Status of National Arrangements on Dose Registry

“Regulatory provisions on NDR & its’ implementation”

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Japan

REGIONAL WORKSHOP ON ON THE MANAGEMENT OF NATIONAL DOSE REGISTRIES
20 – 24 March 2023, Bangkok / Thailand

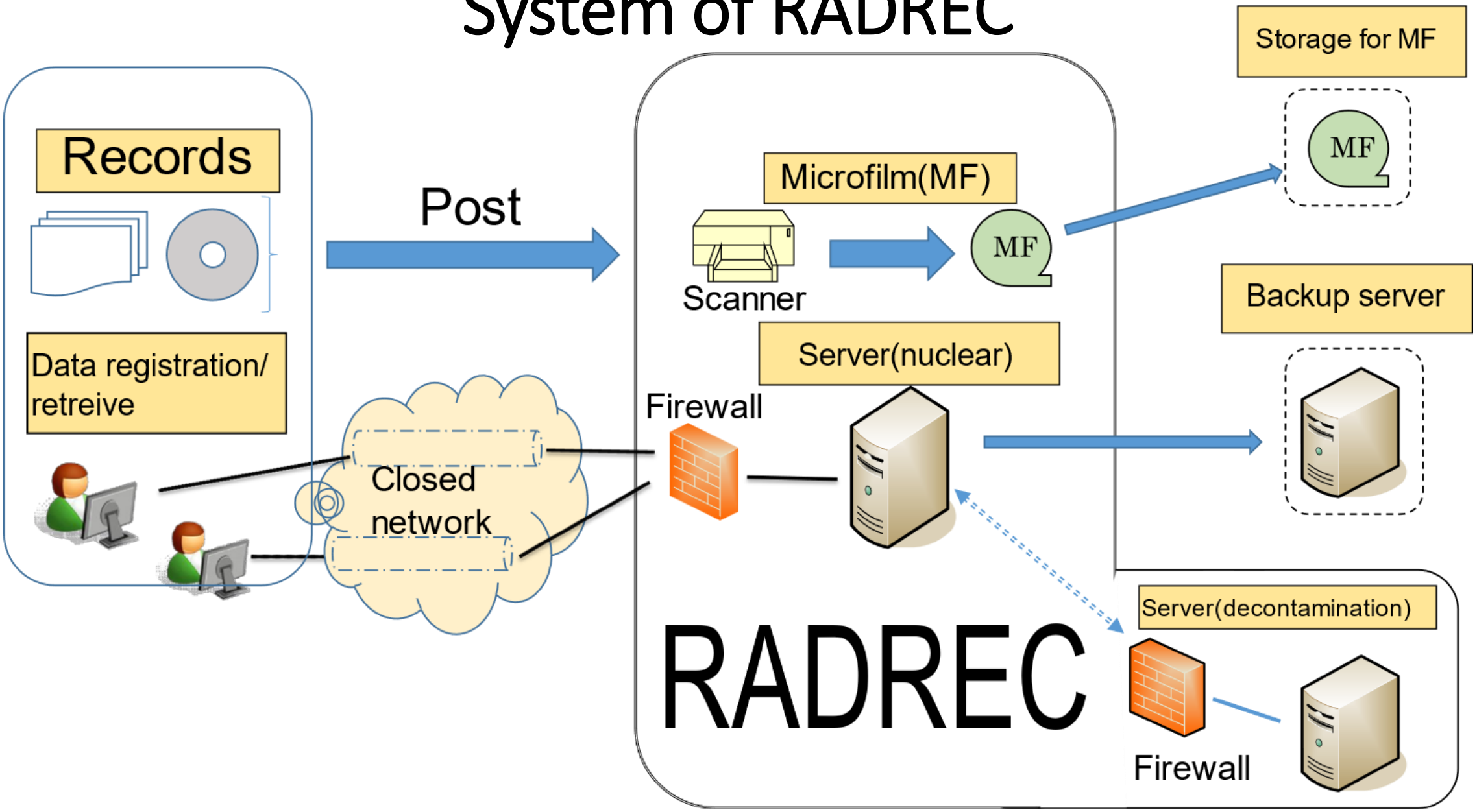
Legal Basis- Regulatory provisions: Status in Japan

- Requirements and provisions for the NDR:
  - There is **no NDR system** in Japan. Instead, it is responsible for employers, registrants, and licensees to record and monitor dosimetry of their radiation workers.
  - In the case that the radiation worker has ceased or the records of the dosimetry have been preserved for five years or more, the records can be passed on to the body which Nuclear Regulation Authority has authorized.
  - REA (Radiation Effects Association) has been licensed as a “dose registration organization” named RADREC (Radiation Dose Registry Center)
    - Registration and Control System for Exposure Dose of Nuclear Workers (established in October 1977)
    - Registration and Management System for Exposure Dose of Decontamination Workers (launched in November 2013) following the accident at the Fukushima Daiichi Nuclear Power Plant
    - Registration and Control System for Exposure Dose of Radioisotopes Workers (established in October 1984)

