



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)



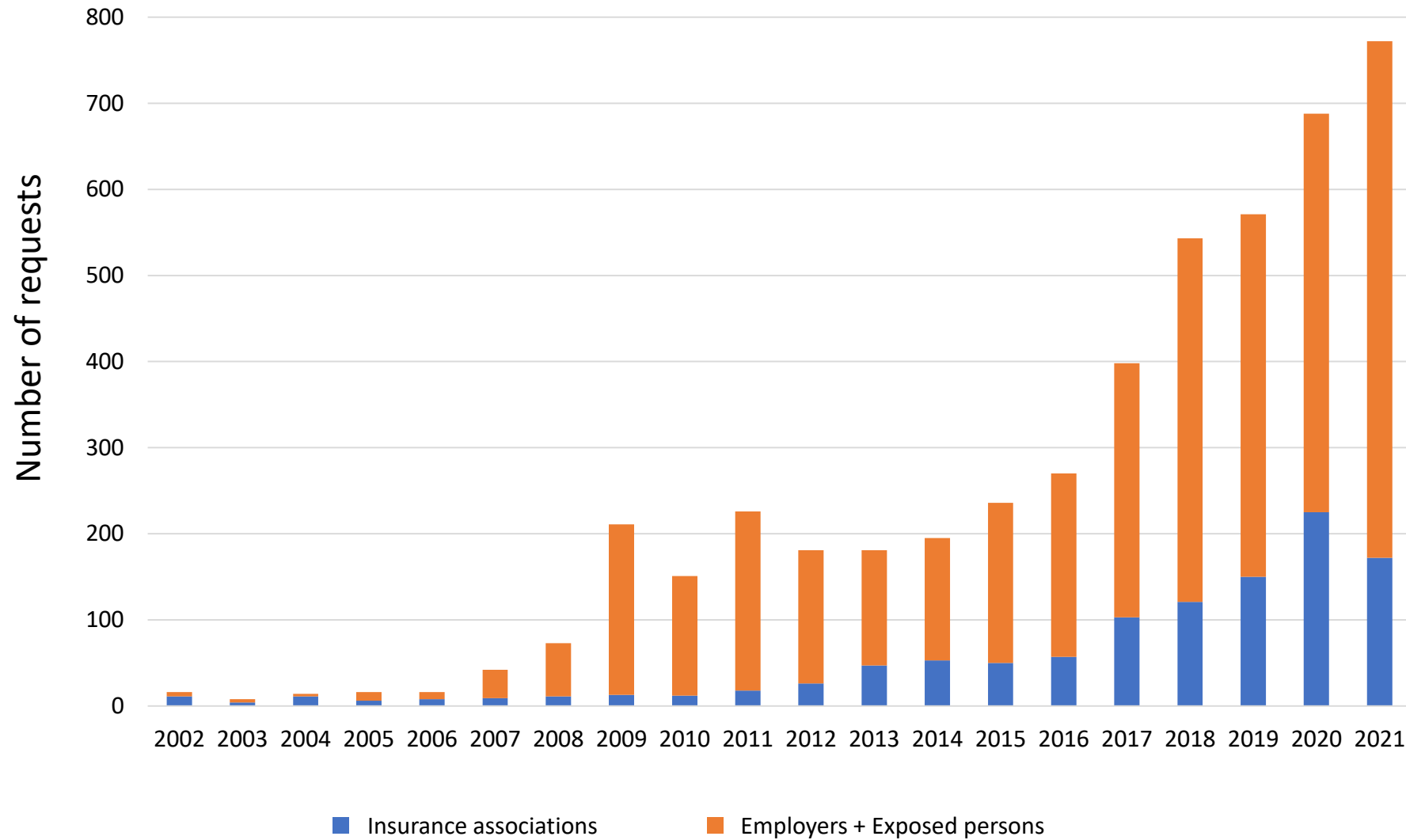


Tasks of the German National Dose Register (SSR)

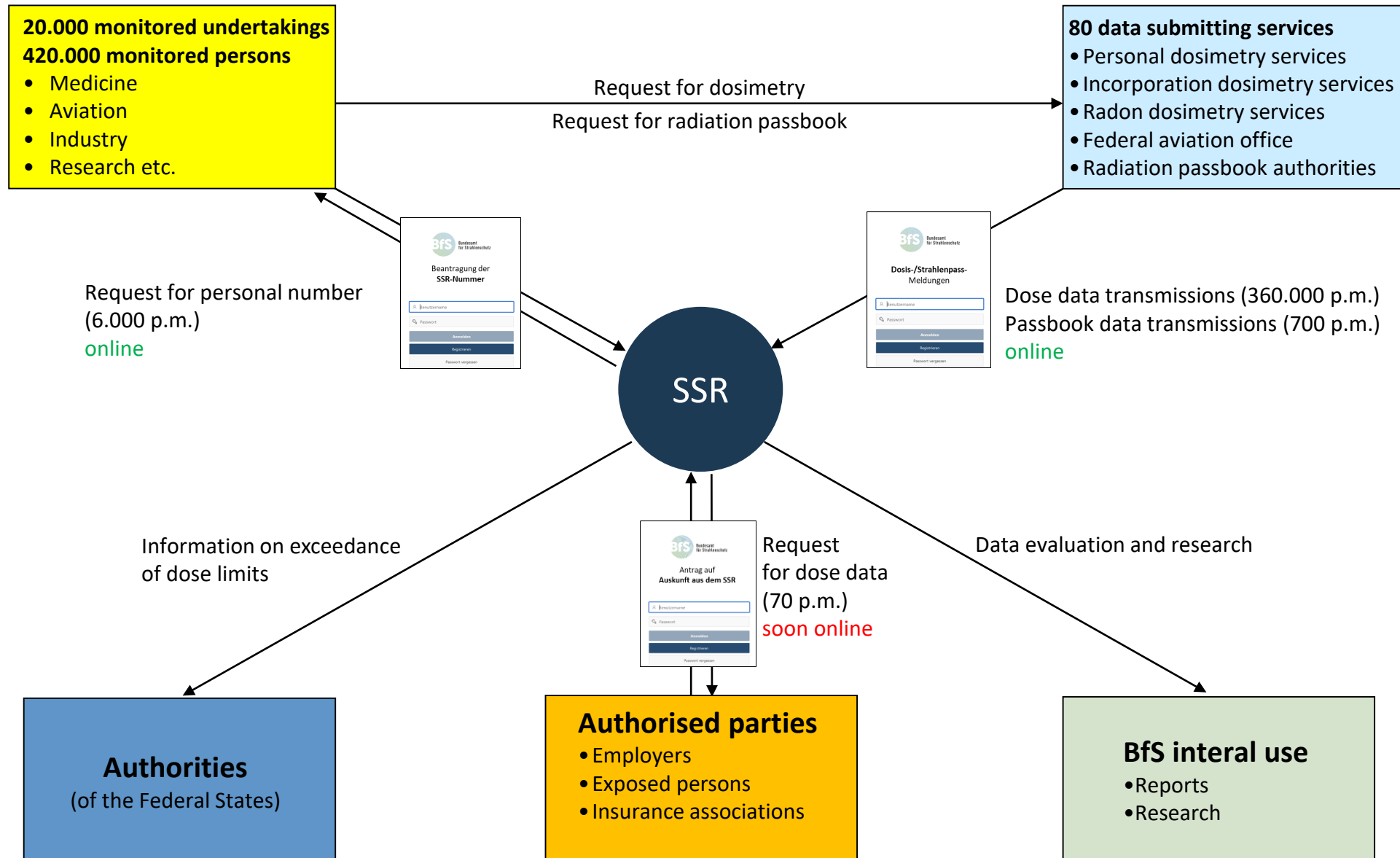
- **Central recording of**
 - occupational radiation dose
 - radiation passbook issuance data
- **Issuance of a personal ID number**
 - based on the social security number
- **Central surveillance of**
 - dose limits
 - issuance of radiation passbooks
- **Data evaluation and research**
 - using data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



