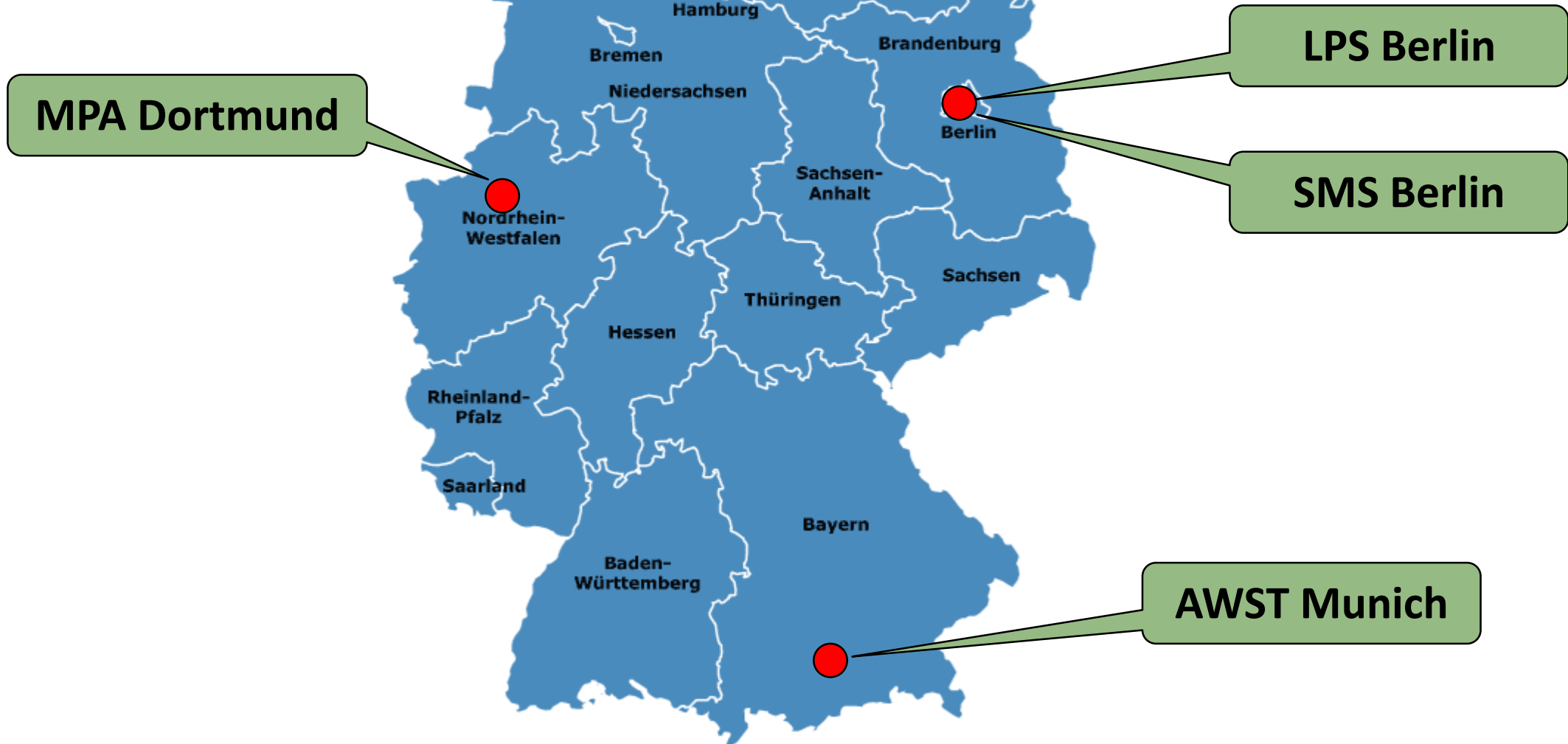
$H_p(3)$





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Personal dosimetry services





Internal dosimetry

In vitro monitoring



Alpha spectrometry
Liquid scintillation counter
ICP-MS (mass spectrometry)

