



**UNSCEAR**

United Nations Scientific Committee  
on the Effects of Atomic Radiation



# Experiences with data collection for UNSCEAR surveys in the ROK

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*Data collection for medical exposure in Korea*

*Data collection for Occupational exposure in Korea*

## □ Medical Exposure Data Submission Status

Primary Disciplines	Modality Category	Submission
<b>Diagnostic and Interventional Radiology (RD)</b>	Projectional radiography (without contrast media)	○
	Radiography and fluoroscopy (mostly with contrast media)	○
	Computed tomography (CT)	○
	Image-guided interventional procedures (IGIP)	X
<b>Nuclear Medicine (NM)</b>	Diagnostic procedures using gamma cameras and SPECT or SPECT-CT	X
	Diagnostic procedures using PET, PET-CT and PET-MRI	X
	Therapeutic procedures	X
<b>Radiotherapy (RT)</b>	External beam therapy systems	X
	Brachytherapy	X

## Information on the detailed questionnaire (Deadline)

\* required field

## Would you be able to provide detailed information on

Staff and devices RD*	yes
Frequency RD*	yes
Age and sex RD*	yes
Dose RD*	yes

## Data from several sources:

- reports from public health centers
- Korean Medical Association
- Korean Society of Radiology
- Korean Orthopaedic Association
- Korean Society of Gynecologic Oncology

## Information on staffing levels

Profession	Number of persons
<b>All Physicians</b>	115930
General practitioners (GP)	40380
Dentists	17139
Radiologists	3311
Other physicians conducting radiological exams	13198
Interventional radiologists	
Interventional cardiologists	
Other physicians conducting interventional procedures	
Medical physicists in radiology/imaging	
Radiation technologist in radiology/imaging	21290
Nurses in radiology/imaging	5402
Other (please specify)	6666
Other (please specify)	3109

→ surgeons using C-arm during surgery

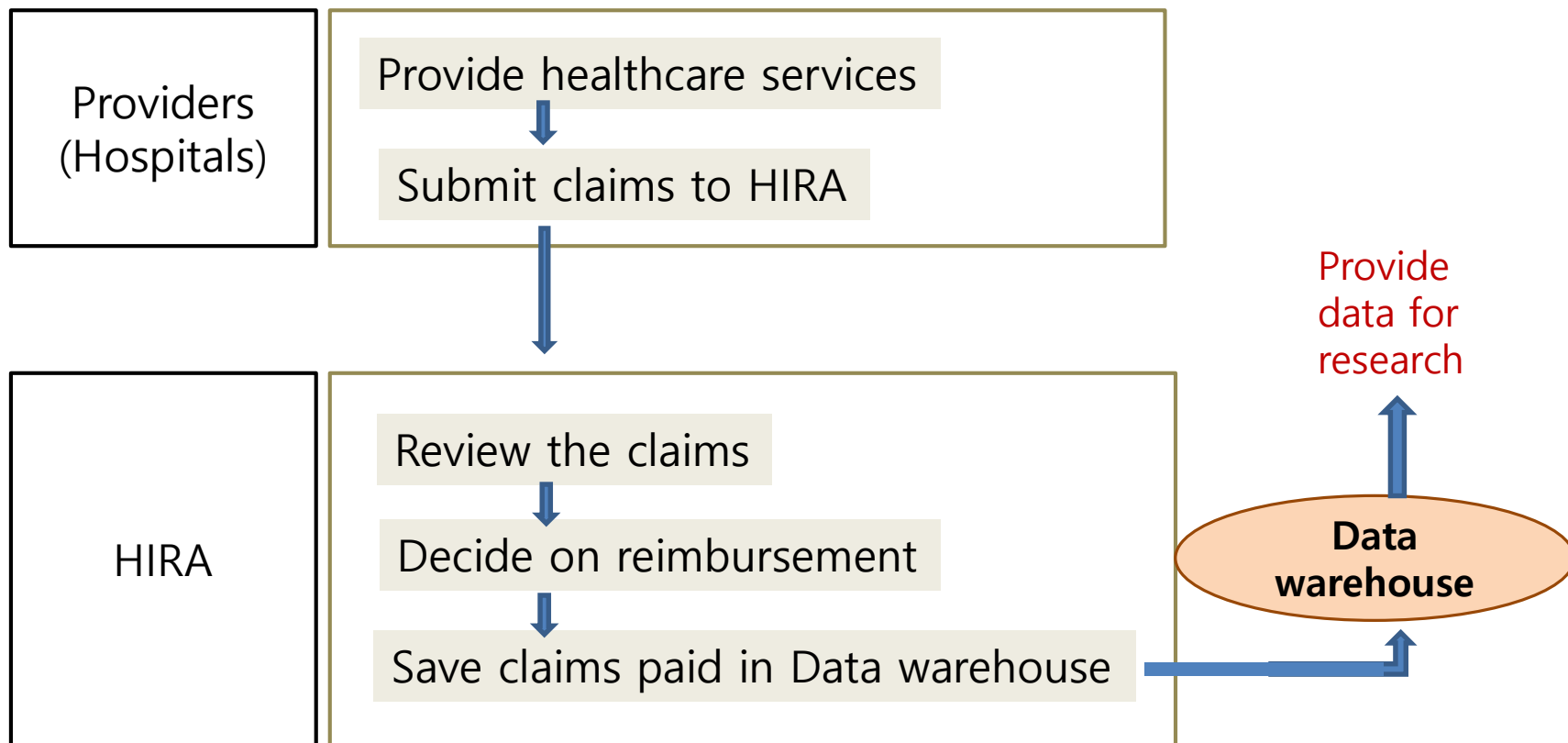
## □ Source of Data Collection (RD)