Requests for information from the SSR

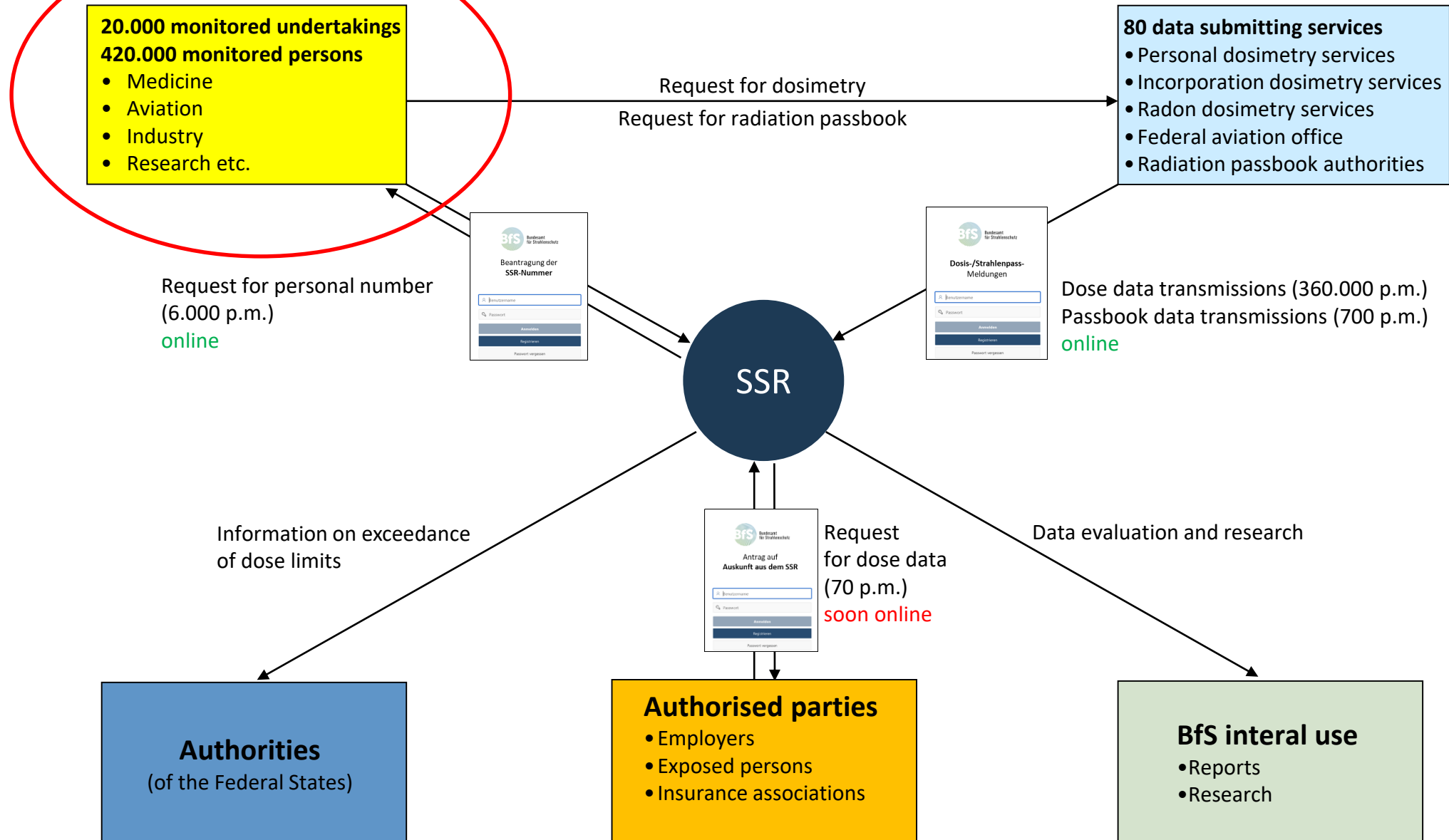


Overview on Occupational Radiation Monitoring in Germany



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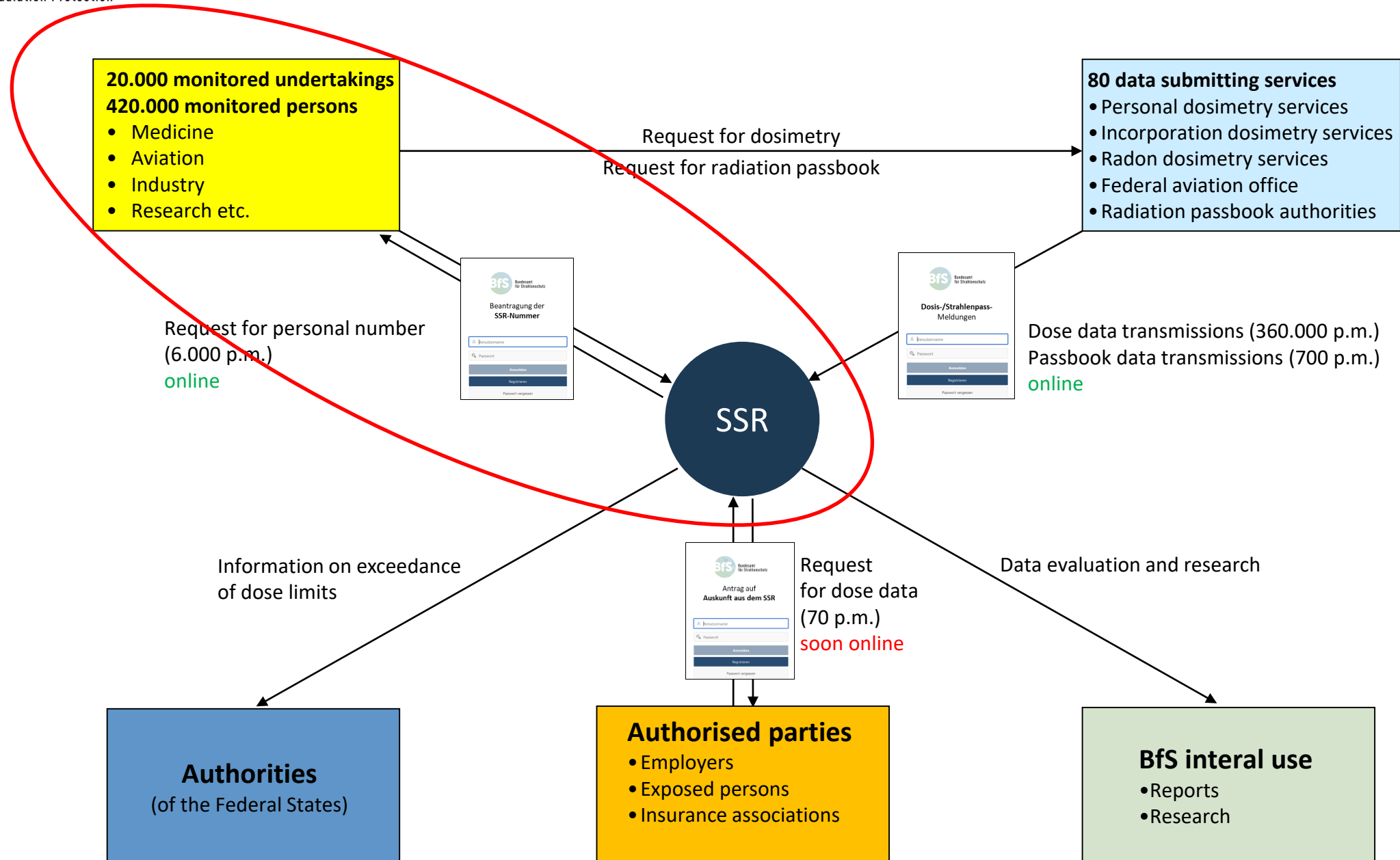
Monitored **Sectors**

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



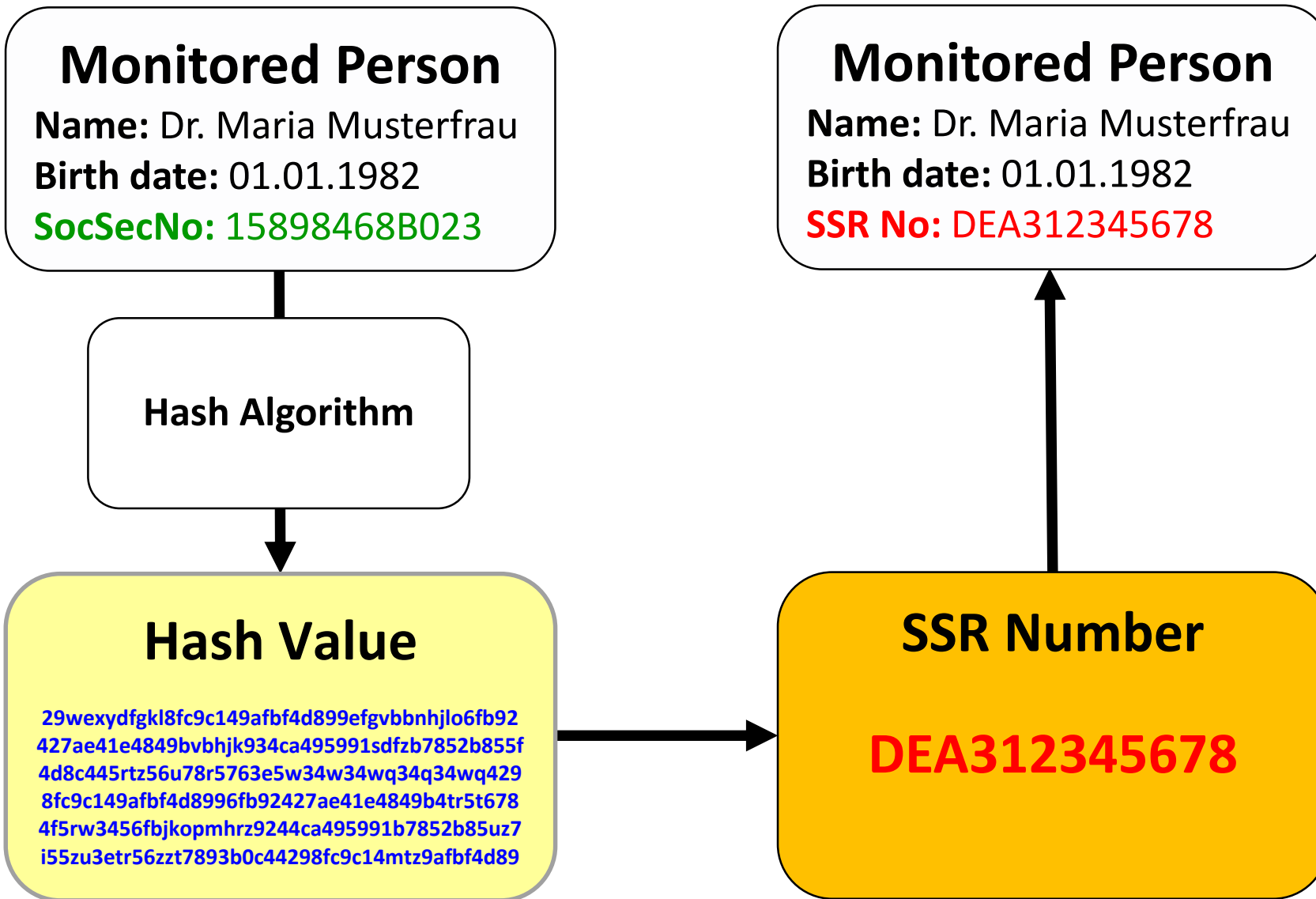
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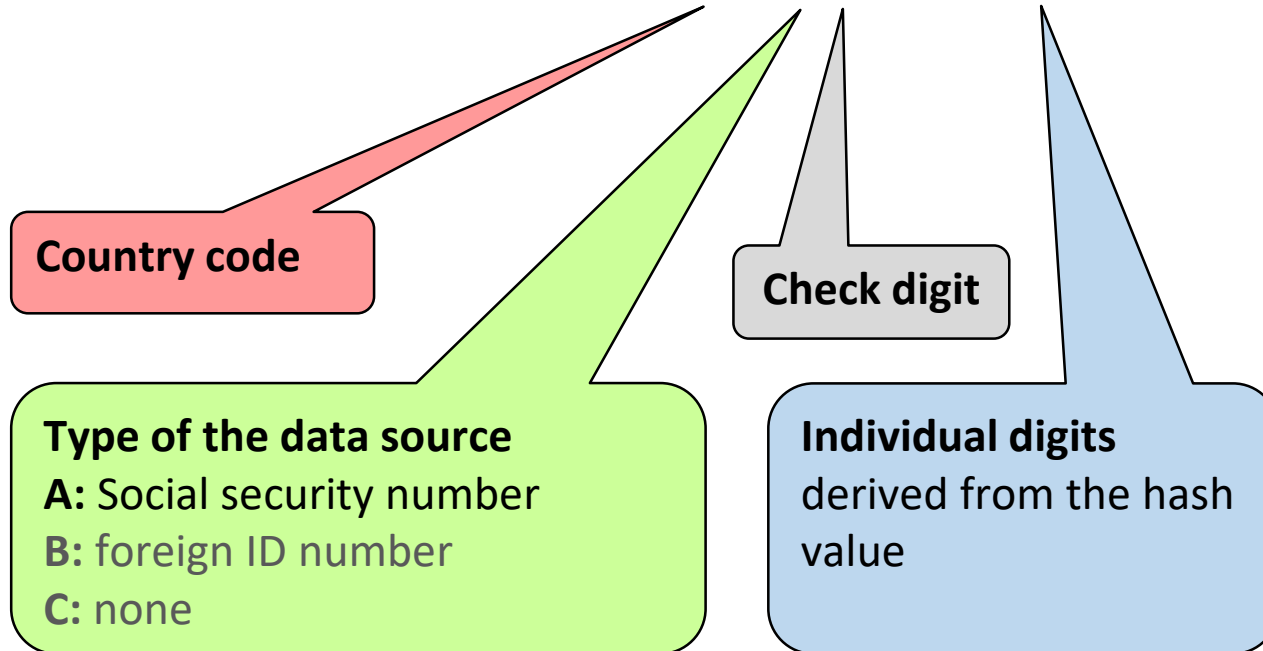


Personal ID Number (SSR Number)



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

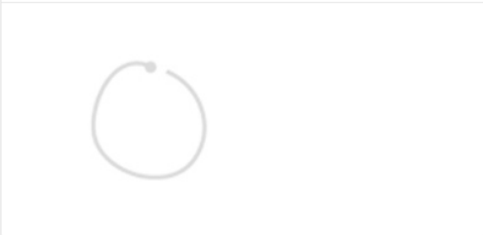
 Password

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

☒	Sozialversicherungs-Nr. (§ 147 SGB VI)	Surname	Given name(s)	Birth Name	Akademischer Grad (optional)	Date of birth	Place of birth
☒							

1 rows selected

Total 1

Special cases

Generate

German

English



Federal Office for
Radiation Protection

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!