In vivo monitoring

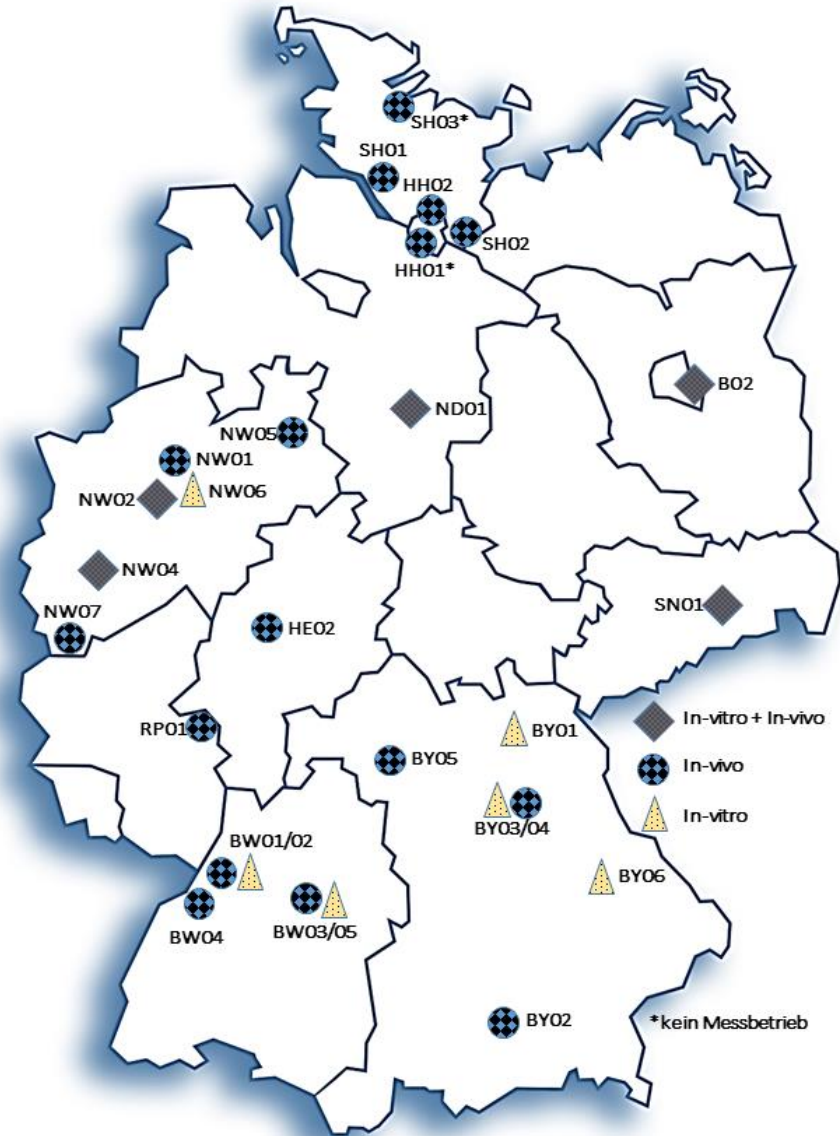


Whole body counter

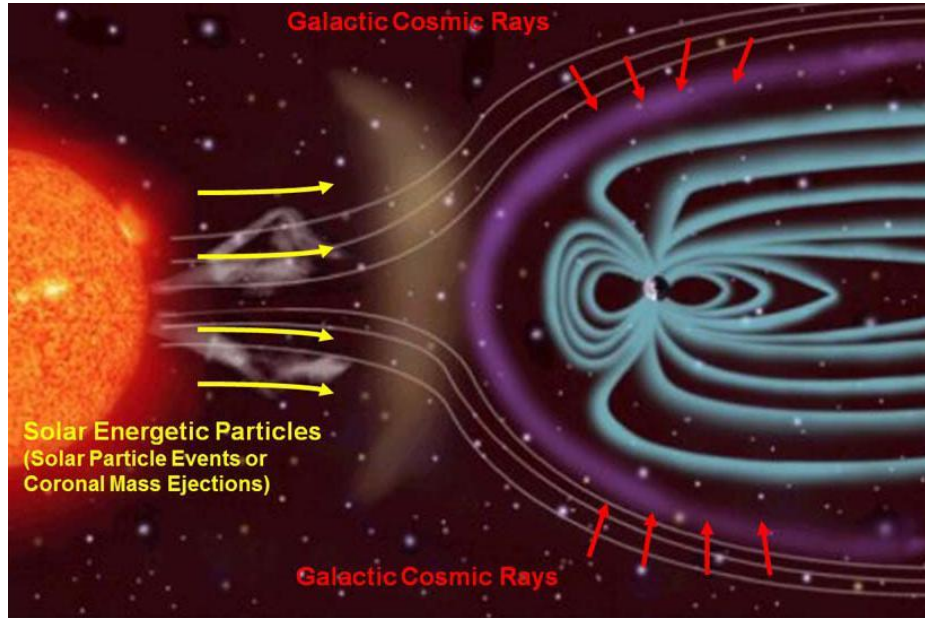


Internal dosimetry services

| | |
|---------|-----------------------------------|
| B02 | BfS, Berlin |
| BW01/02 | KIT, Karlsruhe |
| BW03/05 | Universität Tübingen |
| BW04 | LUBW Karlsruhe |
| BY01 | LfU, Kulmbach |
| BY02 | BfS, Neuherberg |
| BY03/04 | AREVA NP, Erlangen |
| BY05 | Universität Würzburg |
| BY06 | Universität Regensburg |
| HE02 | Justus-Liebig Universität, Gießen |
| HH01 | ASKLEPIOS Klinik St. Georg |
| HH02 | Universität Hamburg |
| ND01 | Med. Hochschule Hannover |
| NW01 | Universität Essen |
| NW02 | LIA, Düsseldorf |
| NW04 | Forschungszentrum Jülich |
| NW05 | Universität Münster |
| NW06 | Bayer AG, Wuppertal |
| NW07 | RWTH Aachen |
| RP01 | Joh.-Gutenberg Universität, Mainz |
| SH01 | E.ON Kernkraft, Brokdorf |
| SH02 | Kernkraftwerk Krümmel |
| SH03 | Universität Kiel |
| SN01 | VKTA Rossendorf e.V., Dresden |

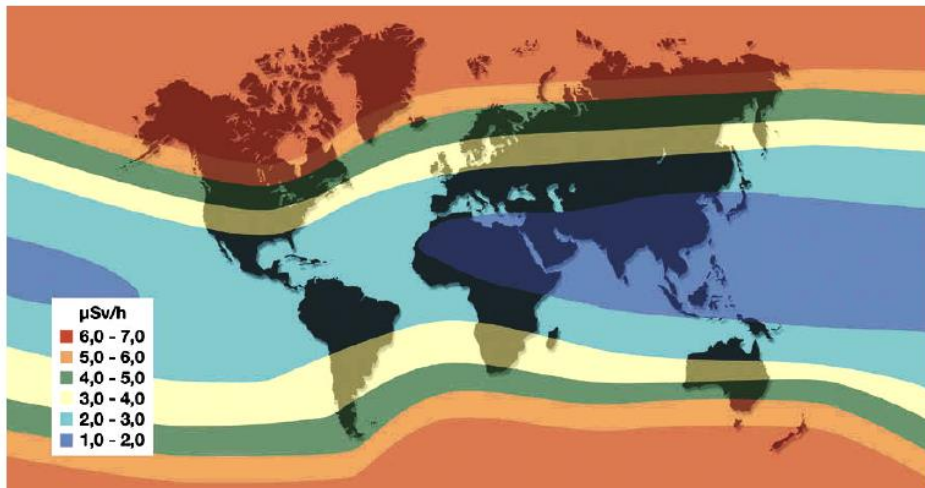


Cosmic radiation dosimetry



Effective dose can be calculated dependent on:

- Flight duration
- Flight altitude
- Flight route (latitude)
- Solar activity





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Federal aviation office



Federal Aviation Office
(LBA) Braunschweig



Radon dosimetry



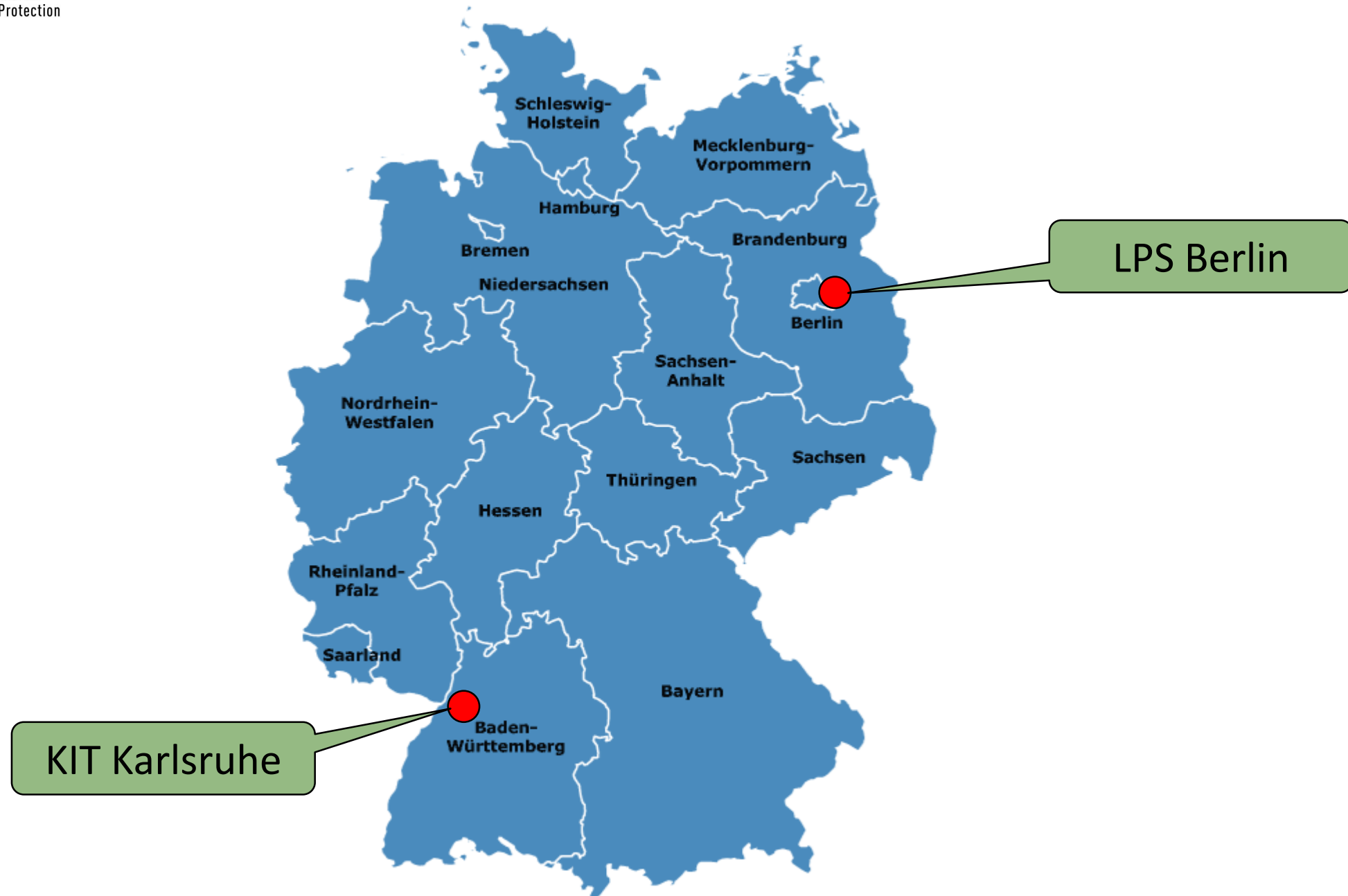
- Wearing time: 3 months
- Detection level: 15 Bq/m³
- Internal dose is calculated based on the measured Radon activity and conversion factors by ICRP





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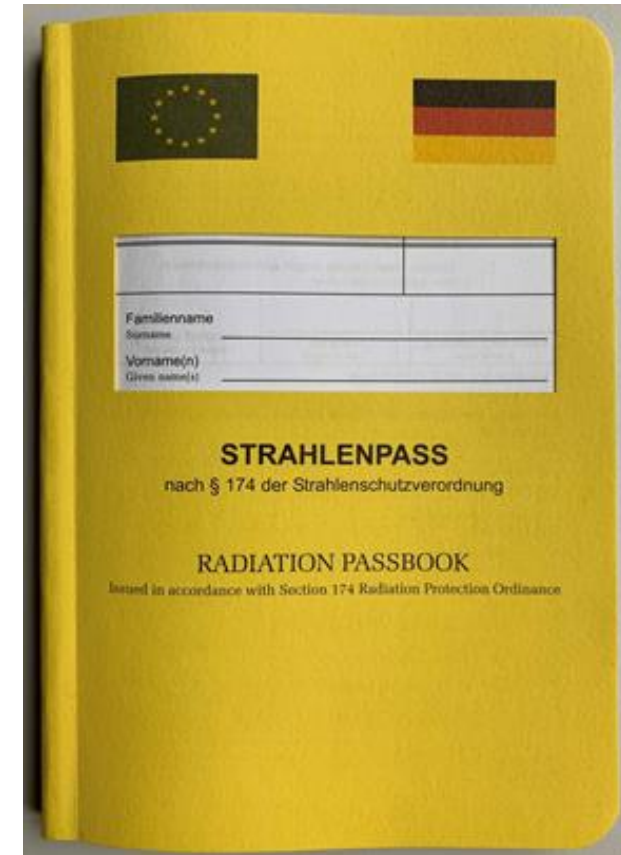
Radon dosimetry services