Institution	Examinations	Modality Category
<b>HIRA</b> (Health Insurance Review and Assessment Service):	Diagnostic radiography covered by medical insurance (~ 600 types of procedures)	Radiography Fluoroscopy CT
<b>NHIC</b> (National Health Insurance Corporation)	Diagnostic Radiography for health checkups (4 types of examinations)	Radiography Fluoroscopy
<b>KNTA</b> (Korean National Tuberculosis Association)	Radiography to screen tuberculosis in middle/high school students (Chest PA)	Radiography
<b>MOE</b> (Ministry of Education)	Radiography to screen tuberculosis or scoliosis in primary/middle/high school students (Chest PA)	Radiography

## Health Insurance Review and Assessment (**HIRA**)

: our main source of data.

[Flow of National Healthcare System in Korea]



## Advantages of HIRA data

- Representativeness
- comprehensiveness

Universal coverage system in Korea, in which **all citizens** are covered, and all healthcare providers submit claims electronically.

- Include information on 50 million pts
- covering 98% of the total population
- Mostly based on fee-for-service delivery system, a few exceptions of diagnosis-related group reimbursement

**Table 1.** NHI program from 2010

Parameters	Reported numbers by year				
	2010	2011	2012	2013	2014
<u>Total population</u> , No. (unit: 1,000)	49,410	49,779	50,004	50,220	<u>50,424</u>
<u>Beneficiaries</u> , No. (unit: 1,000)	50,581	50,909	51,169	51,448	<u>51,757</u>
Health insurance	48,907	49,299	49,662	49,990	50,316
Medical aid	1,674	1,609	1,507	1,459	1,441
Coverage rate, % (beneficiaries/total population)	102.3	102.3	102.3	102.4	102.6
No. of claims (unit: 1,000)	1,307,823	1,327,233	1,420,857	1,418,710	1,453,776
Inpatient	12,491	13,201	14,338	15,512	17,491
Outpatient	1,295,332	1,314,032	1,406,519	1,403,199	1,436,285
<u>No. of providers</u>	81,681	82,948	83,811	84,971	<u>86,629</u>
Tertiary hospitals	44	44	44	43	43
General hospitals	274	275	278	281	287
Hospitals	2,182	2,363	2,524	2,683	2,811
Clinics	27,469	27,837	28,033	28,328	28,883
Community health centers	3,515	3,508	3,502	3,504	3,516
Oriental clinics	12,229	12,585	12,906	13,312	13,654
Dental clinics	14,872	15,257	15,566	15,930	16,377
Pharmaceuticals	21,096	21,079	20,958	20,890	21,058

NHI = National Health Insurance.





## Limitations of HIRA data

- Non-reimbursed healthcare services
- Data complexity

- ❖ Some service, such as newly-developed expensive medical services are not covered under the HIRA system.
  - Non-reimbursement cases are not stored at the HIRA database.  
Ex) PET-CT
- ❖ Data format and classification of procedure is different between UNSCEAR survey and the Korean system.
  - HIRA data include the **frequency of RT**, but not the dose.  
UNSCEAR survey collects **number of RT patients**.  
→ So, additional information from relevant professional society are needed.

- HIRA classifies the therapeutic NM by routes of intake, Oral/Intra-venous/Others.

Modality Category	Medical Practice (Insurance Number Code)
Therapeutic Nuclear Medicine procedures	Unsealed Source- <b>Oral</b> (HD071)
	Unsealed Source- <b>Intravenous</b> (HD072)
	Unsealed Source- <b>Others</b> (HD073)

UNSCEAR survey classifies the therapeutic procedure by nuclides.