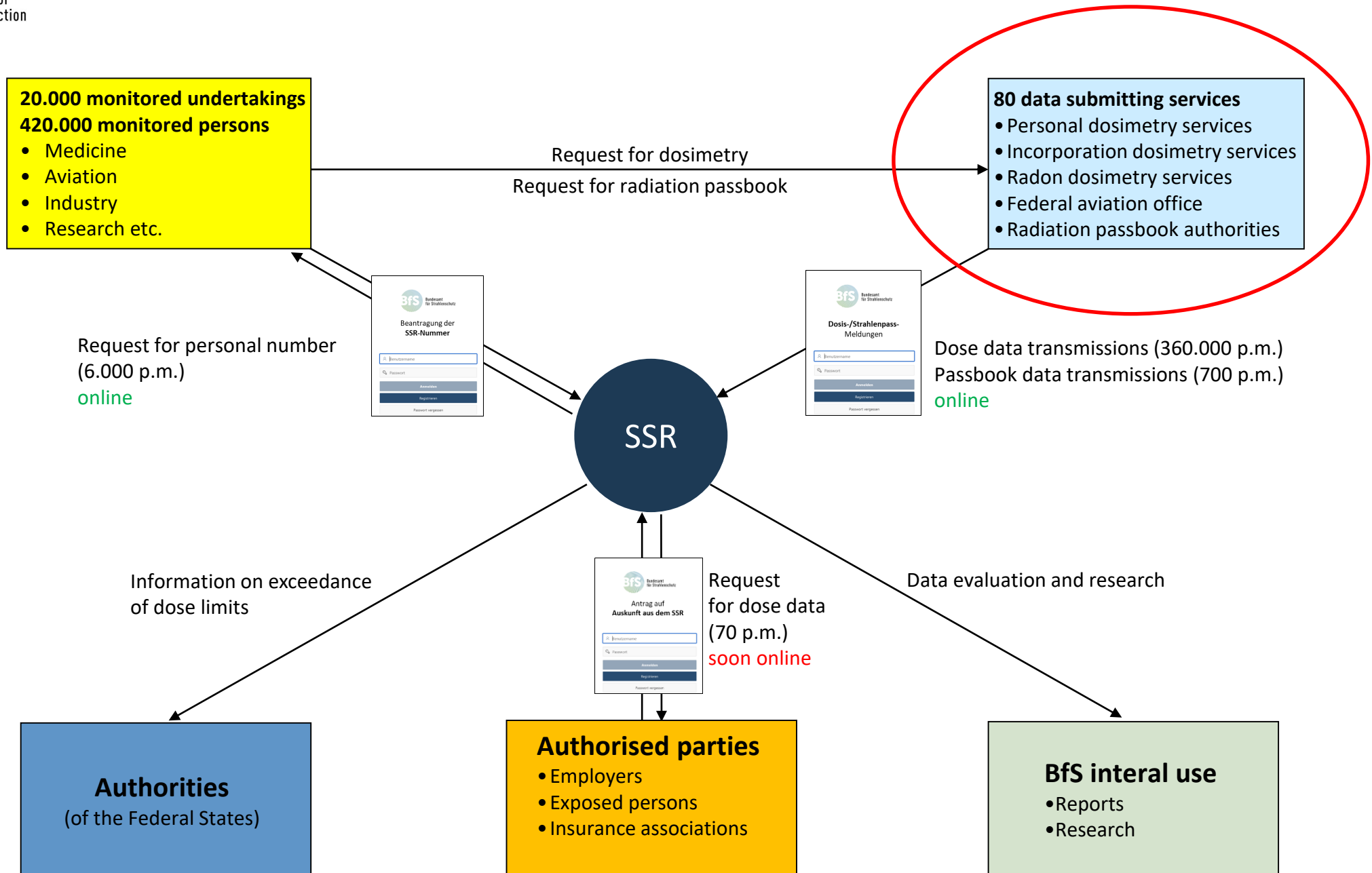
Die Strahlenschutzregisternummer (SSR-Nummer) ist Ihre persönliche Kennnummer nach §170 Strahlenschutzgesetz und für die zentrale Überwachung der beruflichen Strahlenexposition erforderlich. Über die SSR-Nummer sind Sie im Strahlenschutzregister eindeutig identifiziert. Mithilfe dieser Nummer können 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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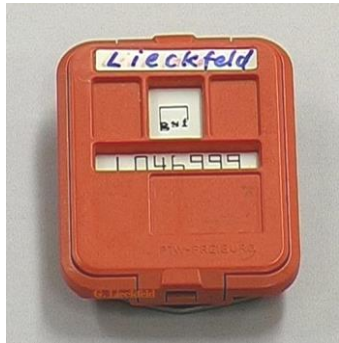
Data submitting services