Issuing of radiation passbooks

- New German radiation passbook since 01.07.2019
- Based on the HERCA* model of a European Radiation Passbook
- Uniform terminology
- In two languages (own and English)
- Issued by the own country



*Heads of the European Radiological Protection Competent Authorities



Radiation passbook authorities



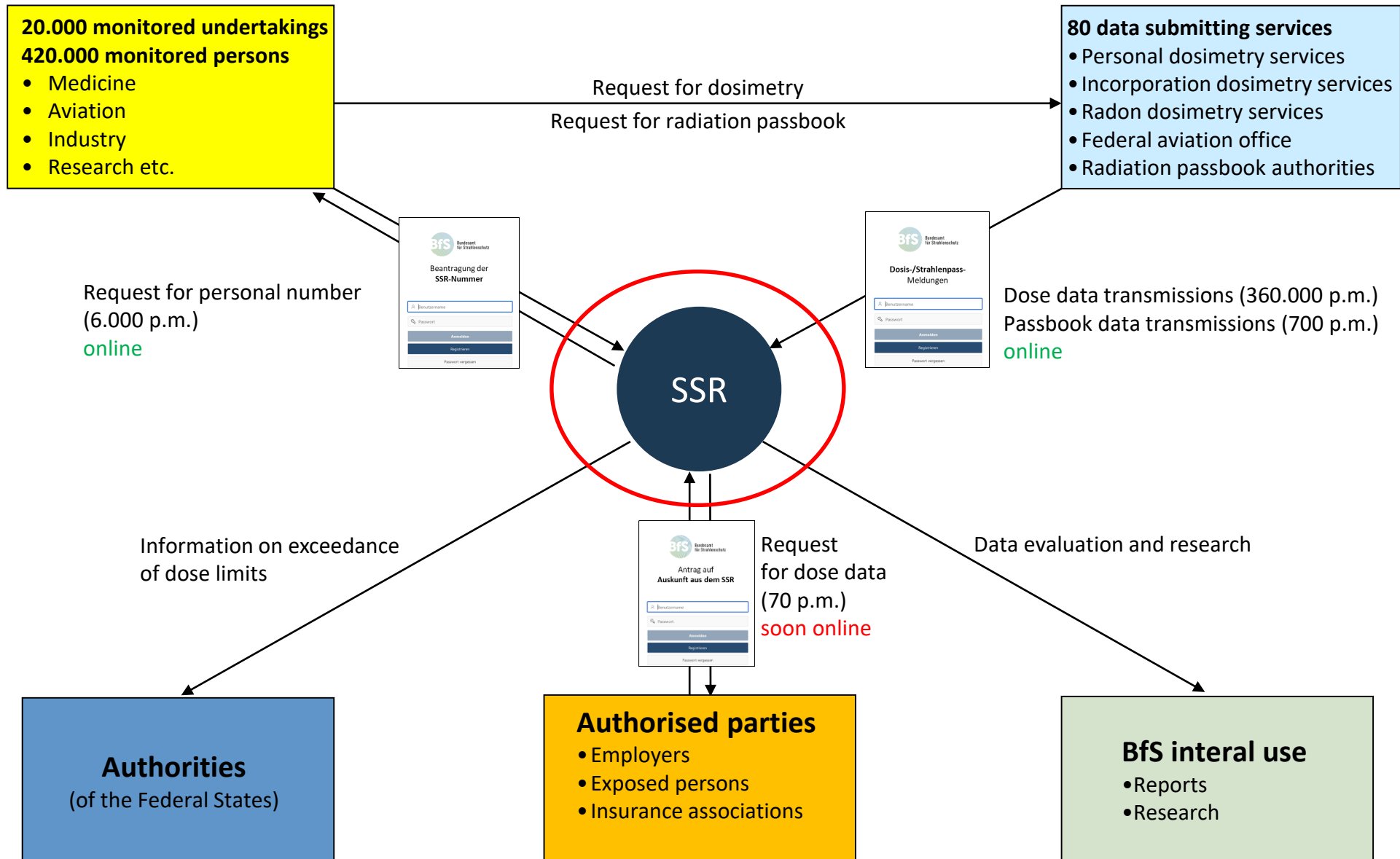
Radiation passbooks issued by

53 radiation passbook authorities
in 16 federal states

➔ hard to control multiple
ownership

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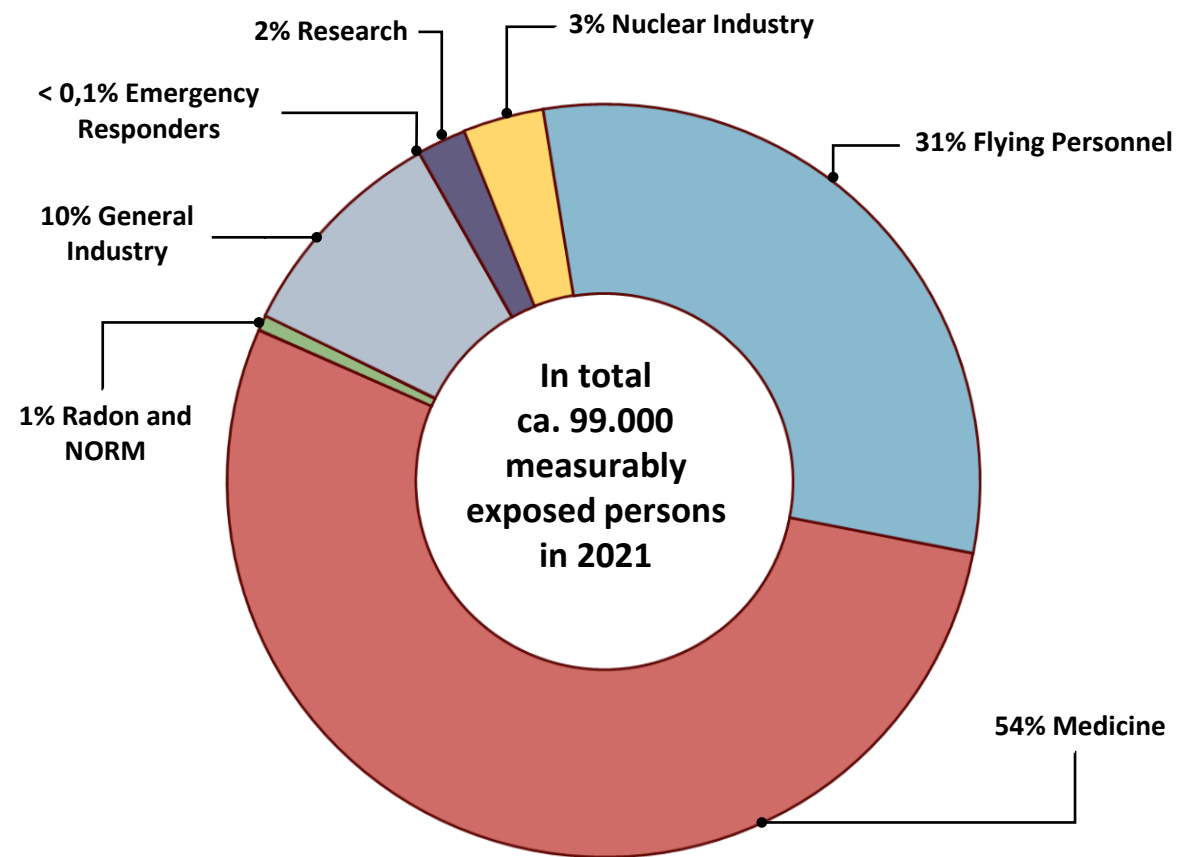
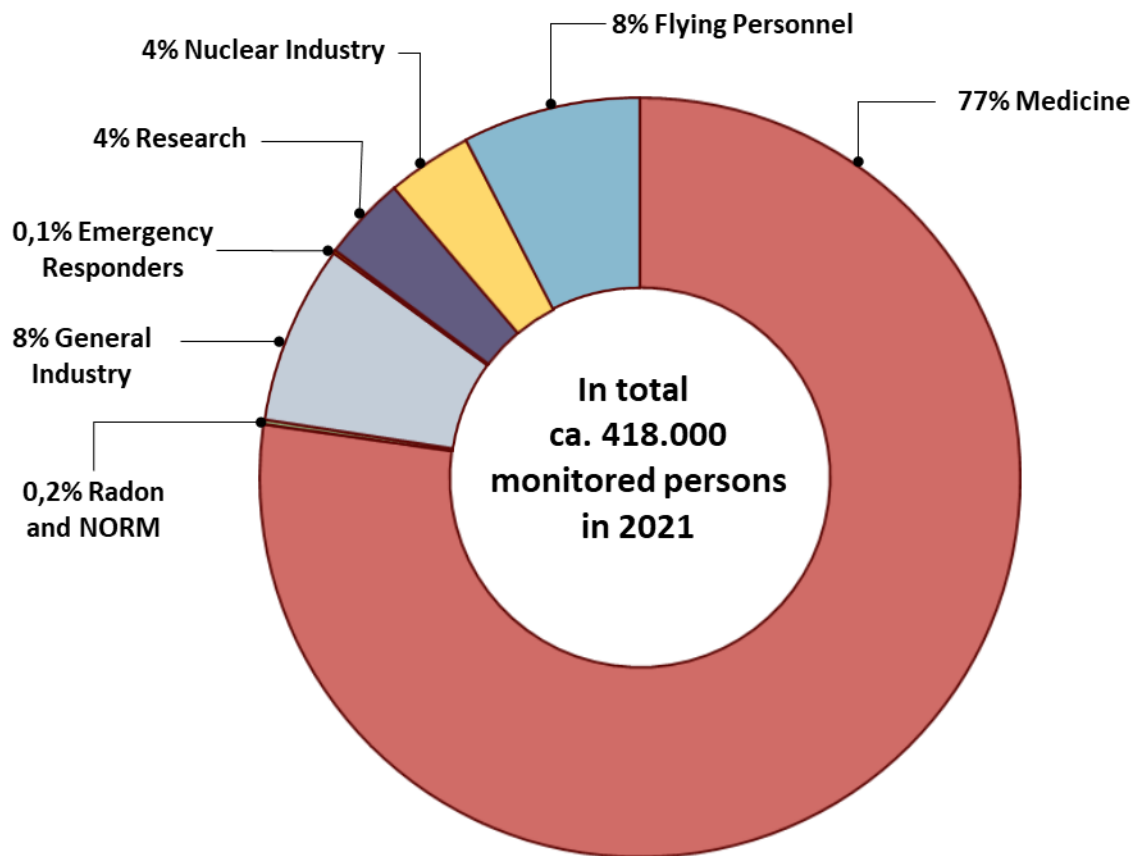
Data Content