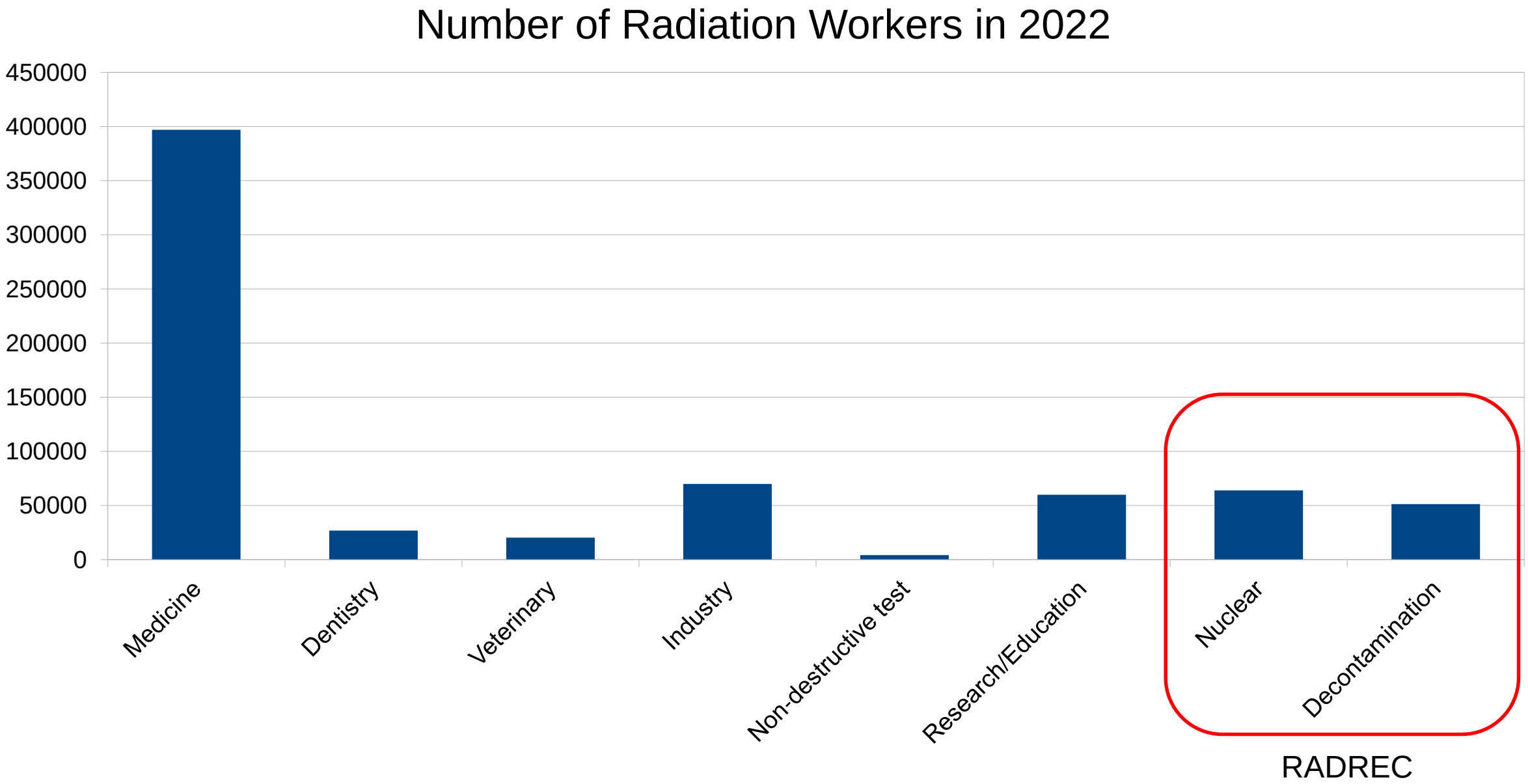
TSP - Radiation Dose Registry Center, RADREC

- Since 1977, RADREC has been operating a central radiation dose registration system for workers at nuclear facilities.
- The RADREC operates a central registration database, to which nuclear operators should submit electronic data of dose records once a year.
- The system also includes issuance of “radiation passbooks”, which record previous doses and the histories of medical examinations and radiation education for each worker, because the contract workers may move from site to site frequently along with their passbook.
- In 1984, the radiation dose registry system was established for radioisotope workers who are working in academic research institutes, hospitals, and industrial research organizations using radioisotopes and radiation generators.
- However, due to cost burdens, only a few licensees provide the dose records
  - About 30 US$/person/year

System of RADREC



Radiation Workers in Japan



Radiation Workers in Japan

- After the Fukushima-Daiichi accident, large periodical maintenance work at nuclear power reactors was not implemented, except for the decommissioning of the Fukushima-Daiichi reactors, so that average radiation dose has been dominated by the contribution from decommissioning.
- The number of decontamination workers increased from 2012 to 2015, then decreased from 2016 to 2017, because the operation in the special decontamination areas was mostly completed by the end of March 2017.