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



Personal dosimetry

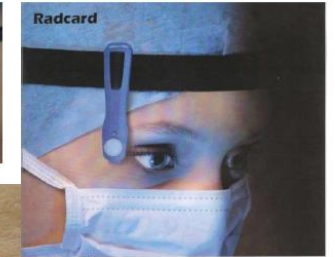
$H_p(10)$



$H_p(0.07)$



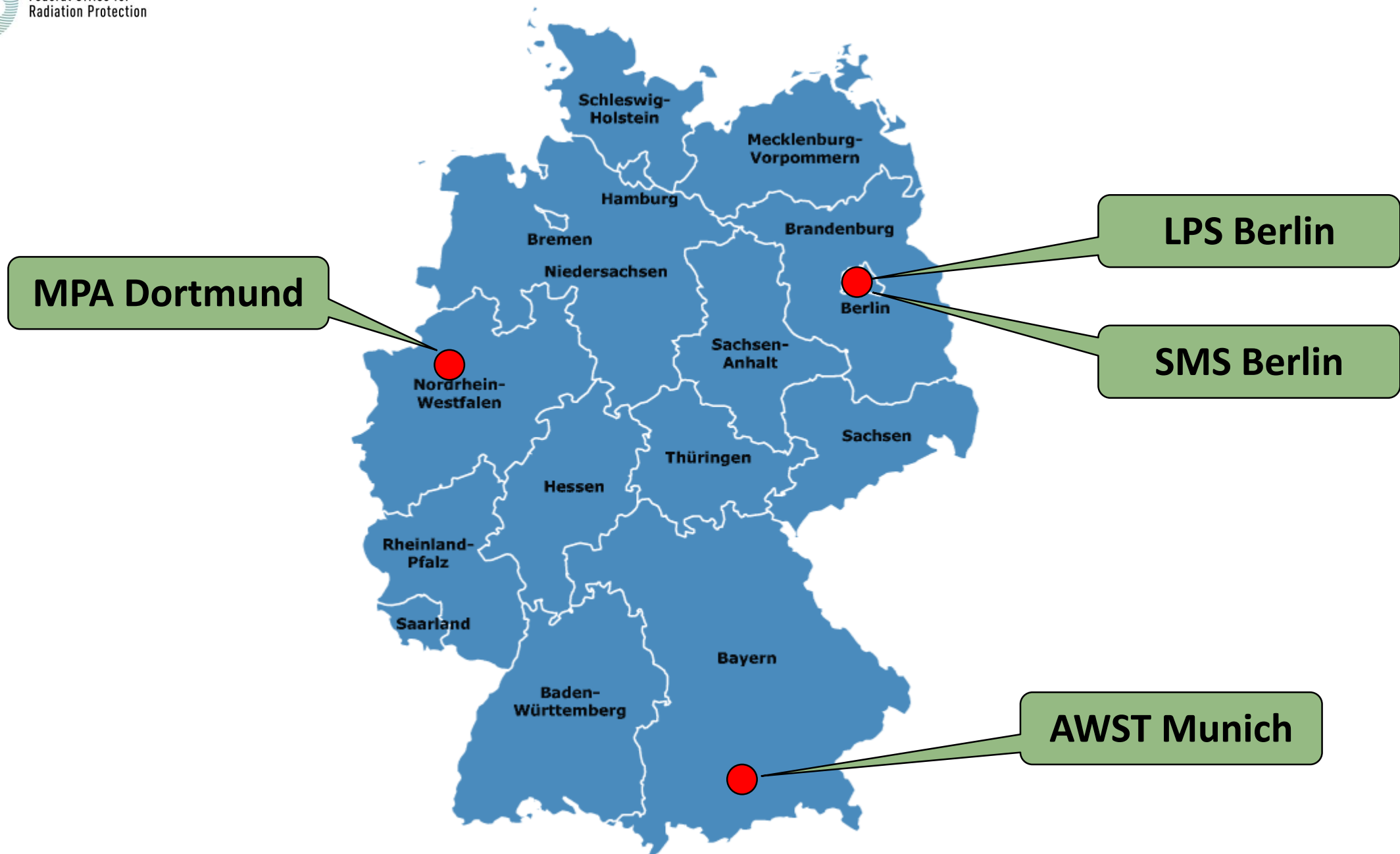
$H_p(3)$





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Personal dosimetry services





Internal dosimetry

In vitro monitoring



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

In vivo monitoring

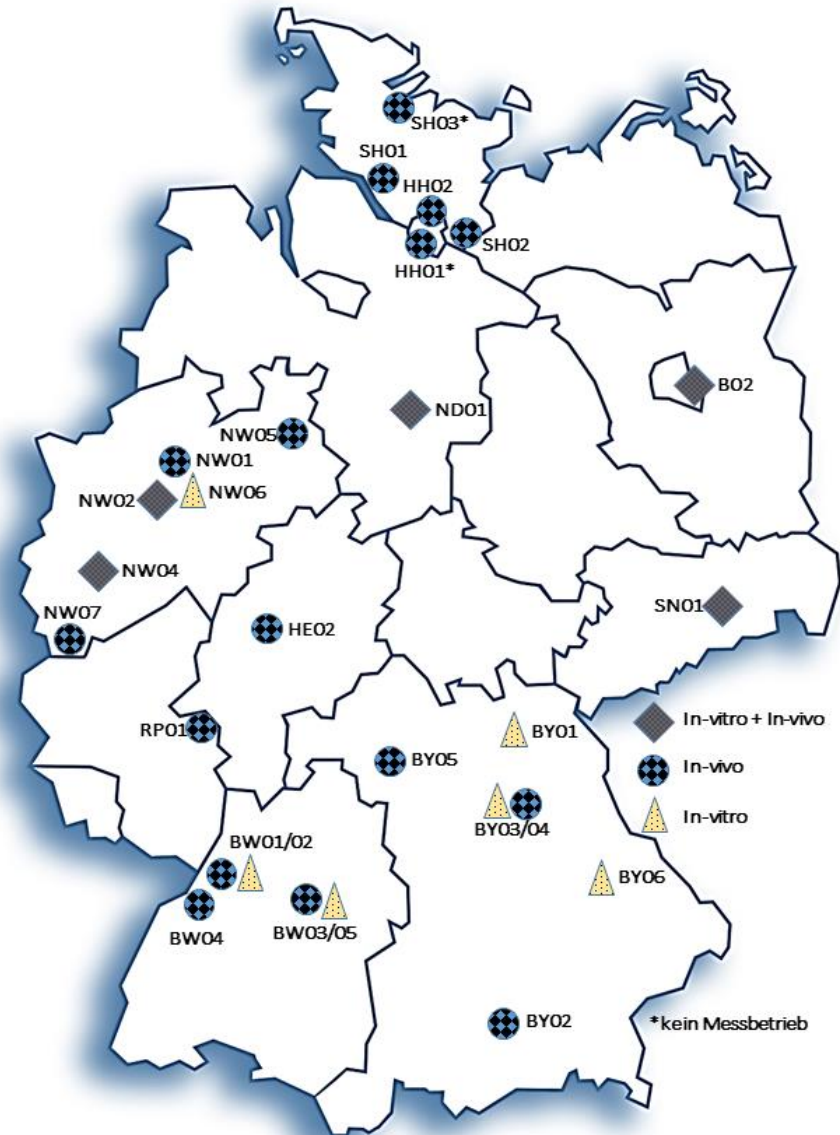


Whole body counter

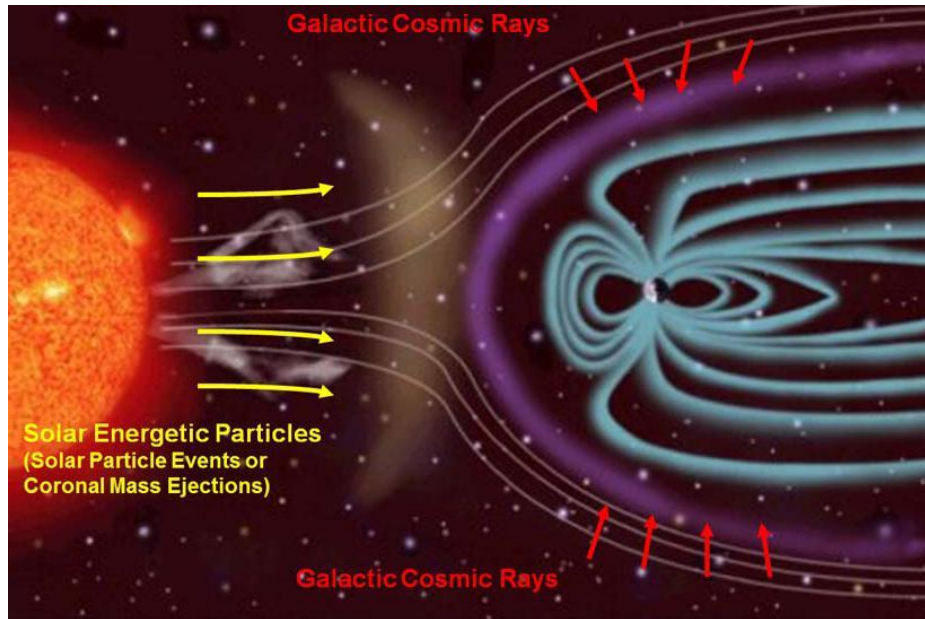


Internal dosimetry services

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

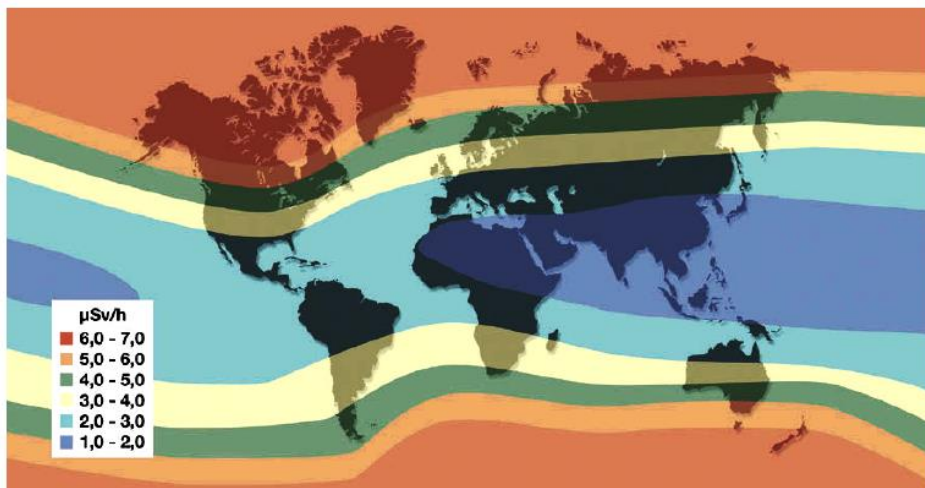


Cosmic radiation dosimetry



Effective dose can be calculated dependent on:

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





Federal Office for
Radiation Protection

Federal aviation office



Federal Aviation Office
(LBA) Braunschweig



Radon dosimetry



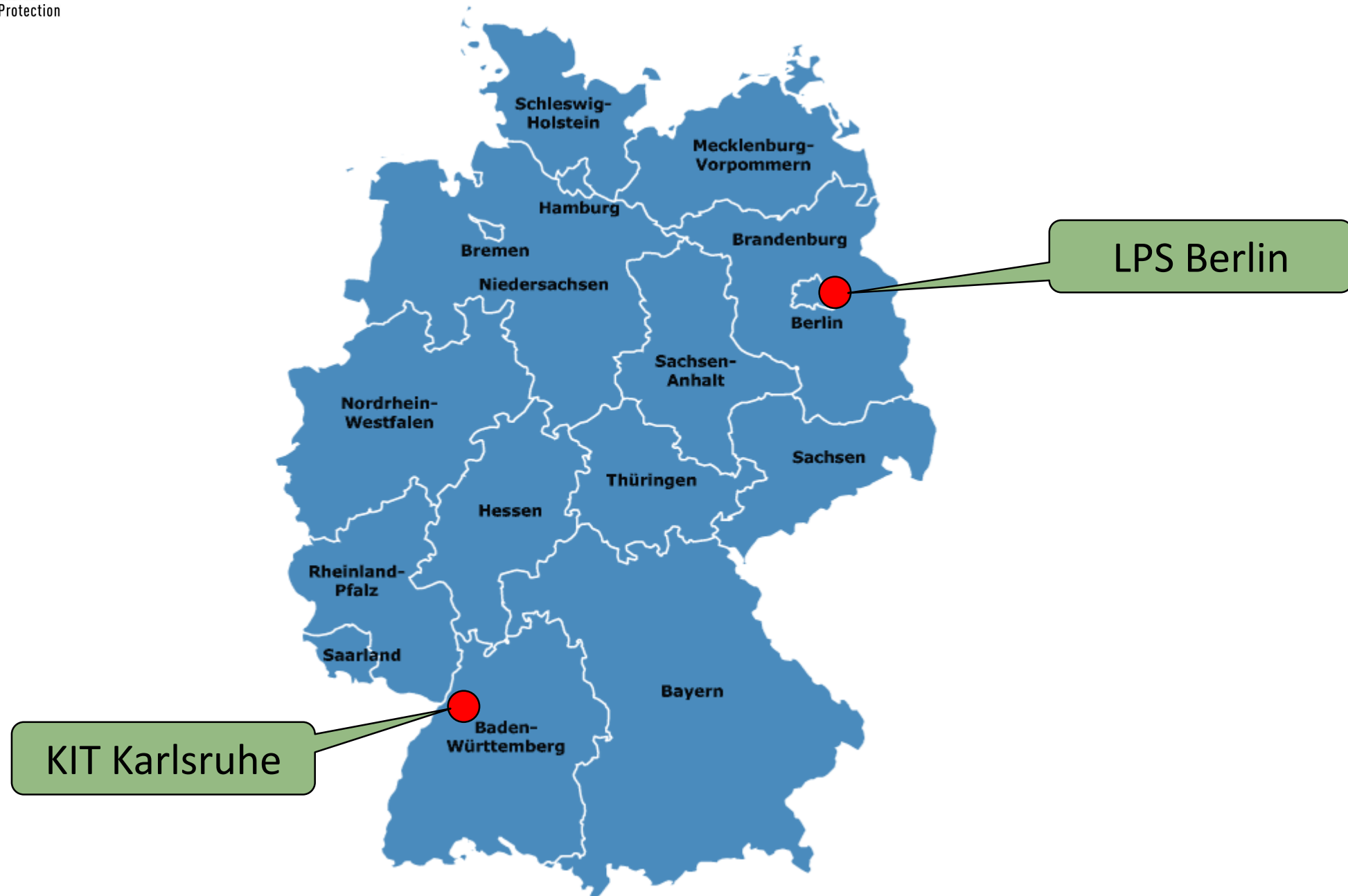
- Wearing time: 3 months
- Detection level: 15 Bq/m³
- Internal dose is calculated based on the measured Radon activity and conversion factors by ICRP