| Aktuell | |
|---|-------------|
| Monitored persons | ca. 420.000 |
| Monitored undertakings | ca. 20.000 |
| Dose entries per month | ca. 360.000 |
| Radiation passbook issuance entries per month | ca. 700 |

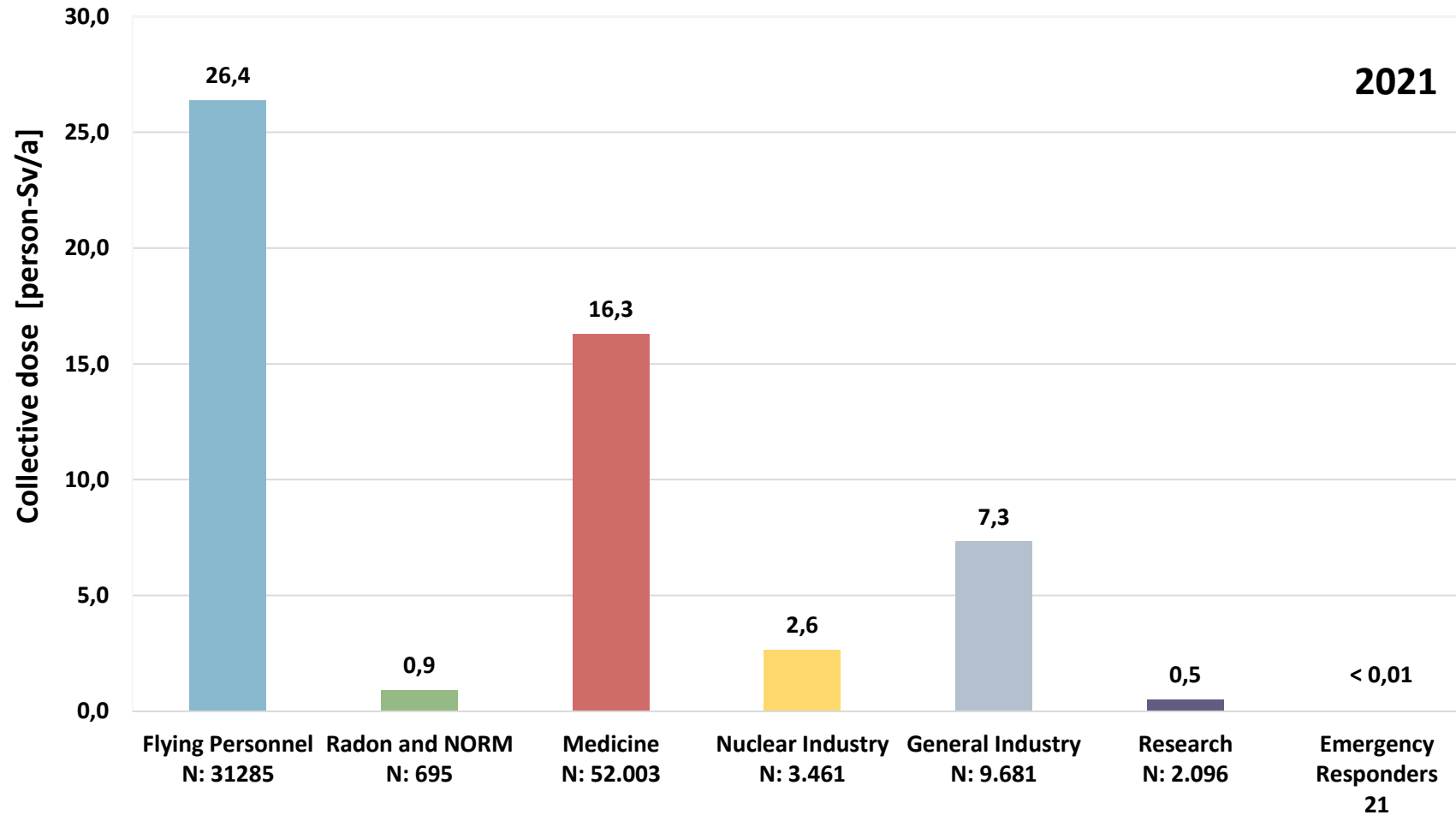
| Gesamtdatenbestand des SSR | |
|----------------------------------|-----------------|
| Monitored persons | ca. 2.000.000 |
| Monitored persons with ID number | ca. 530.000 |
| Monitored undertakings | ca. 120.000 |
| Dose entries | ca. 121.000.000 |



