

Type of examination	Diagnostic reference levels <sup>*1</sup>	Actual exposure dose <sup>*2</sup>	
		Dose	Type of dose
General imaging: Front chest	0.3mGy	0.06mSv	Effective dose
Mammography (mean glandular dose)	2.4mGy	Around 2 mGy	Equivalent dose (Mean glandular dose)
Fluoroscopy	IVR (InterVentional Radiology): Fluoroscopic dose rate 20 mGy/sec	Gastric fluoroscopy Around 4.2-32 mSv <sup>*3</sup> (varies depending on operators and subjects)	Effective dose
Dental imaging	From 1.1 mGy at the frontal teeth of the mandible to 2.3 mGy at the molar teeth of the maxilla	Around 2-10 μSv	Effective dose
X-ray CT scan	Adult head simple routine: 85 mGy Child (age 6-10), head: 60mGy	Around 5-30mSv	Effective dose
Nuclear scanning	Value for each radioactive medicine	Around 0.5-15mSv	Effective dose
PET scan	Value for each radioactive medicine	Around 2-20mSv	Effective dose

\* 1 : "Diagnostic Reference Levels based on the Latest Survey within Japan," J-RIME, etc., June 7, 2015 (partially updated on August 11, 2015)

(<http://www.radher.jp/J-RIME/>)

\* 2 : "Q&A on Medical Exposure Risks and Protection Regarding Medical Exposure from CT Scans, etc.," National Institutes for Quantum and Radiological Science and Technology (<http://www.nirs.qst.go.jp/rd/faq/medical.html>)

\* 3 : Prepared based on "Gastric Fluoroscopy" in "X-ray Medical Checkup" in "Basic Knowledge on Medical Radiation," (<http://www.khp.kitazato-u.ac.jp/hoshasen/iryo/>), Kitazato University Hospital, Radiology Department

Prepared based on materials \*1, \*2 and \*3 above

Exposure doses from radiological examinations vary by the types of examinations. Some examinations, such as dental imaging, only involve very slight, local exposure, while some other examinations, such as X-ray CT scans and nuclear scanning, involve relatively high exposure doses. Even with the same type of examination, doses could vary widely depending on the medical institution. It is therefore recommended to use diagnostic reference levels as criteria for determining whether doses might be too high for diagnosis. If the average radiation dose of a medical institution greatly deviates from the diagnostic reference levels, the International Commission on Radiological Protection (ICRP) recommends that irradiation conditions for the examination be reconsidered.

Some countries are already using the diagnostic reference levels. In Japan, the Japan Association of Radiological Technologists issued a medical exposure guideline (reduction targets) in 2000, in which they compiled values equivalent to the diagnostic reference levels. It was updated in 2006 as the 2006 medical exposure guideline. The Japan Network for Research and Information on Medical Exposures (J-RIME)\* created Japan's first diagnostic reference levels based on the results of surveys conducted by participating organizations ("Diagnostic Reference Levels based on the Results of the Latest National Survey," Japan Association on Radiological Protection in Medicine, etc., June 7, 2015 (partially updated on August 11, 2015)).

Note\*: The Japan Network for Research and Information on Medical Exposures (J-RIME) started in 2010 as a base for establishing a medical exposure protection system that matches Japan's circumstances, by gathering expert opinions through cooperation from academic societies and associations, and collecting and sharing domestic and international research information on medical exposures. J-RIME's activities include collecting data on medical exposure, such as exposure doses from radiation therapy and risk assessment, to get a picture of medical exposures in Japan, and building an appropriate protection system for medical exposure in Japan while taking international trends into account (source: website of the National Institute of Radiological Sciences of National Institutes for Quantum and Radiological Science and Technology: <http://www.nirs.qst.go.jp/rd/structure/merp/j-rime.html>, in Japanese).

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