Federal Office for
Radiation Protection

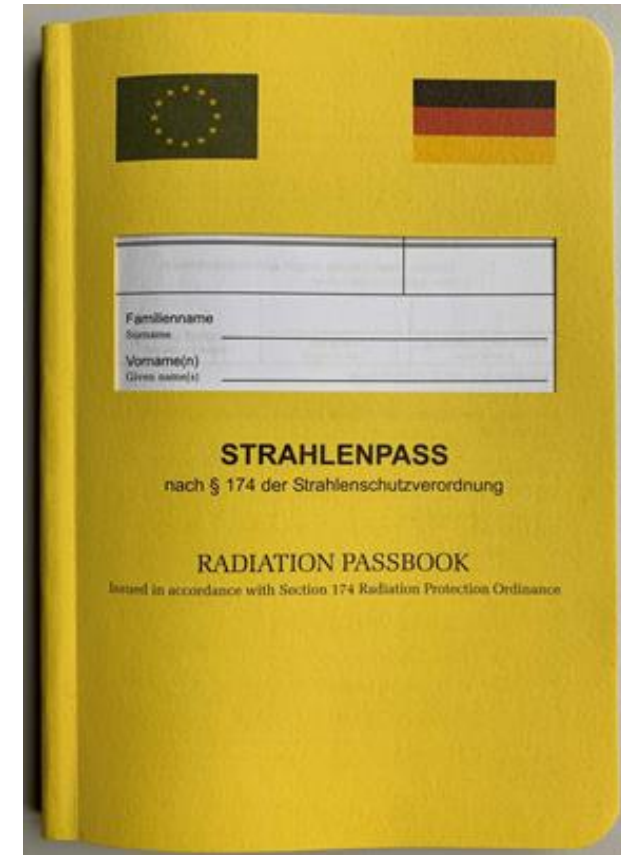
Radon dosimetry services





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

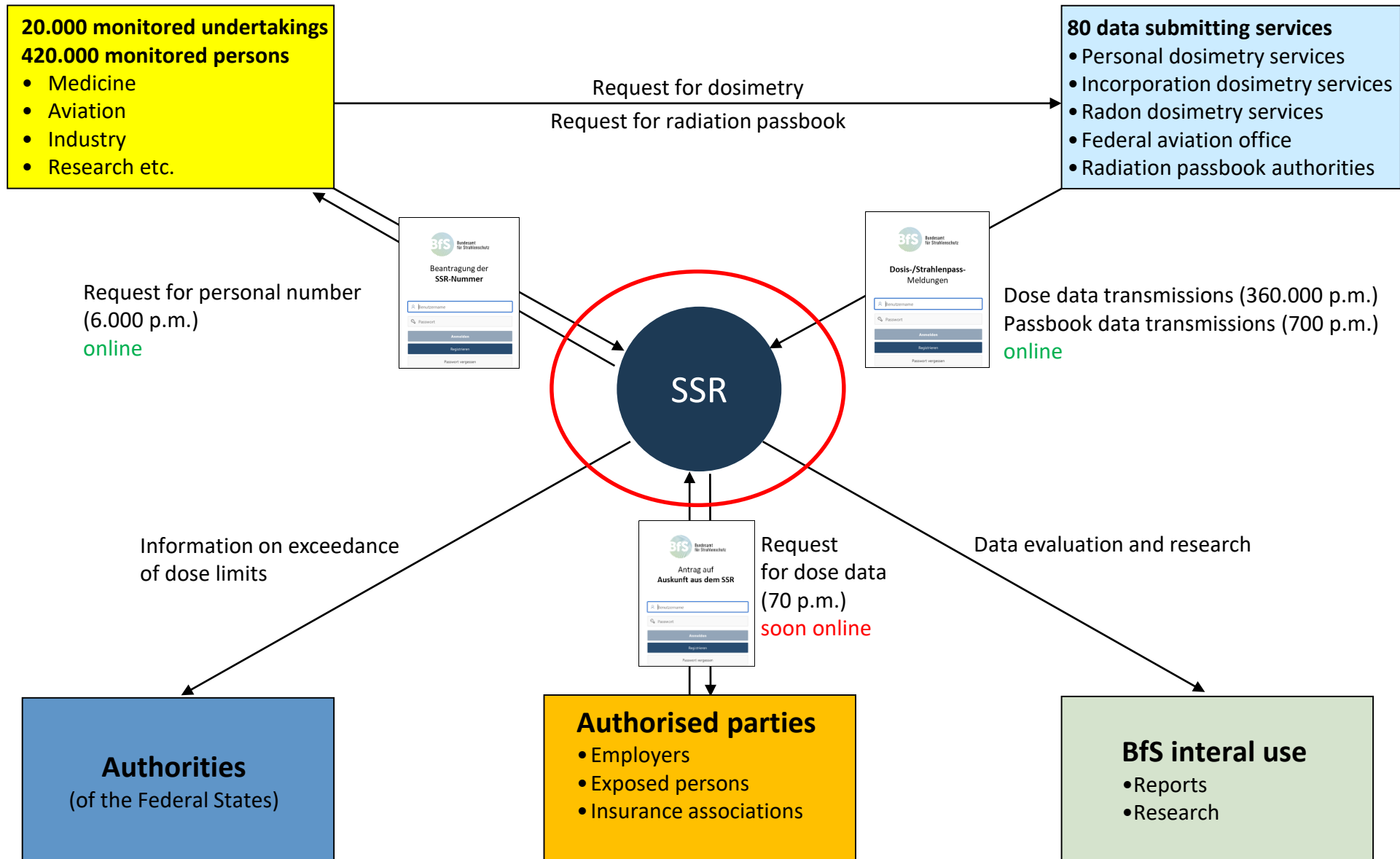
53 radiation passbook authorities
in 16 federal states

➔ hard to control multiple
ownership



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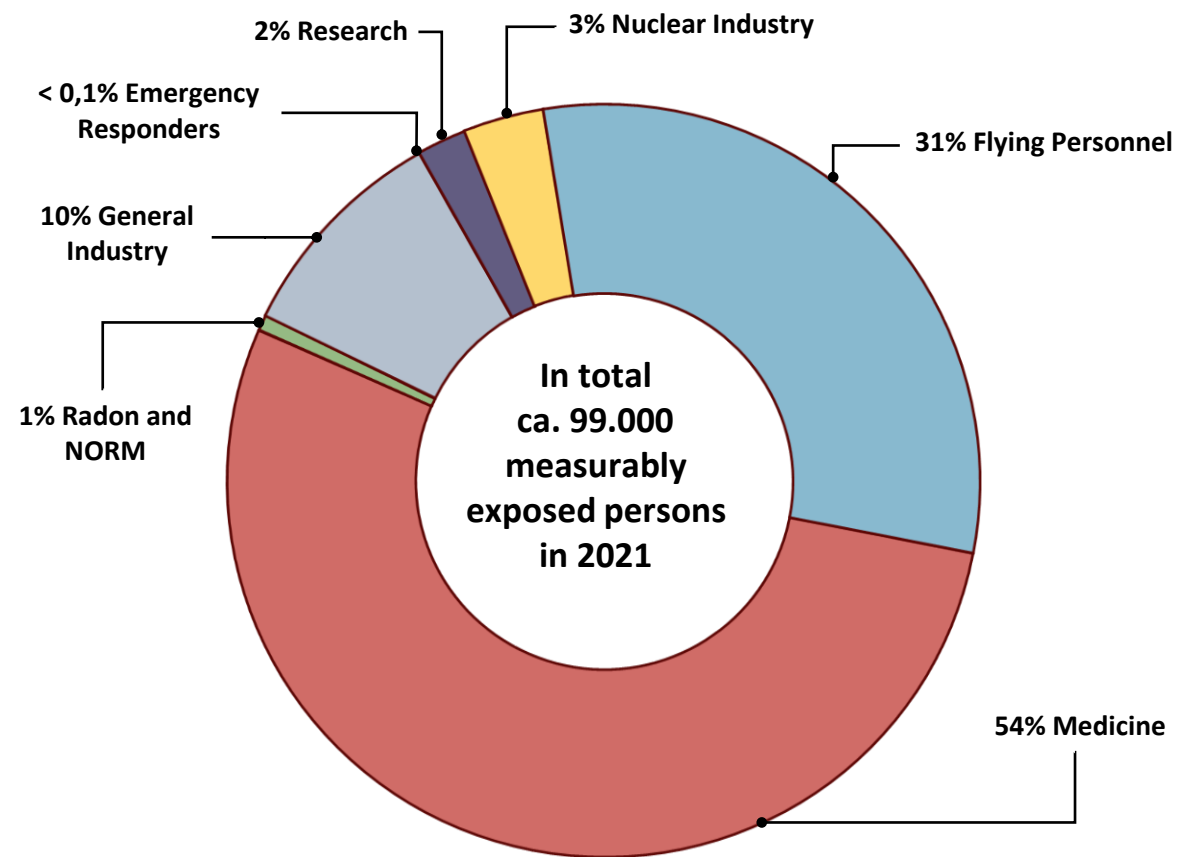
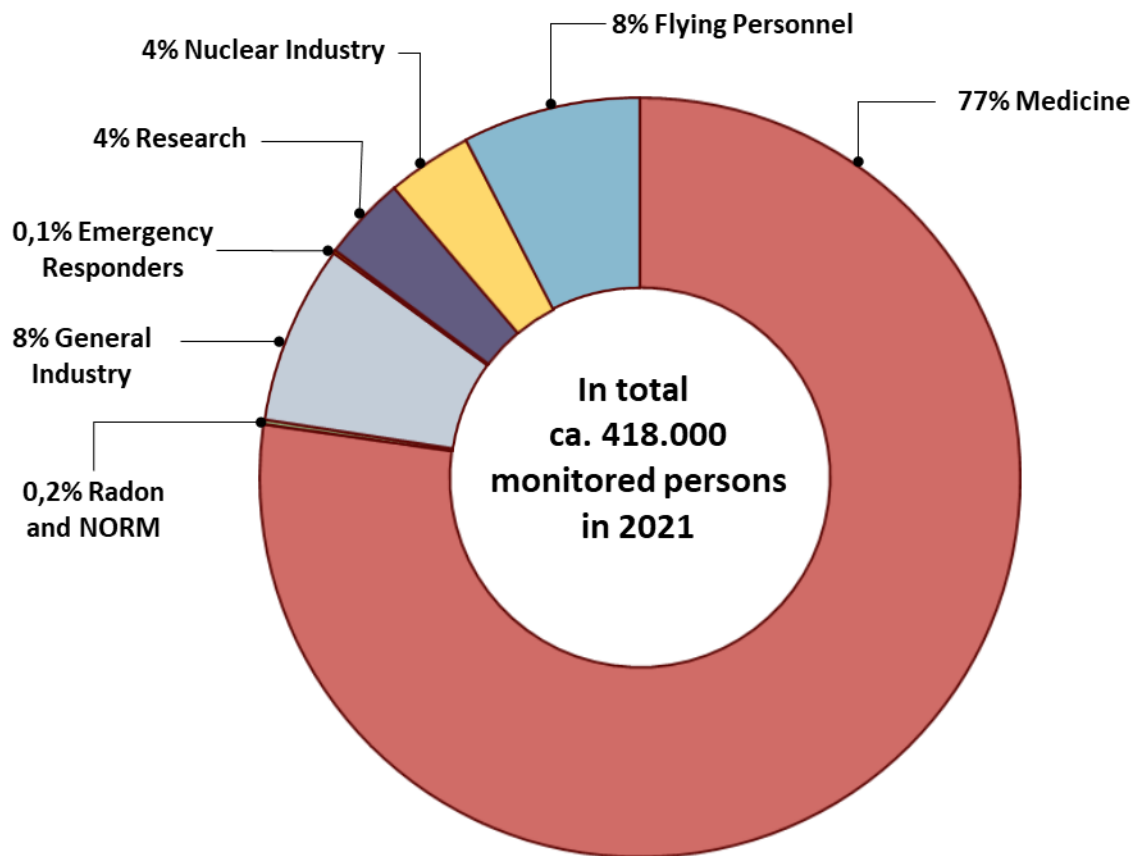


Aktuell	
Monitored persons	ca. 420.000
Monitored undertakings	ca. 20.000
Dose entries per month	ca. 360.000
Radiation passbook issuance entries per month	ca. 700