Monitored vs. measurably exposed persons

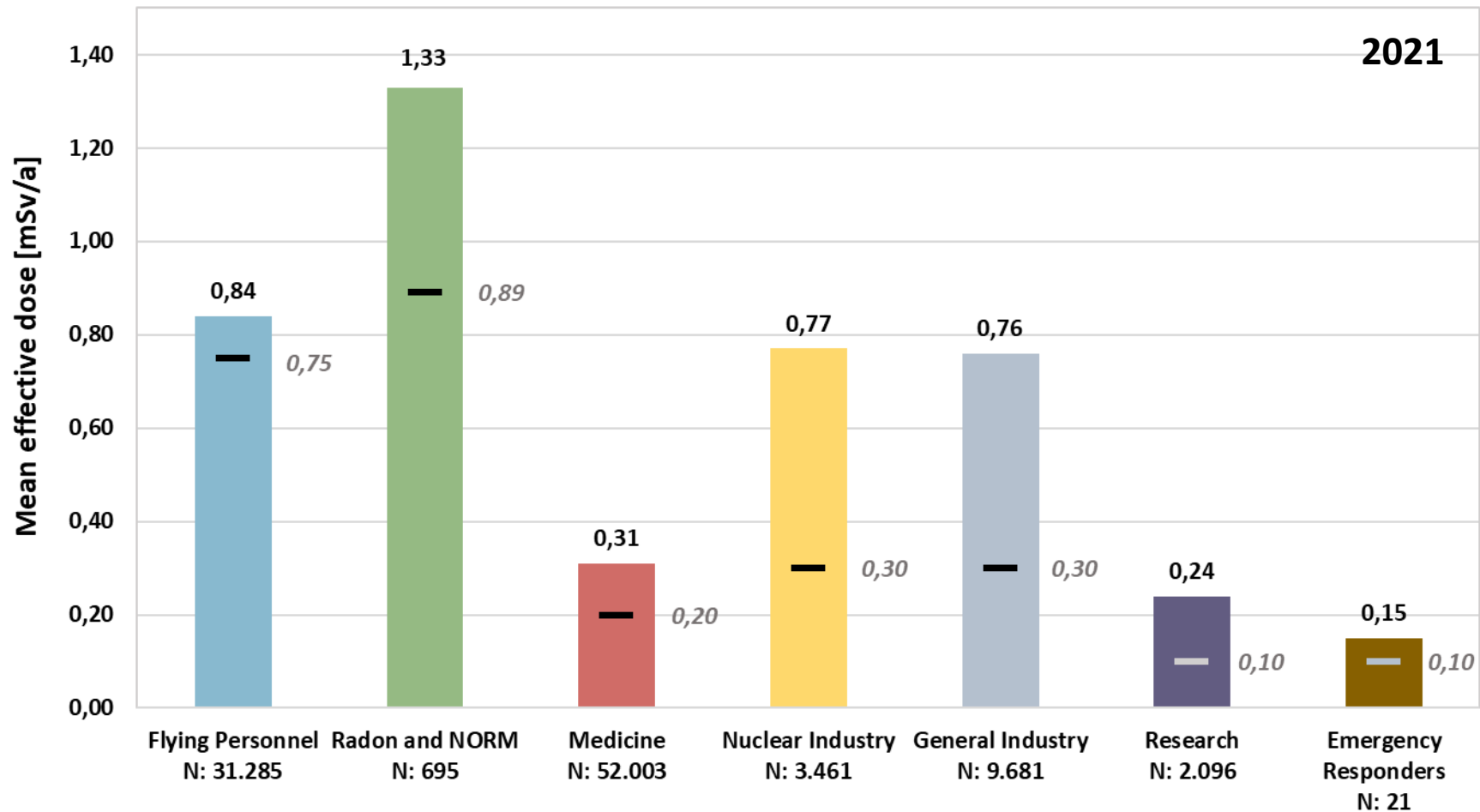


Collective anual dose of all monitored persons

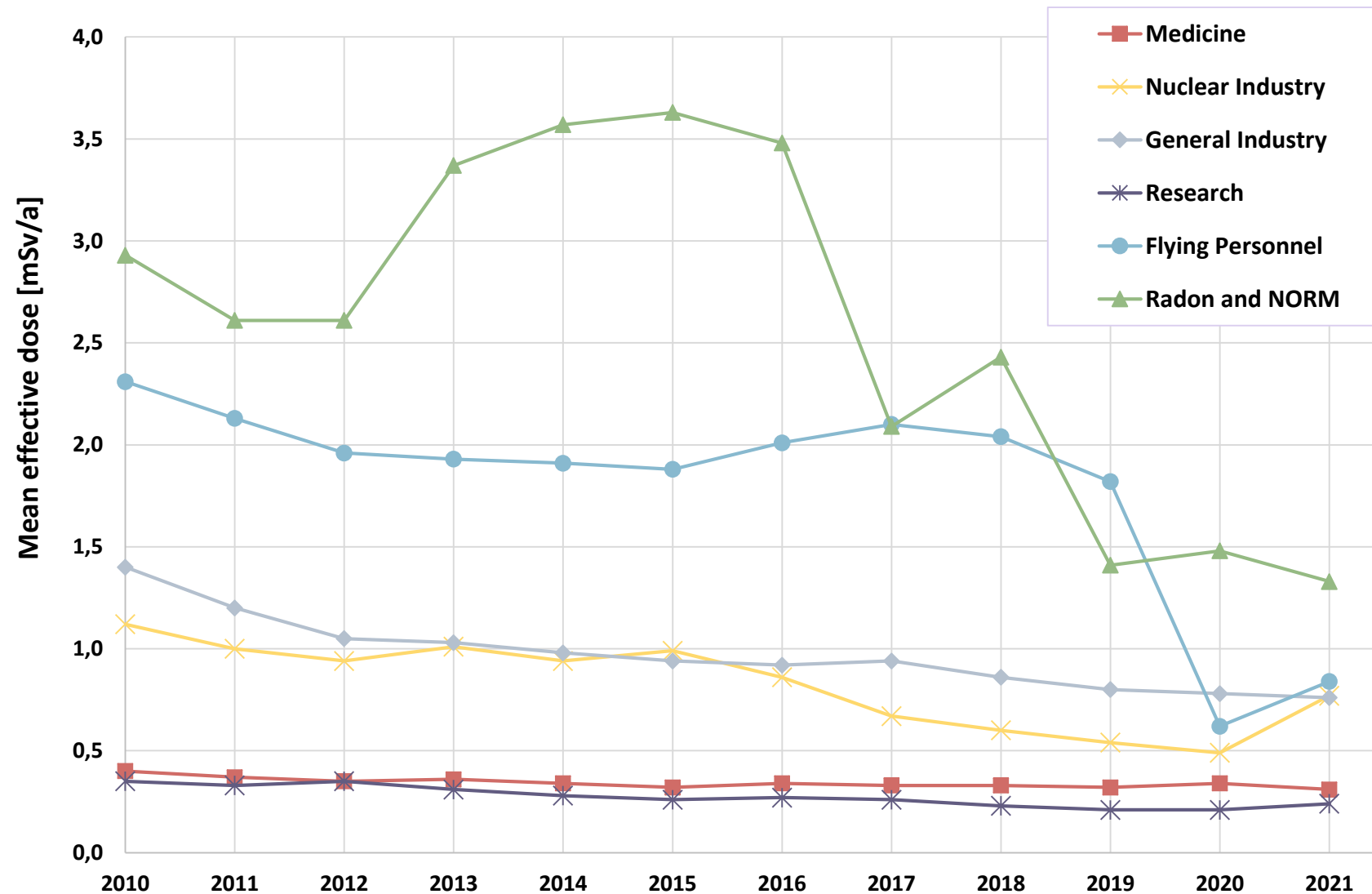




Mean effective annual dose of all measurably exposed persons

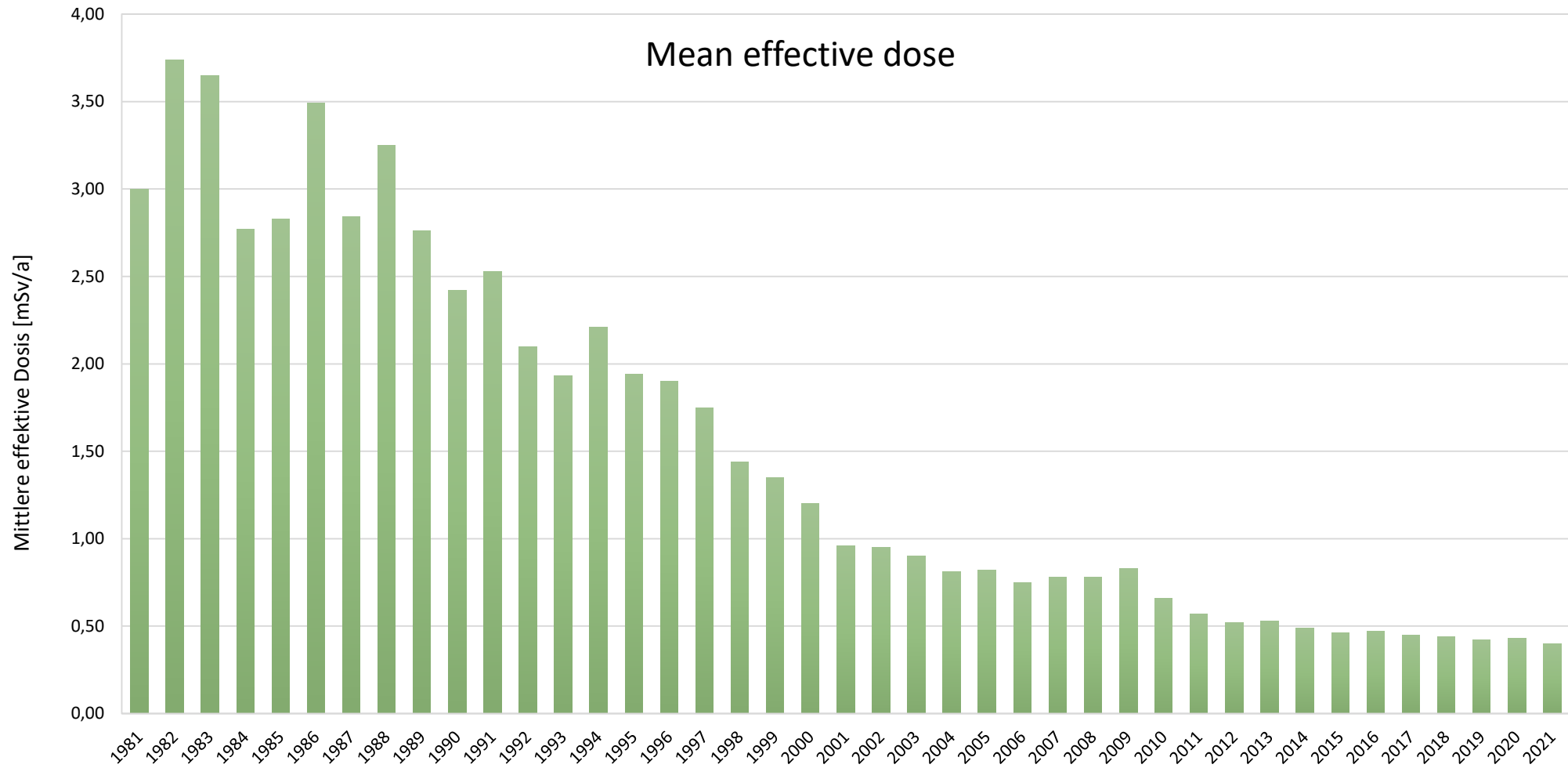