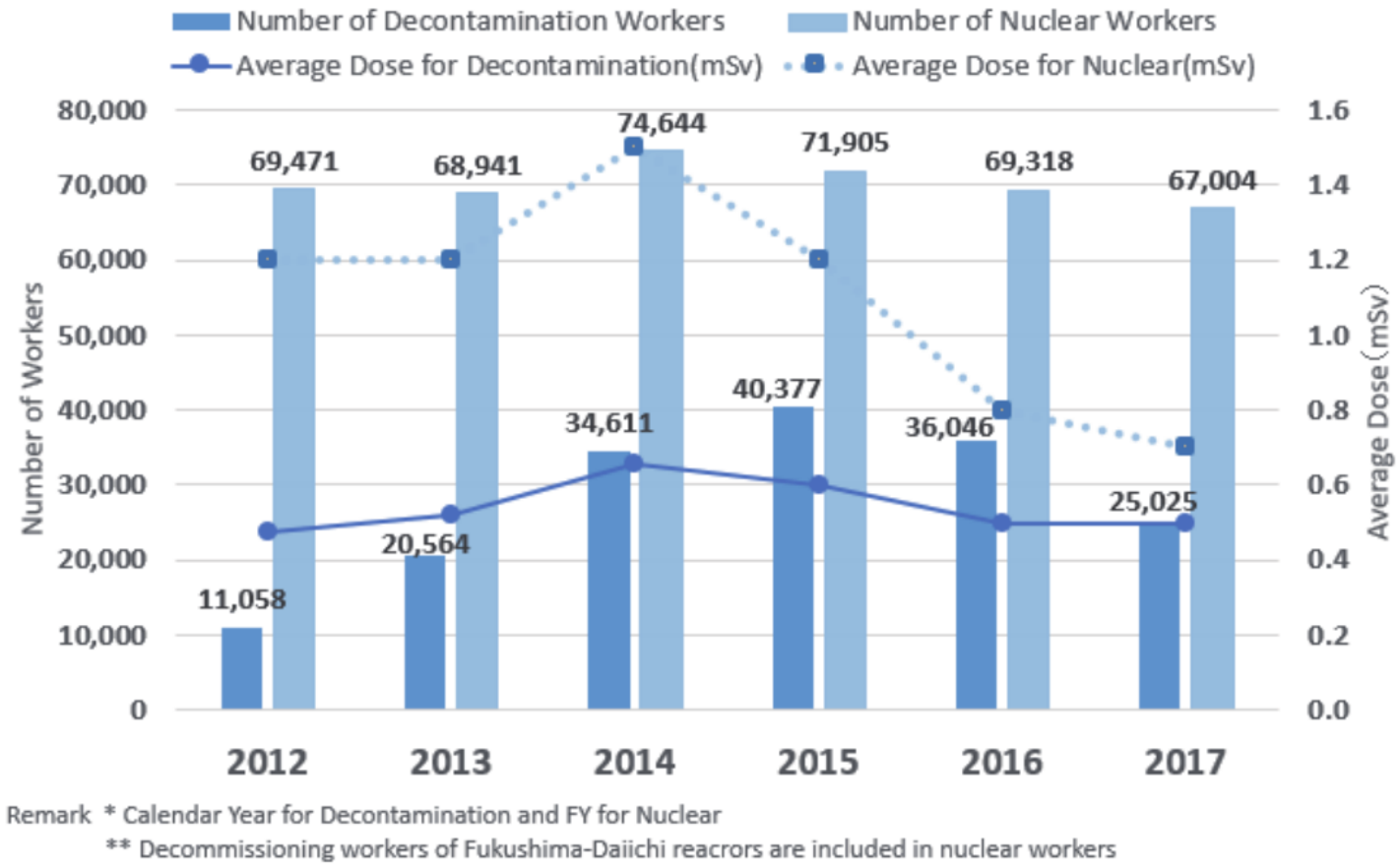


Fig. 1 Transitions of number of radiation workers and average dose for nuclear and decontamination workers.