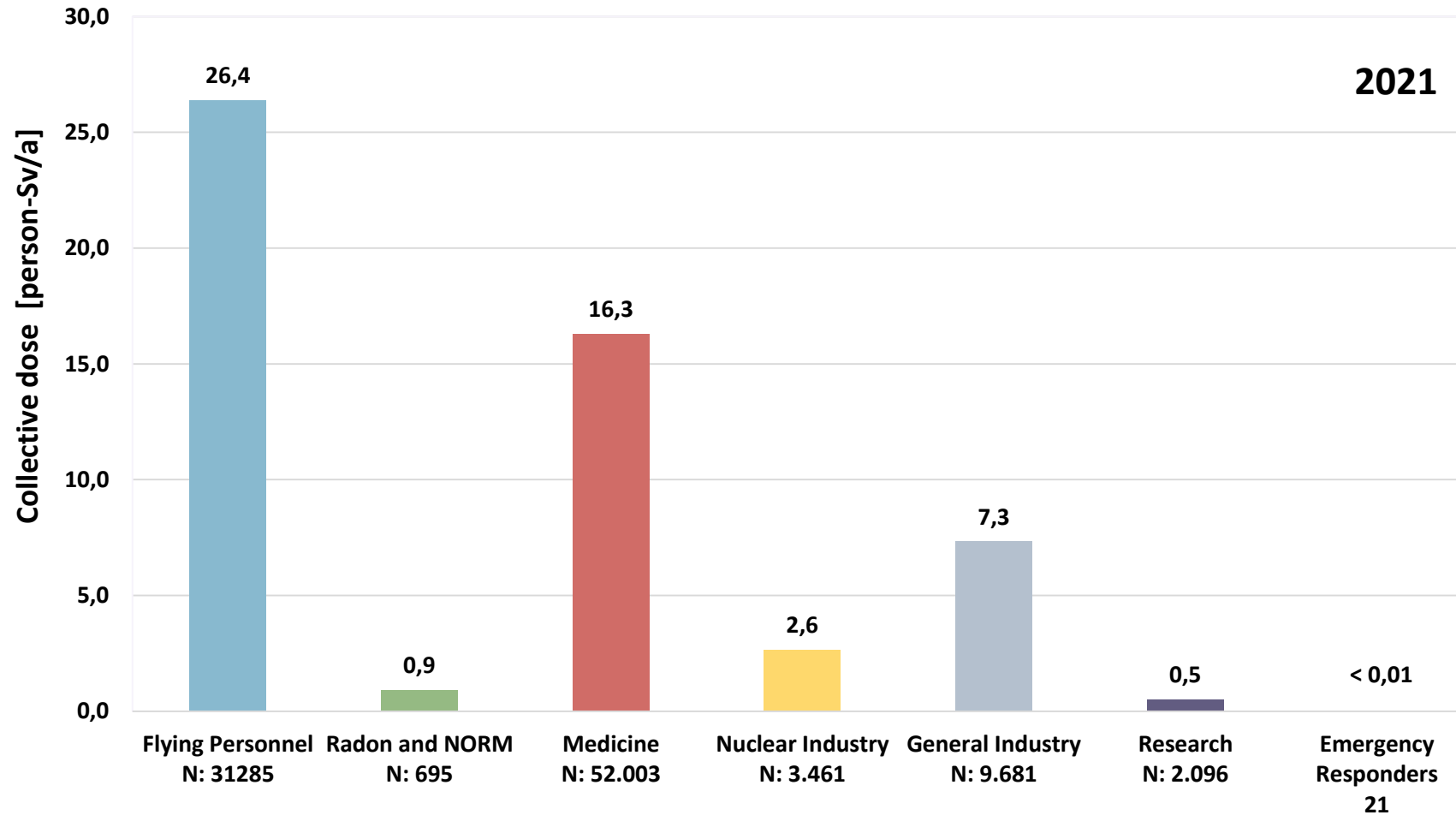
Gesamtdatenbestand des SSR	
Monitored persons	ca. 2.000.000
Monitored persons with ID number	ca. 530.000
Monitored undertakings	ca. 120.000
Dose entries	ca. 121.000.000