Mean effective annual dose of all measurably exposed persons





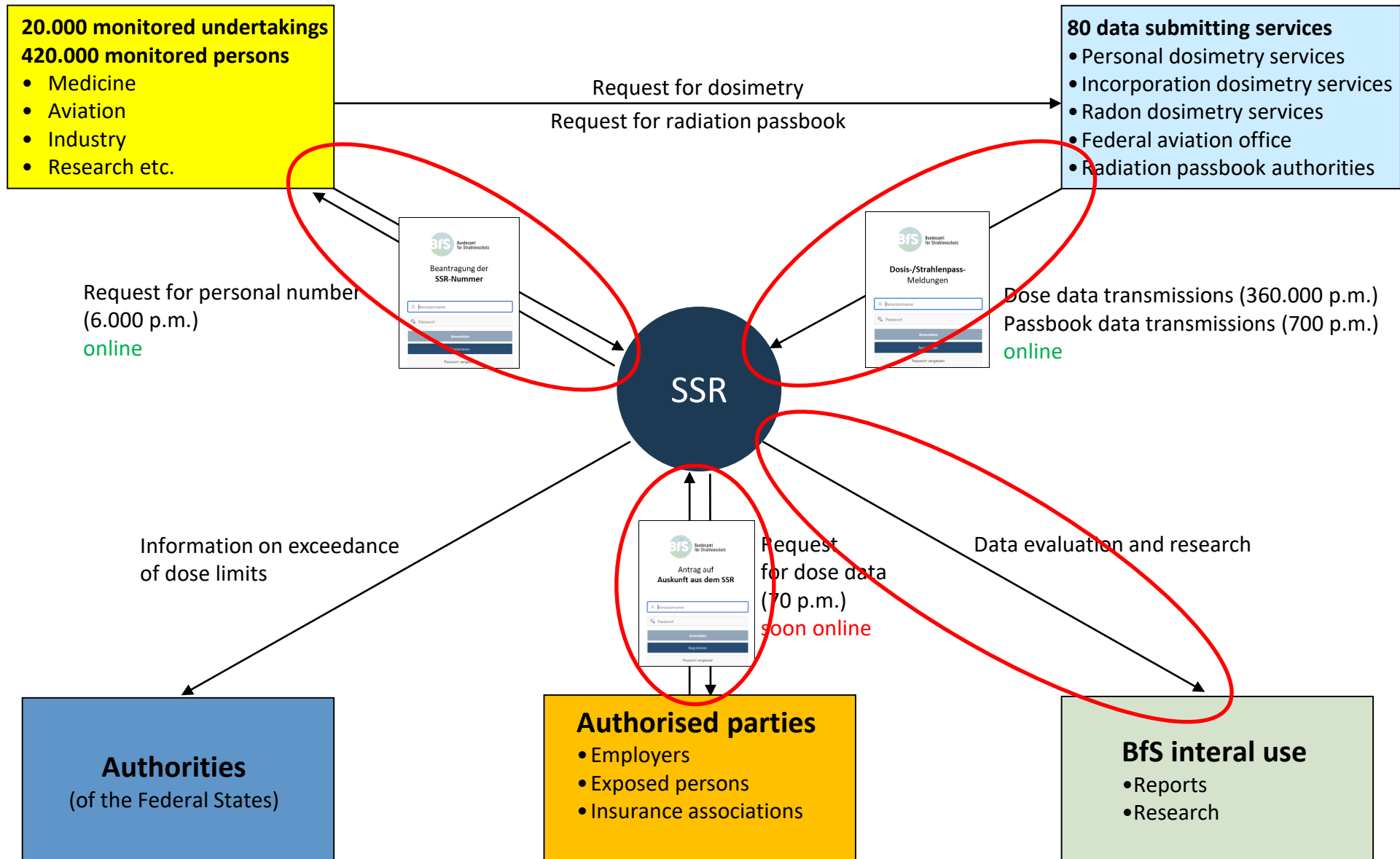
Mean effective annual dose – only external exposure





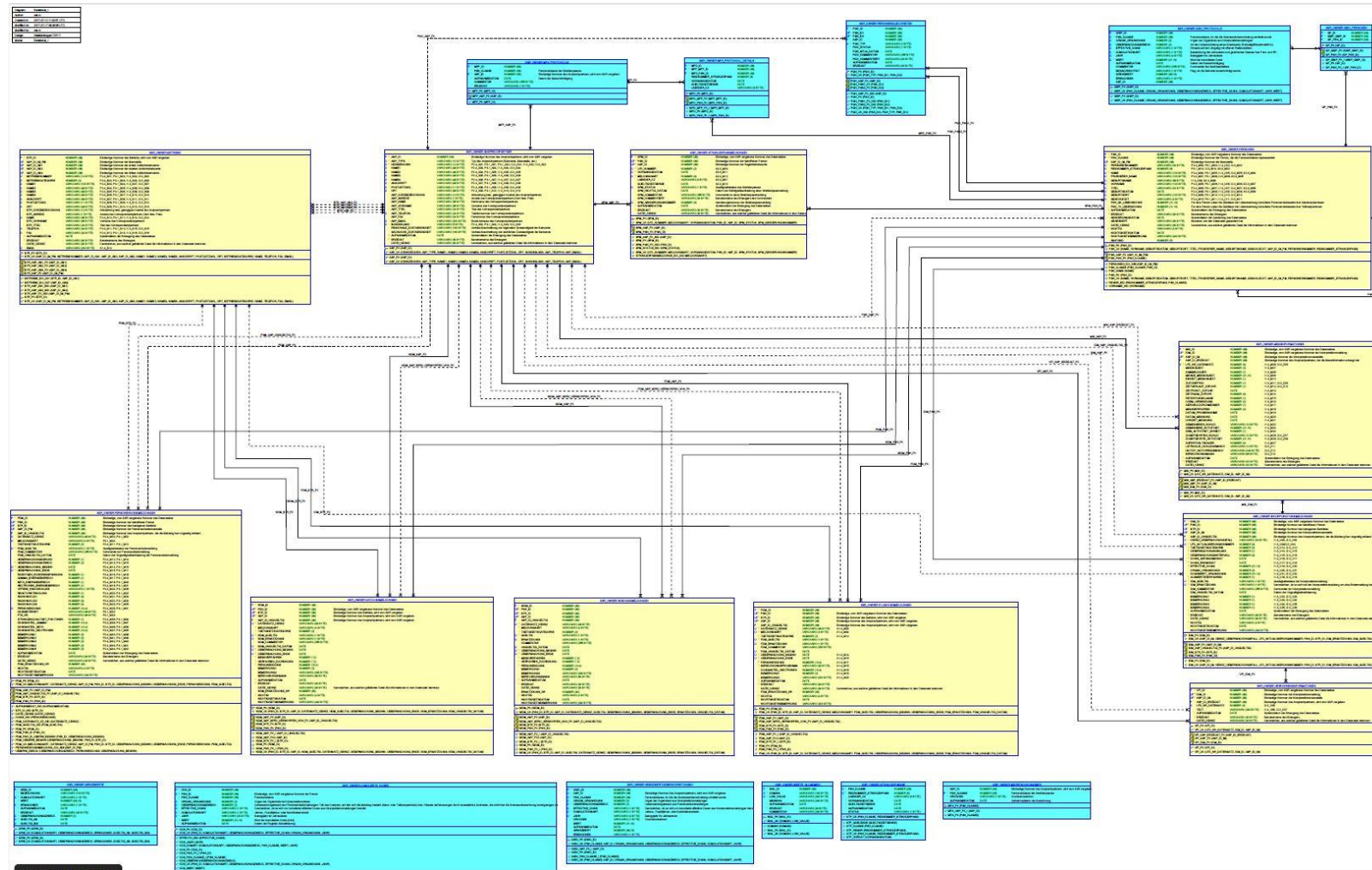
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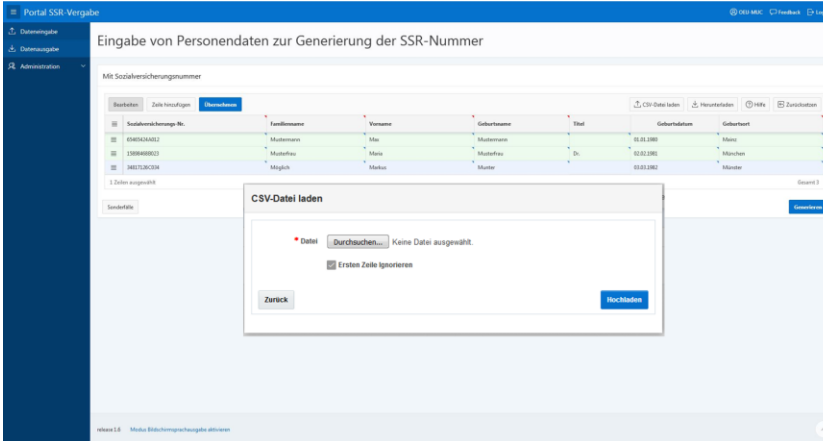