T Asano and A Ito, Experience and Perspective on Radiation Dose Registry in Japan. Jpn. J. Health Phys.,54(2), 135～136 (2019)

Dosimetry service characteristics

In Japan, we have mainly two providers to offer dosimetry service, namely, Chiyoda Technol (https://www.c-technol.co.jp), and Nagase Landauer (https://www.nagase-landauer.co.jp)

- Monitoring periods used for external dosimetry:

Every month

OSL personal dosimeter by Nagase Landauer

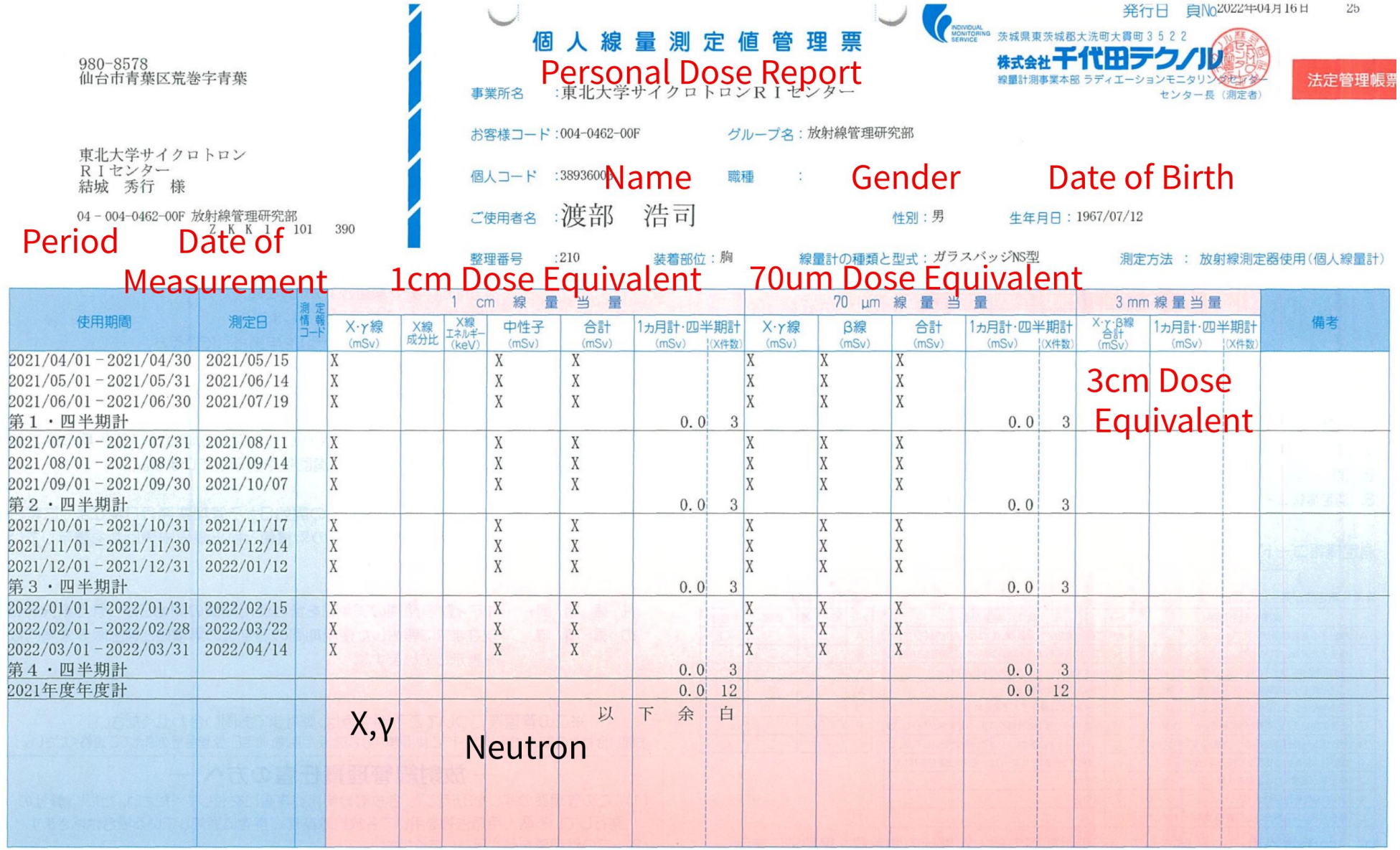
Glass badge by Chiyoda technol

- Extremity dosimetry:

- Internal dosimetry:

Not collect

Example of 2022 Annual Report



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個人線量測定値管理票
Personal Dose Report

発行日　自No 2022年04月16日　25

INDIVIDUAL MONITORING SERVICE
茨城県東茨城郡大洗町大貫町３５２２
株式会社千代田テクノル
線量計測事業本部 ラディエーションモニタリングセンター
センター長（測定者）

法定管理帳票

事業所名　:東北大学サイクロトロンＲＩセンター

お客様コード:004-0462-00F　　グループ名：放射線管理研究部

個人コード　:3893600　　職種　:

ご使用者名　:渡部　浩司　　性別：男　　生年月日：1967/07/12

整理番号　:210　　装着部位：胸　　線量計の種類と型式：ガラスバッジNS型　　測定方法　：　放射線測定器使用（個人線量計）

Name　Gender　Date of Birth

Period　Date of Measurement　1cm Dose Equivalent　70um Dose Equivalent

使用期間	測定日	測情 定報 コード	1 cm 線量当量 X・γ線 (mSv)	X線成分比	X線エネルギー (keV)	中性子 (mSv)	合計 (mSv)	1カ月計・四半期計 (mSv)	(X件数)	70 μm 線量当量 X・γ線 (mSv)	β線 (mSv)	合計 (mSv)	1カ月計・四半期計 (mSv)	(X件数)	3 mm 線量当量 X・γ・β線合計 (mSv)	1カ月計・四半期計 (mSv)	(X件数)	備考
2021/04/01－2021/04/30	2021/05/15		X			X	X			X	X	X						
2021/05/01－2021/05/31	2021/06/14		X			X	X			X	X	X						
2021/06/01－2021/06/30	2021/07/19		X			X	X			X	X	X						
第１・四半期計								0.0	3				0.0	3				
2021/07/01－2021/07/31	2021/08/11		X			X	X			X	X	X						
2021/08/01－2021/08/31	2021/09/14		X			X	X			X	X	X						
2021/09/01－2021/09/30	2021/10/07		X			X	X			X	X	X						
第２・四半期計								0.0	3				0.0	3				
2021/10/01－2021/10/31	2021/11/17		X			X	X			X	X	X						
2021/11/01－2021/11/30	2021/12/14		X			X	X			X	X	X						
2021/12/01－2021/12/31	2022/01/12		X			X	X			X	X	X						
第３・四半期計								0.0	3				0.0	3				
2022/01/01－2022/01/31	2022/02/15		X			X	X			X	X	X						
2022/02/01－2022/02/28	2022/03/22		X			X	X			X	X	X						
2022/03/01－2022/03/31	2022/04/14		X			X	X			X	X	X						
第４・四半期計								0.0	3				0.0	3				
2021年度年度計								0.0	12				0.0	12				
			X,γ			Neutron		以下余白										

3cm Dose Equivalent

Dosimetry service characteristics

- Dose assessment methodologies for internal dosimetry:

Licensee has responsibility to estimate internal dose by means of (1) monitoring air concentration of radioisotope in the working area, or (2) computation due to amounts of used radioisotopes

- Calibration procedures for internal dosimetry:

Air monitor must be calibrated periodically.

- Dose estimation of internal dose using the results of workplace monitoring:

Yes(1) or No (2)

- Monitoring requirements for emergency exposure situations and recording arrangements:

Government has responsibility to monitoring exposure and record program

Provision for Quality Management System for TSPs

- Provide info on
  - What system?
  - Certification:
  - Accreditation and scope:
  - Qualified staff:
  - Training requirements:

General characteristics of the ~~NDR~~ RADREC

- Establishment date:

1977 only for nuclear workers

- Responsible body/organization:

RADIATION EFFECTS ASSOCIATION

- Role of the RADREC:

Keep records of radiation workers' histories of doses, medical examinations and radiation education. The records are used for the Japanese epidemiological study on low-dose radiation effects

- Occupational categories included in the RADREC:

Nuclear workers, and decontamination workers

- Responsible organisation (individual) for submitting the required information to the RADREC:

Electric power companies and decontamination contractors

General characteristics of the ~~NDR~~ RADREC

- Information is required by the RADREC:

Dose, results of medical examination, radiation education

- Types of doses are recorded in the RADREC:

External dose, internal dose

- Procedure applicable for overexposure and/or in an emergency situation:

No appliation

- Time period for submitting data to the RADREC:

annually

- Retainment period of the RADREC data:

Until 95 years old

- Number of currently registered occupationally exposed workers: (in your service in the country or from all services)

665,250 workers in 2019

General characteristics of the NDR

- Type of database to establish a NDR and maintenance arrangements (e.g., in-house developments, off the shelf, etc.) :

No NDR in Japan

- Difficulties when establishing the NDR:

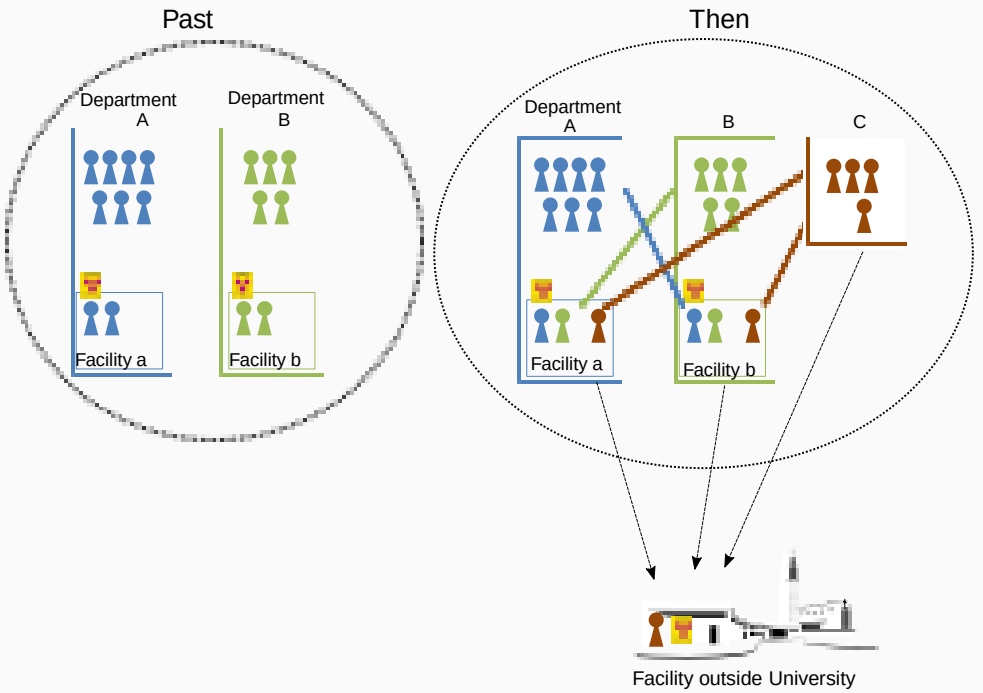
Circumstances are very different among the bodies, cost, no support from government

Management of Dose Registries: Experience in Universities across Japan

Radiation and radioisotopes Facilities past and then in University

Past

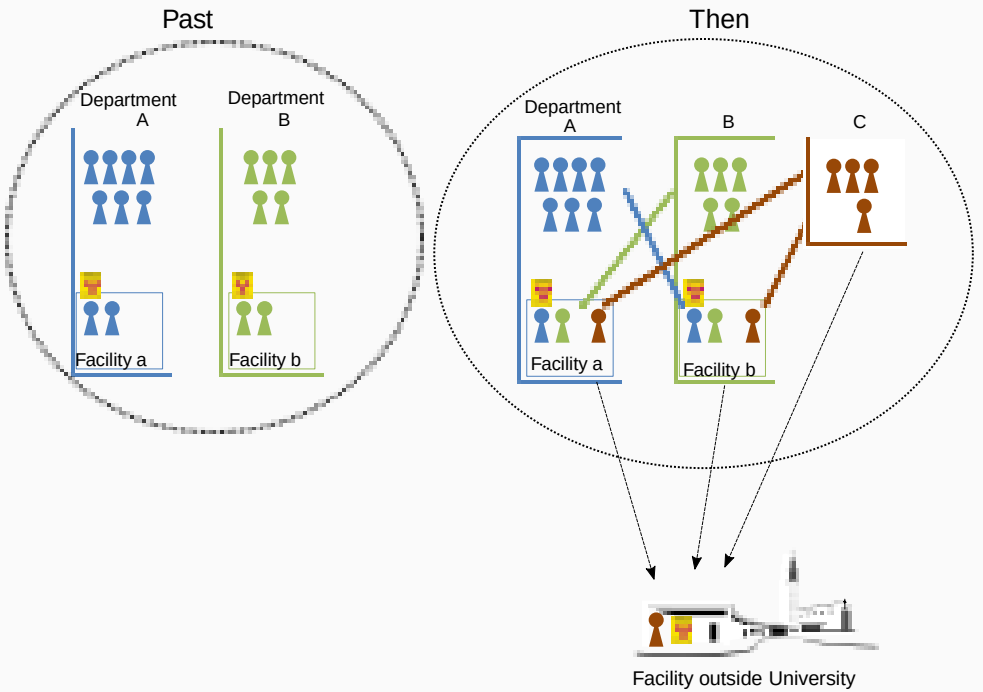
- Each department owns its facility
- Only person who belongs to the department uses the facility