Monitored vs. measurably exposed persons

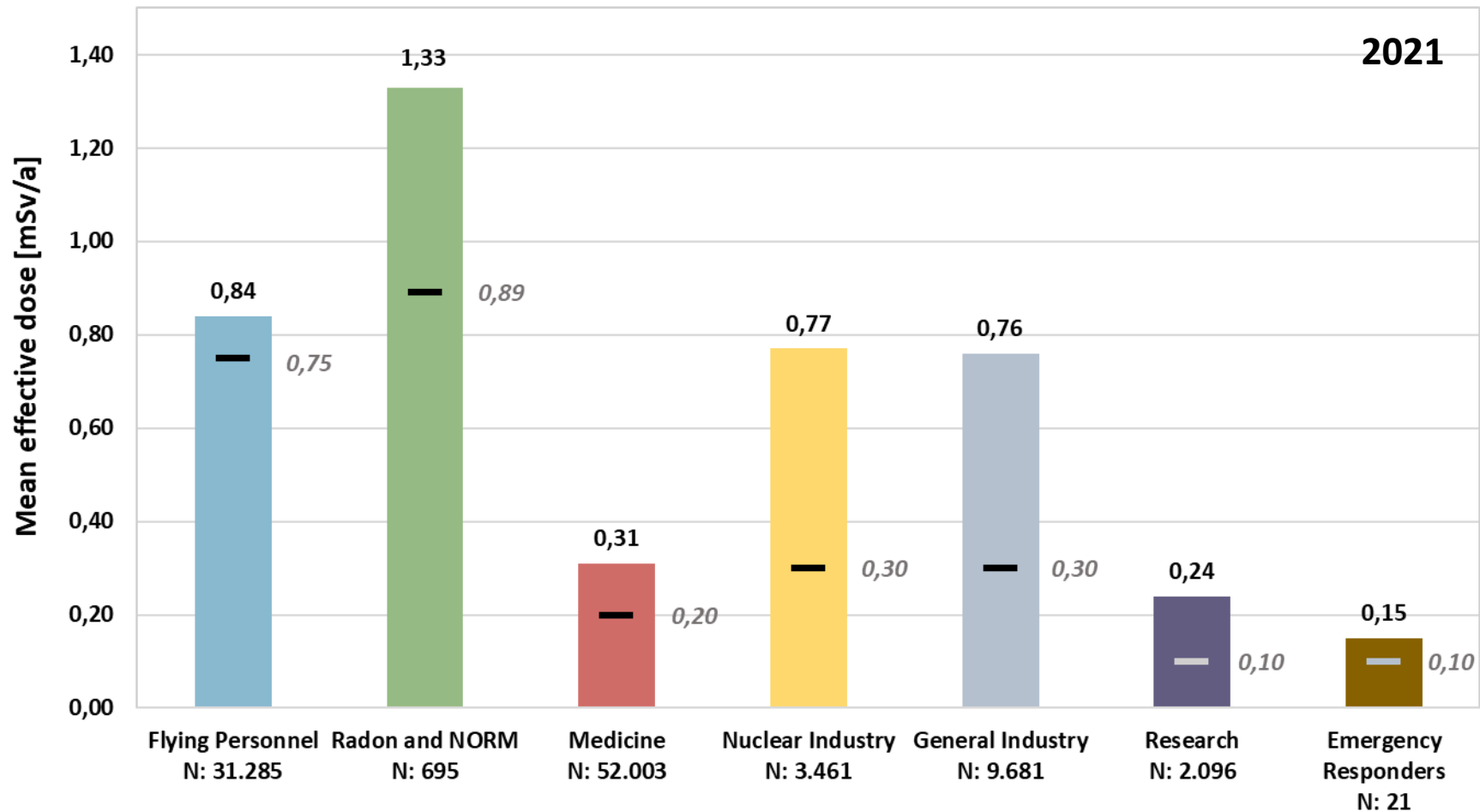


Collective anual dose of all monitored persons



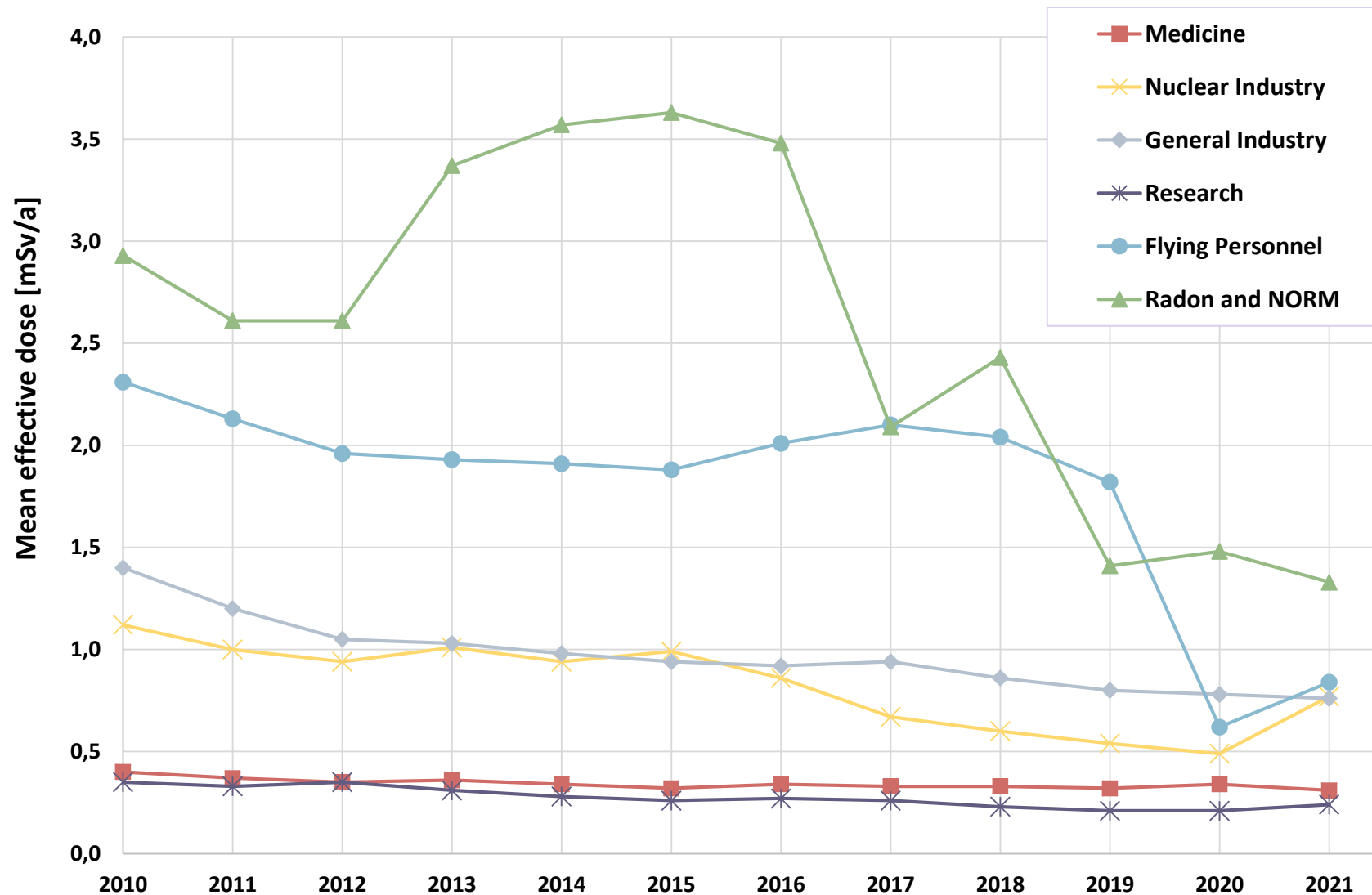


Mean effective annual dose of all measurably exposed persons



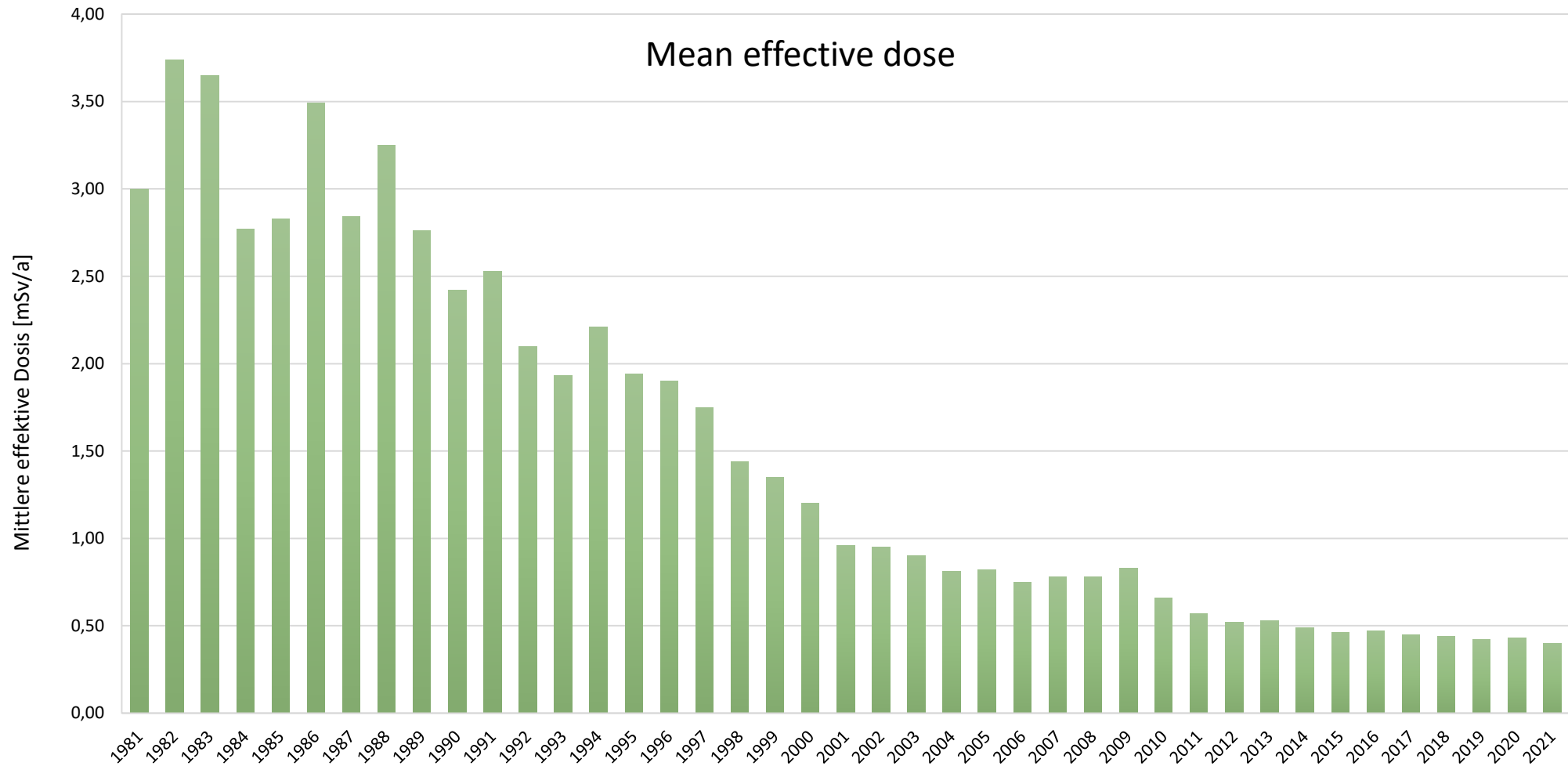


Mean effective annual dose of all measurably exposed persons





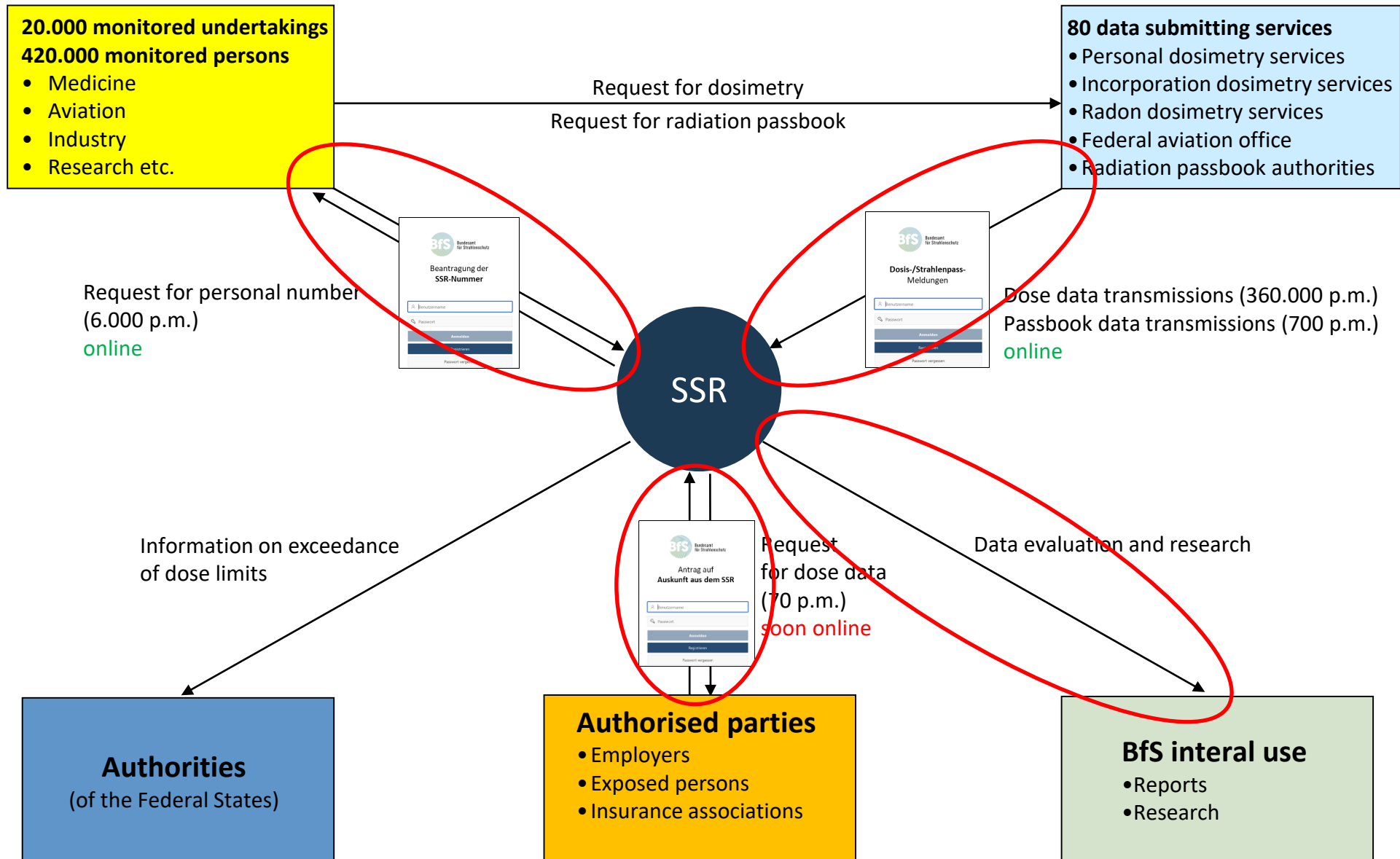
Mean effective annual dose – only external exposure





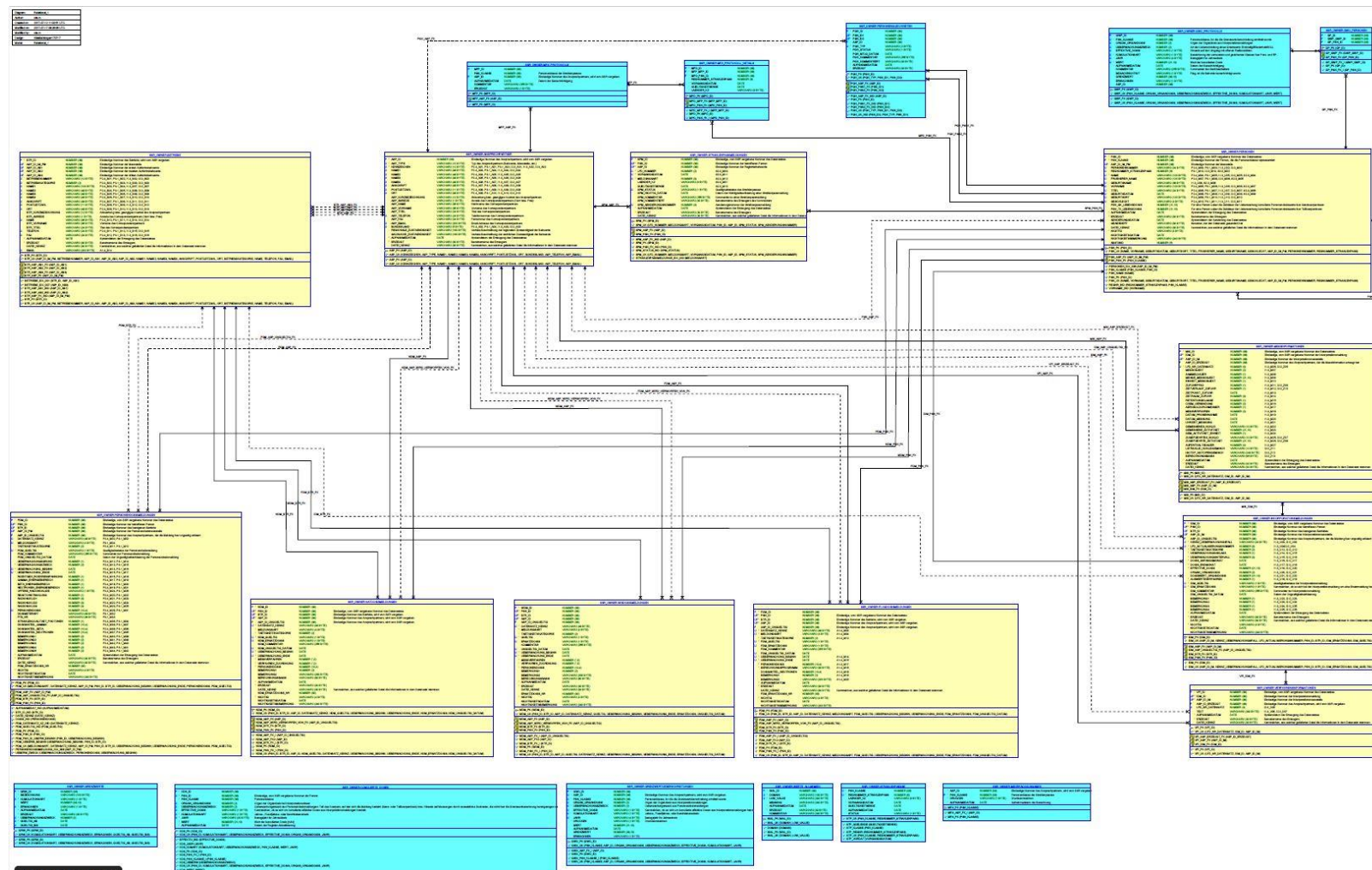
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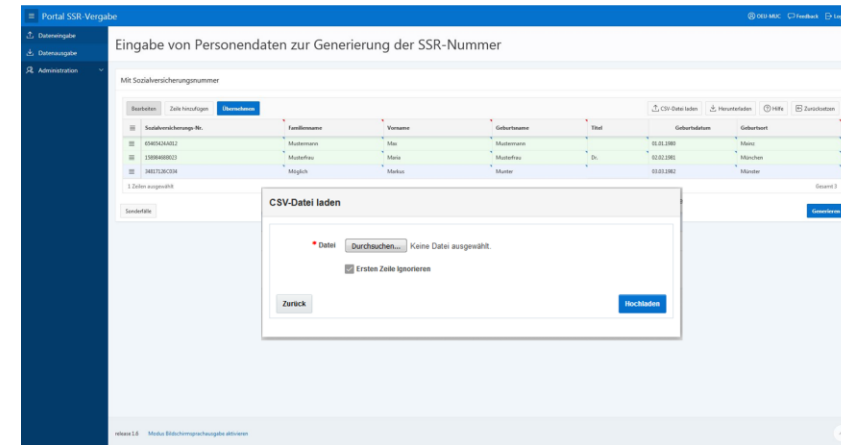