The SSR is based on a **relational database**

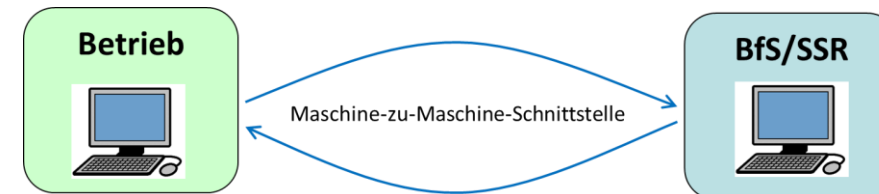


Interfaces with the SSR

- **Web Application**
- small amounts of data
 - no in-house development necessary



- **Web Service**
- big amounts of data
 - in-house development necessary





The **users** and **roles**

SSR staff

Administration

SSR staff

Admins:

- Änderung des Profils (alle)
- Anlegen/Löschen/Ändern von initialen Accounts für alle Rollen (außer Betriebe)
- Ausführen aller Services über APEX-Maske und Webservice
- Generierung von SSR-Zertifikaten

Undertakings

Request for personal ID number

Undertakings

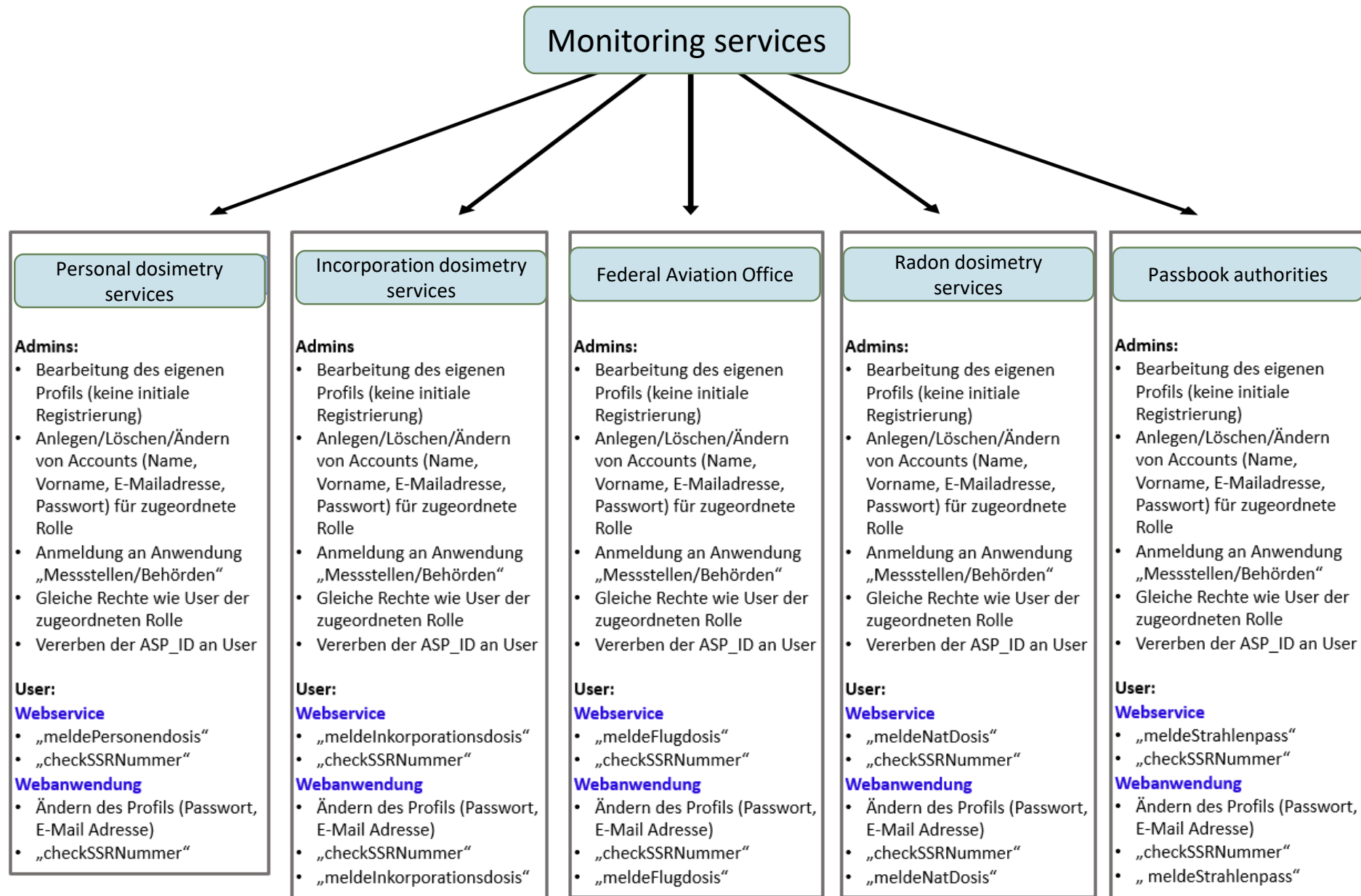
User:

- Anlegen/Bearbeitung des Profils (alles außer Betriebsnummer)
- Webservice „generiereSSRNummer“ ausführen
- Webanwendung „generiereSSRNummer“ ausführen

Monitoring services

Dose/passbook data transmissions

Next slide





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Interface specification e.g. transmission of external dose

Information on person:

- id number of person
- title
- first name
- last name
- name at birth
- place of birth
- birth date
- nationality
- sex

Information on company:

- id number of company
- name of company
- address of company
- telephone number of company
- name of radiation protection officer

Information on authority:

- name of authority
- contact details of authority

Information on dose record: (e.g. external dose)

- dose record number
- type of record
- start of monitoring
- end of monitoring
- personal dose
- proportion of neutrons
- proportion of beta radiation
- proportion of gamma radiation
- job category
- type of dosimeter
- type of nuclide
- Occupational sector and category (**next slide**)

Occupational **sectors**

ISO 24426
(in progress)

UNSCEAR

ESOREX*

| ISO 24426 [Medical] | UNSCEAR [Medical use] | ESOREX [Medical] |
|-----------------------------|---------------------------|--------------------------|
| ISO 24426 [Nuclear] | UNSCEAR [Nuclear] | ESOREX [Nuclear] |
| ISO 24426 [Industry] | UNSCEAR [Industrial uses] | ESOREX [Industry] |
| ISO 24426 [Natural sources] | UNSCEAR [Natural sources] | ESOREX [Natural sources] |
| ISO 24426 [Others] | UNSCEAR [Miscellaneous] | ESOREX [Others] |

*European Study on Occupational Radiation Exposure: <https://esorex-platform.org>