Radiation and radioisotopes Facilities past and then in University

Then

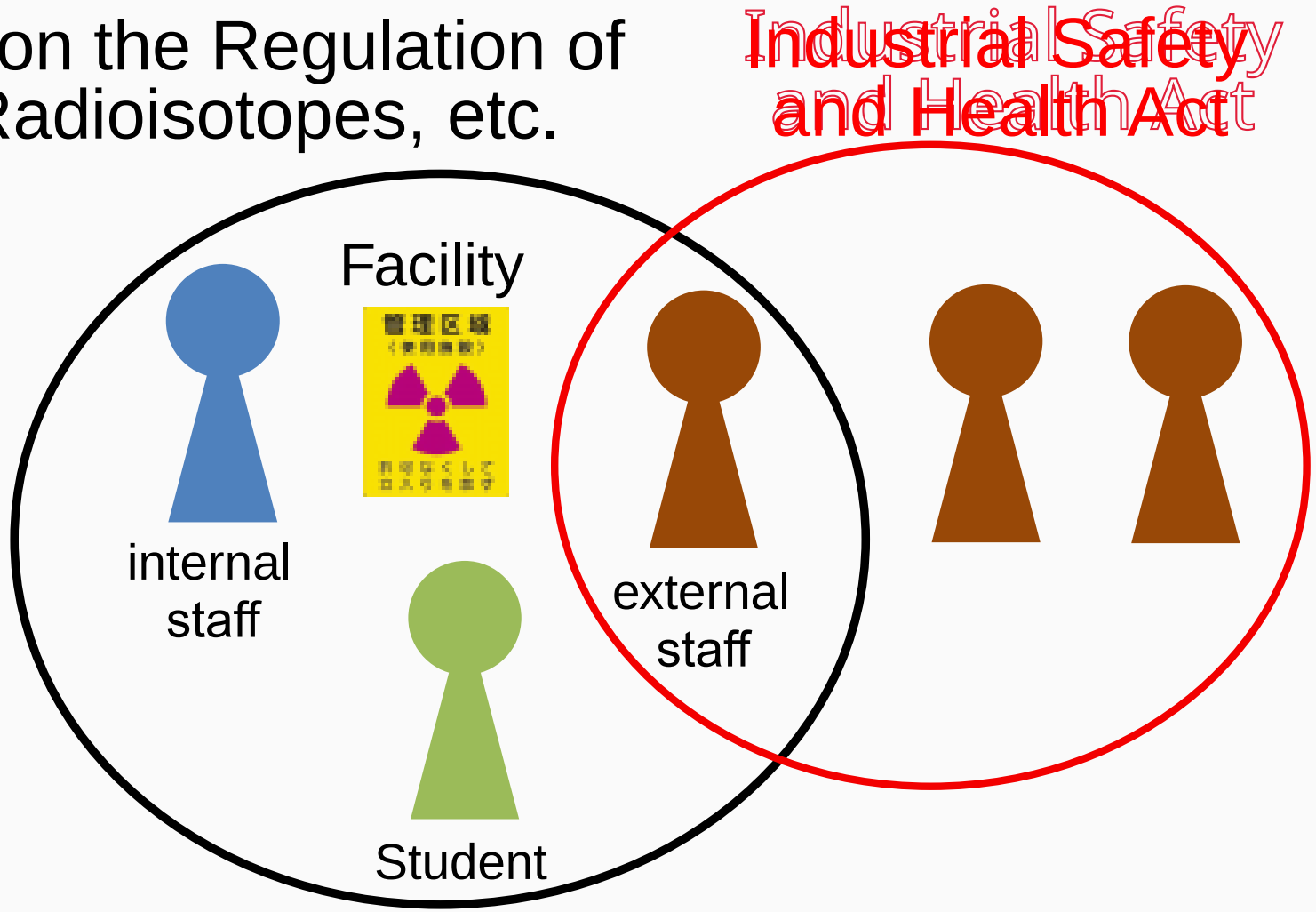
- Users from different departments or another university
- Many users do not use their facility but use external facilities such as large accelerator facilities



Issues in radiation and radioisotopes facility in Universities

- Complex employment systems (affiliated to multiple departments, dual appointments with external parties)
- Aging facilities (most facilities in Japan were established in the last century)
- Shortage of budgets and administration staff
- Human error and missing information due to paper-based work
- University employees and students must be treated differently as law