Therapeutic procedures	<sup>131</sup> I for malignant thyroid disease	I-131
	<sup>131</sup> I for benign thyroid disease	I-131
	Therapy with <sup>131</sup> I MIBG	I-131
	Peptide Receptor Radionuclide Therapy (PRRT)	
	Selective internal radiation therapy (SIRT)	Y-90
	Polycythaemia vera	P-32
	Bone metastases (palliation)	Sr-89 Sm-153
	Radiosynovectomy	Au-198
	Radioguided surgery	

## Issues to be improved in the future (I)

*- For medical exposure*

At the government level

- Fund for data collection is essential.
- Constant system or organization to coordinate professional societies is recommended.

At the private level

- Need to handle the big data from HIRA.
- Need to recognize the importance of data collection and be willing to cooperate.
- Need to collect non-reimbursement examination data in addition to the HIRA data.
- Need to transform the Korean data into the UNSCEAR survey format.

[Occupational exposure survey questionnaires]

The UNSCEAR Global Survey on occupational exposure consists of several worksheets, each sheet for each year separately.

**ROK data, year from 2003 to 2014, submitted.**

Workforce											
NUMBER OF WORKERS IN DOSE INTERVALL									Number All	Number > MDL	Number Female Workers
<MDL	MDL-1	>1-5	>5-10	>10-15	>15-20	>20-30	>30-50	>50			

Dose									
AVERAGE EFFECTIVE DOSE IN DOSE INTERVAL (mSv)									
MDL-1	>1-5	>5-10	>10-15	>15-20	>20-30	>30-50	>50	ALL	>MDL

Dose					
Effective Dose of External Exposure (%)	Effective Dose of Inhalation or Ingestion (%)	Effective Dose of Radon and Progeny (%)	Dose to Eye lens (mSv)	Dose to Hands (mSv)	Collective dose (man Sv)

<b>Information related to dosimetry</b>		
Is an occupational external dose monitoring service available in your country?		YES
Is an occupational internal dose monitoring service available in your country?		YES
Is a central occupational dose register database available in your country?		YES
What is the annual dose limit for effective dose adopted in your country?		20mSv
Above what dose is recording required in your country?		0.1mSv
What is the value of minimum detectable level MDL per measurement interval?		0.01mSv
Recorded dose quantities in (mSv) E :	E	Hp(10): Hp(10)
<b>Information on the detailed questionnaire</b>		
<b>* required field</b>		
<b>Would your country be able to responde the detailed questionnaire by year*</b>		YES

The dose interval of UNSCEAR survey was different from the Korean data.  
The dose interval among Korean data was different from each other.

UNSCEAR	mSv/year	KCDC	mSv/year	NSSC	mSv/year
	MDL-1		$\leq 0.1$		$< 0.1$
	>1-5		$0.1 < \leq 0.2$		$0.1 \leq < 1$
	>5-10		$0.2 < \leq 0.3$		$1 \leq < 5$
	>10-15		$0.3 < \leq 0.4$		$5 \leq < 10$
	>15-20		$0.4 < \leq 0.5$		$10 \leq < 20$
	>20-30		$0.5 < \leq 0.6$		$20 \leq < 50$
	>30-50		$0.6 < \leq 0.7$		$50 \leq$
	>50		$0.7 < \leq 0.8$		
	ALL		$0.8 < \leq 0.9$		
	>MDL		$0.9 < \leq 1.0$		
			$1.0 < \leq 2.0$		
			$2.0 < \leq 5.0$		
			$5.0 < \leq 20.0$		
			$20.0 < \leq 50.0$		
			$> 50.0$		

For Occupational exposure data collection...

Various governmental jurisdiction was the biggest hurdle for data collection.

- Civilian aviation workers :  
(Ministry of Land, Infrastructure and Transport)
- Medical workers :  
KCDC, Ministry of Health and Welfare
- Veterinarians :  
(Animal and Plant Quarantine Agency)
- Industrial radiography workers :  
Nuclear Safety and Security Commission (NSSC)  
Korea Foundation of Nuclear Safety
- Air force and other military workers :  
(Ministry of National Defense)

※ Ministries in parentheses are the relevant ministries, but do not have a function of radiation protection

In spite of **Various job categories and governmental jurisdiction**, data collection for occupational exposure was possible, because the **Korea Foundation of Nuclear Safety** has been collecting Korean data of occupational exposure for long time.

➔ **Constant system or organization for data collection** is important!



## Issues to be improved in the future (II)

*- For Occupational exposure*

At the government level

- Each governmental Ministry needs to set up data collection system for the profession they manage.
- Need a constant system or organization to harmonize the data of all categories of profession.

At the private level

- Need to recognize the importance of data collection and be willing to cooperate.
- Need to transform the Korean data into the UNSCEAR survey format.