Job categories

| ISO 24426 [Medical] | UNSCEAR [Medical use] | ESOREX [Medical] |
|---|---|--------------------------|
| Unknown | | |
| Diagnostic radiology (other than dental practise) | Diagnostic radiology | Diagnostic radiology |
| | Conventional diagnostic radiology | |
| Dental practice | Dental practice | Dental radiology |
| Occupational health service and dispensaries | | |
| Interventional radiology | Interventional procedures - cardiovascular procedures | Interventional radiology |
| Radiotherapy | Radiotherapy | Radiotherapy |
| Nuclear medicine | Nuclear Medicine | Nuclear medicine |
| Veterinary medicine | Veterinary medicine | Veterinary units |
| Medical logistics and maintenance | | |
| Transport of radioactive materials for medical uses | | |
| Medical and veterinary research | | |
| Waste processing and treatment | | |
| Other medical uses | All other medical uses | Other medical activities |



Job categories

| ISO 24426 [Nuclear] | UNSCEAR [Nuclear] | ESOREX [Nuclear] |
|---|--|---|
| Unknown | | |
| Military activities | | Military activities |
| | Uranium mining | Uranium ore extraction/processing |
| | Uranium milling | |
| Uranium conversion and enrichment | Uranium conversion | Enrichment and conversion |
| | Uranium enrichment | |
| Reactor operation | Reactor operation | Nuclear power reactor |
| Fuel fabrication | Fuel fabrication | Fuel fabrication |
| Fuel reprocessing | Fuel reprocessing | Reprocessing |
| Decommissioning | Decommissioning | Dismantling of nuclear facilities |
| Waste processing and treatment | Waste management | Radioactive waste management facilities |
| Nuclear logistics and maintenance | | Nuclear logistics and maintenance |
| Transport of radioactive materials for nuclear uses | Transport within nuclear fuel cycle | |
| Nuclear research facilities | | |
| Nuclear safety and inspection | | |
| Others nuclear uses | All other activities in nuclear fuel cycle | Other nuclear activities |



Job categories

| ISO 24426 [Industry] | UNSCEAR [Industrial uses] | ESOREX [Industry] |
|--|--|---|
| Unknown | | |
| Industrial irradiation | Industrial irradiation | Industrial irradiation |
| | Luminizing | |
| | Accelerator operation | |
| | | Electron-beam welding |
| | | X-ray fluorescence (lead detection) |
| | | Manufacturing of consumer products containing radionuclides |
| Non-destructive testing (radiography) | Industrial radiography | Industrial radiography |
| Isotope processing and production | Radioisotope production and distribution | Radioisotopes production and conditioning |
| Neutron sources | | |
| Process control | | |
| Industrial logistics and maintenance | | Industrial logistics and maintenance |
| Industrial gauges | Industrial gauges | Industrial gauges |
| Well-logging | Well logging | |
| Safety monitoring for people and property | | Security screening |
| Transport of radioactive materials for industrial uses | | |
| Industrial research | | |
| Waste processing and treatment | | |
| Borehole inspections/measurements | | |
| Others industrial uses | | Other industrial activities |



Job categories

| ISO 24426 [Natural sources] | UNSCEAR [Natural sources] | ESOREX [Natural sources] |
|--|--|--|
| Unknown | | |
| Civilian aviation | Civilian aviation | Aviation |
| Military aviation | | |
| Space aviation | | |
| Mineral mining activities and ore processing other than coal and uranium | Mineral mining other than coal and uranium | Mining activities and processing |
| | Processing of mineral and ores | |
| Uranium ore extraction and processing | | |
| Gas, oil and coal industries | Oil and natural gas industry | Gas, oil and coal industries |
| | Coal mining | |
| Radon in workplaces other than mineral extraction industries (touristic caves, radon healing caves ...) | Radon in workplaces other than mineral extraction industries | Activities on site exposed with radon |
| Handling and storage of raw materials containing elements of naturally occurring families of thorium, uranium and zirconium including NORM | | Handling and storage of NORM (Th or U) |
| Other natural uses | | |



Job categories

| ISO 24426 [Others] | UNSCEAR [Miscellaneous] | ESOREX [Others] |
|---|--------------------------------|-------------------------------|
| Research (other than nuclear, industry and medical) and Education | Educational establishments | |
| | Waste spent sources | |
| | Transport of radiation sources | |
| | | Regulatory control activities |
| Activities in foreign countries | | |
| Emergency responders (fire service, civil defence, etc.) | | Emergency response |

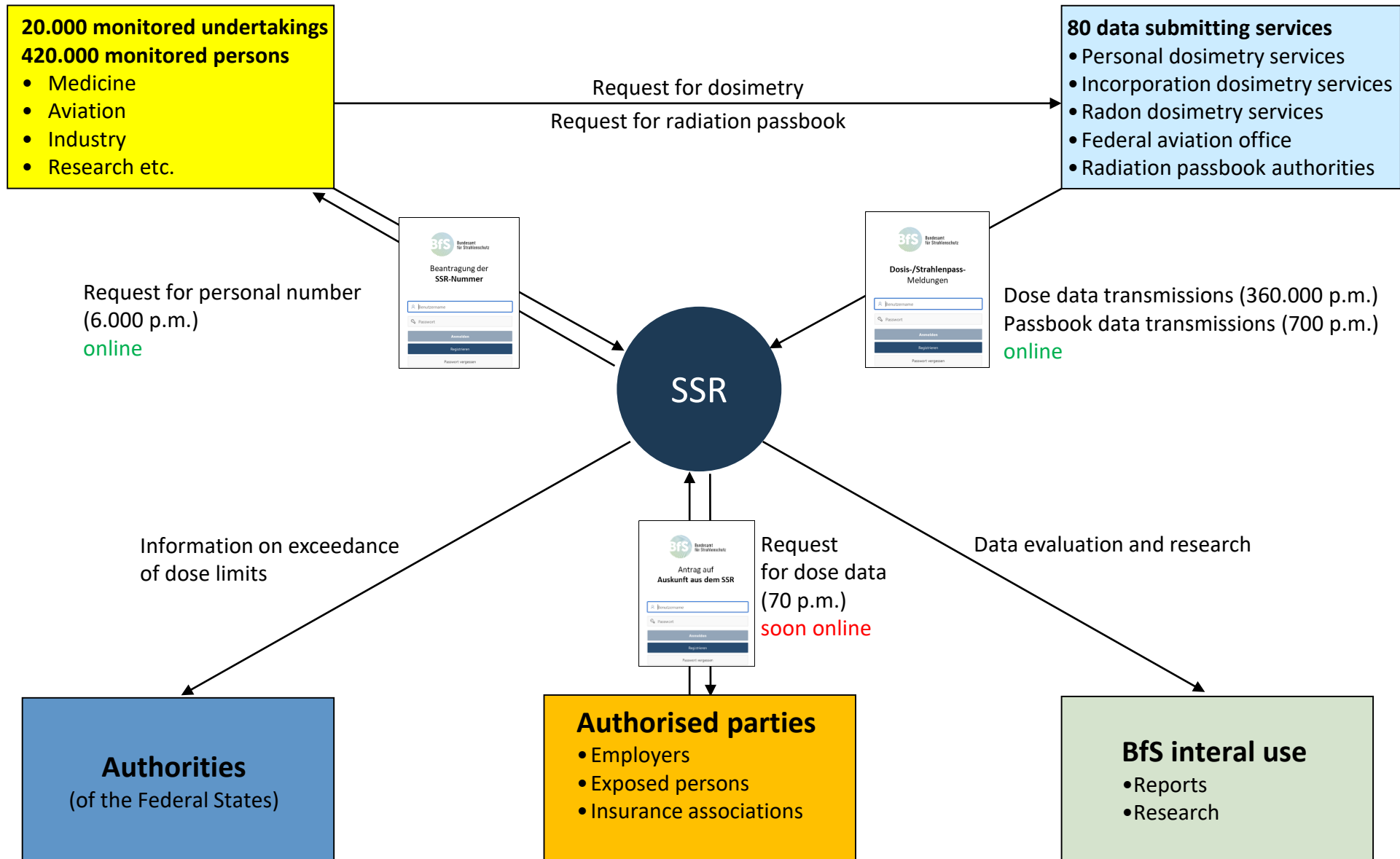
| | | |
|--|--|------------------------------|
| | | ESOREX [Transport] |
| | | Military transport |
| | | Nuclear fuel cycle |
| | | Others (medical, industrial) |

| | | |
|--|--|---|
| | | ESOREX [Research and education] |
| | | Medical, veterinary and pharm. Research |
| | | Nuclear research facilities |
| | | Other research sectors and education |



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Radiation Protection**

Legal Notice

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