Issues in radiation and radioisotopes facility in Universities



How to solve these issues

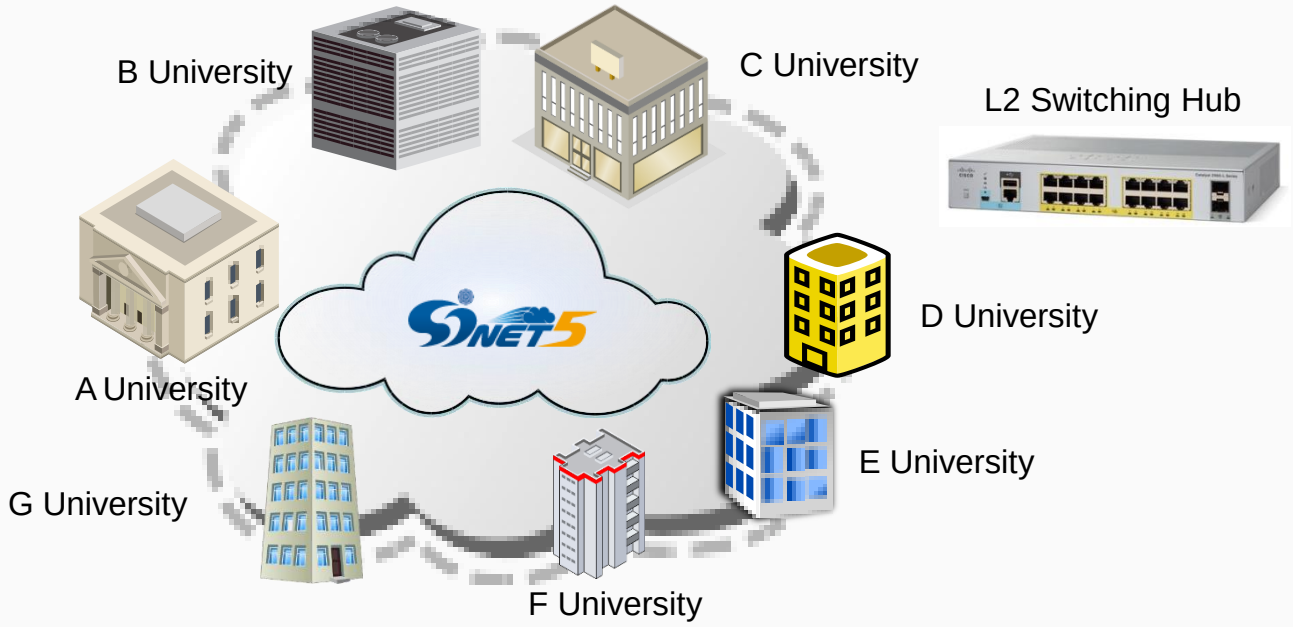
1. Network connection of radiation facilities nationwide
2. Common format for Radiation workers' information
3. System for sharing radiation workers' information at multiple facilities

Conference of National University Radioisotope Research Center, Japan

21 universities have joined this project

Network under SINET5

We have made a layer-2virtual private network circuit (L2VPN) under SINET5 (the science information network) provided by the National Institute of Informatics and connected all facilities of 21 universities



VPN(virtual private network)

Common CSV Format

A common CSV format is proposed. In the CSV format, minimum required items among facilities are included

ID	123456789
Name	Watabe Japan
Affiliation	
Gender	Male
Birthday	1993/04/30
Position	Professor
Last medical checkup	2019/12/22
Result	1
Medical Doctor	Dr Sendai
Date for initial education	2019/12/21
duration of education ‘health effect’	60
duration of education ‘laws’	90
duration of education ‘safe handling’	120
duration of education ‘local rules’	120
Date for reeducation	2019/12/24
Effective dose last year	x
dose of eye lens last year	x
dose of skin last year	x
dose of abdomen (female) last year	x
internal dose last year	x
evaluation method for internal dose	whole body counter
effective dose 1year ago	x
effective dose 2 years ago	xx
effective dose 3 years ago	xxx
effective dose 4 years ago	xxxx

In the CSV file,

- General information of a person
- histories of health checkups
- histories of education
- histories of radiation doses

System in Future

Issues to be addressed

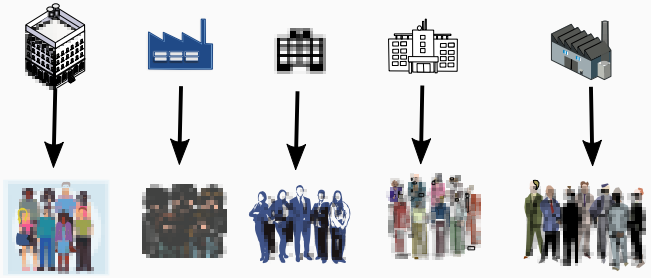
- Protection of personal information
- Each university has different rules, and we must seek solutions to compromise different rules among universities

To do list

- ’My page’ function (each individual can receive data from System and individually apply to any faciltiy)
- Implementation of e-learning system for radiation education
- Internationalization

Radiation and radioisotope facilities in Future

1. Facilities can use a common format and exchange data safely
2. Enable multiple facilities to manage radiation workers on a common platform
3. Worker information can be exchanged safely with off-campus facilities
4. Individuals can manage their information
5. Facilities can connect each other like ’Cloud service’ even internationally



Past and current

Radiation and radioisotope facilities in Future

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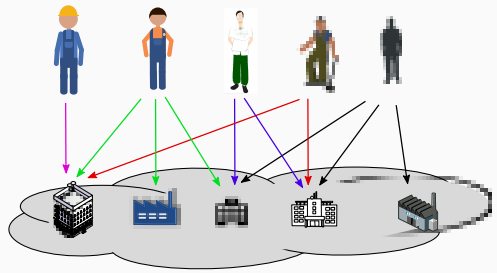

Future