The SSR is based on a **relational database**

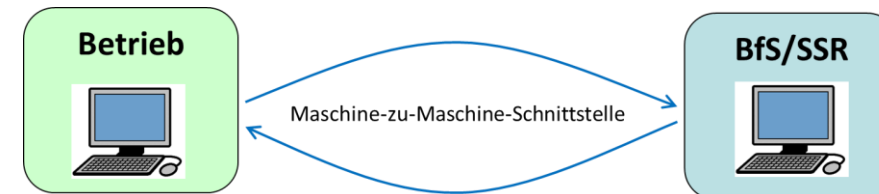


Interfaces with the SSR

- **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

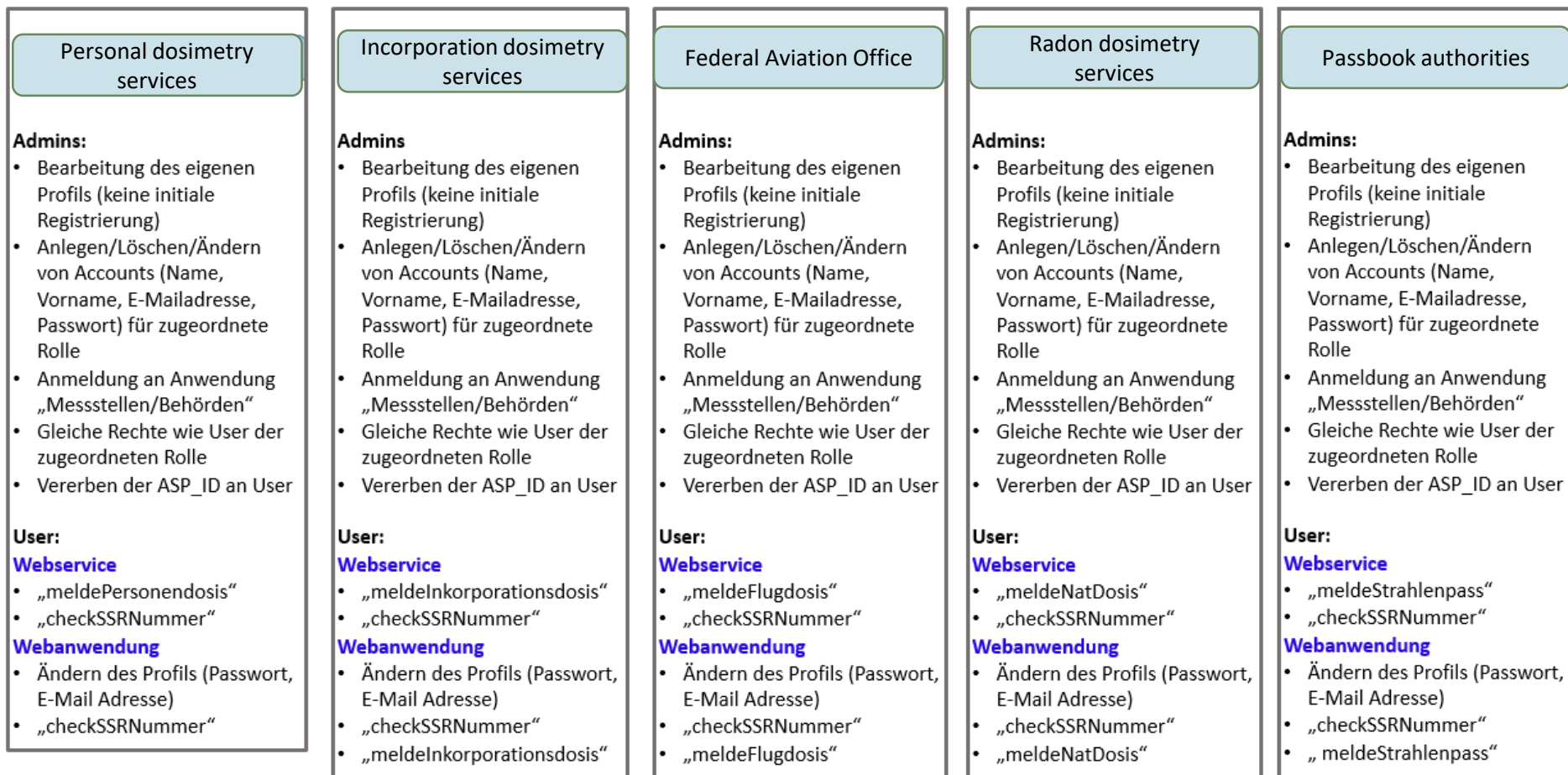
Monitoring services

Dose/passbook data transmissions

Next slide



Monitoring services





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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

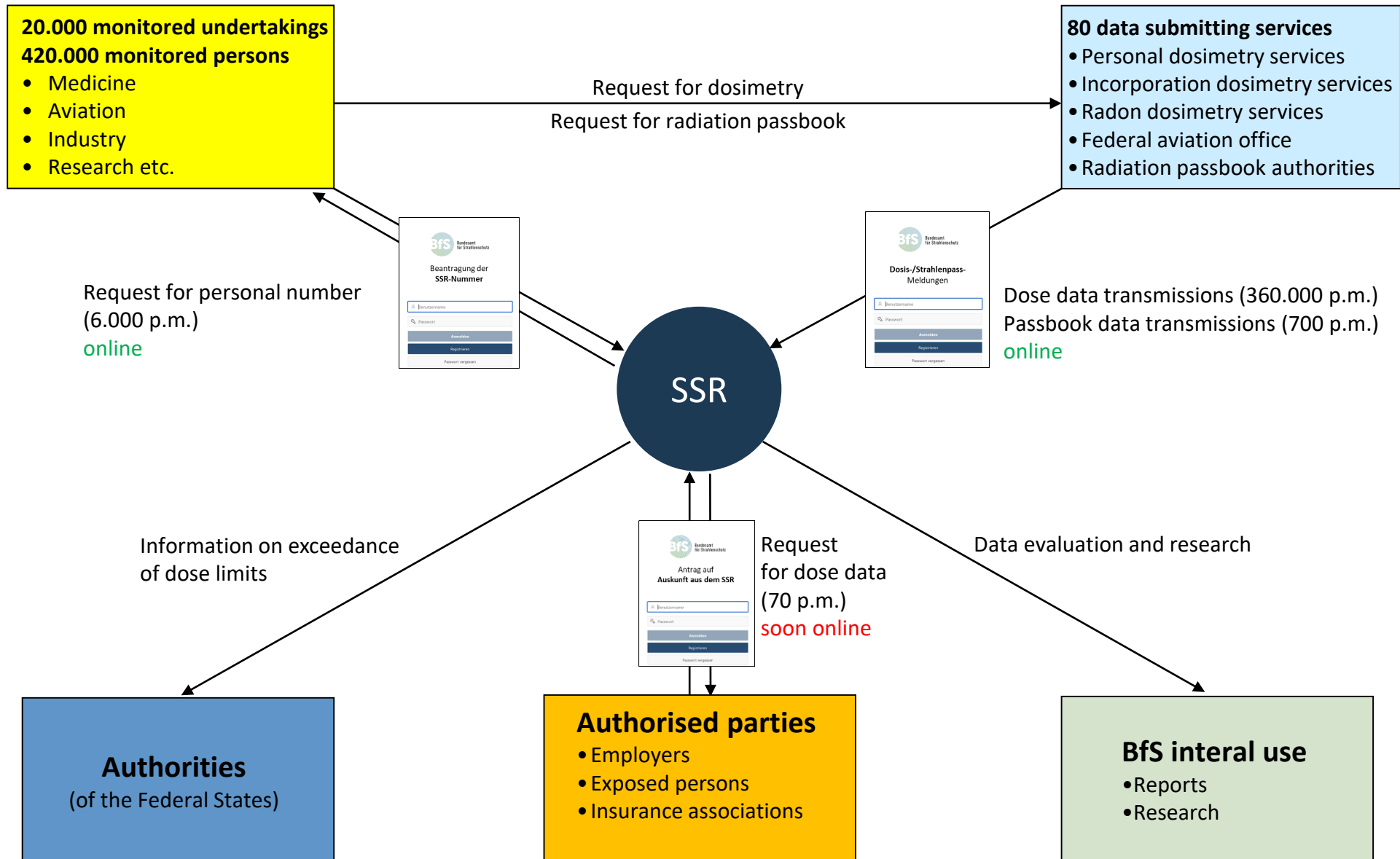
		ESOREX [Transport]
		Military transport
		Nuclear fuel cycle
		Others (medical, industrial)

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



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Legal Notice

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