



## **Occupational Radiation Exposure in Hong Kong (2014)**

Radiation Monitoring Service  
Radiation Health Unit  
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This is a report on the occupational external radiation dose data of persons who were employed in work involving radioactive substances or irradiating apparatus in Hong Kong in the year 2014. The data were obtained from individual whole body occupational monitoring using thermoluminescent dosimeters (TLD) provided by the Radiation Monitoring Service (RMS) of the Radiation Health Unit, Department of Health, the Government of the Hong Kong Special Administrative Region.

### **Whole body radiation monitoring**

In 2014, the RMS provided whole body type individual monitoring dosimeters to 10,096 named persons and 1,272 unnamed users at 848 sites. The named persons could be grouped into 58 different job types in one of the following four job categories: *dental* (10.84%), *industrial* (9.59%), *medical* (60.59%) and *others* (18.98%). A summary of the annual dose distribution tabulated separately by job category and by job type is at Table 1 and 3 respectively.

The average annual dose of all the monitored persons was 0.13 mSv, which indicated a slight increase from 0.11 mSv in 2013. All monitored persons had doses within the statutory limit of 20 mSv in a year. 82.3% had annual doses 0.17 mSv or below, which was the level equivalent to one-tenth the pro rata monthly fraction derived from the annual statutory dose limit. Two persons received a dose exceeding 6 mSv. The highest whole body dose recorded was 8.91 mSv.

For individual job categories, the average annual doses for dental, industrial, medical and others were respectively 0.05, 0.11, 0.14 and 0.12 mSv.

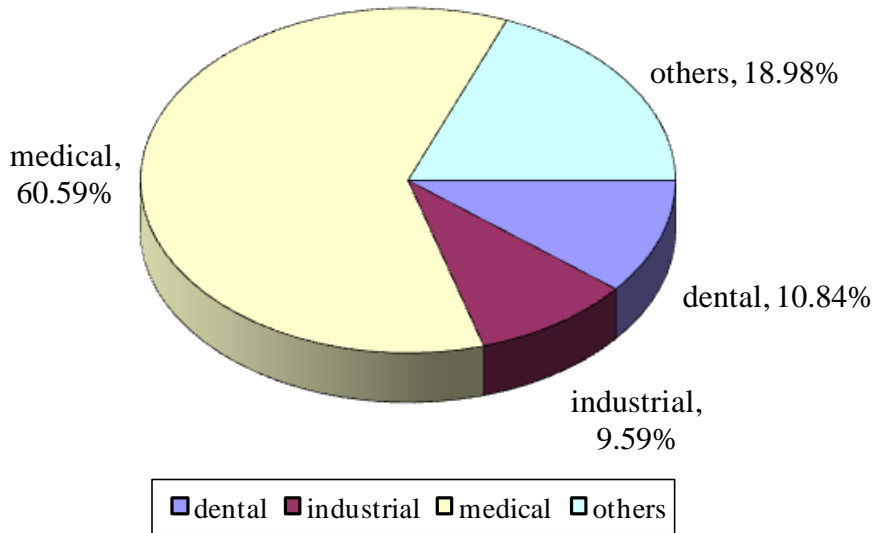
Among the monitored persons, about 49.2% worked in the public sector (including staff in hospitals of Hospital Authority), the rest of about 50.8% worked in the private sector. By gender, 4,978 (49.3%) were male and 5,118 (50.7%) were female (Figure 5). The dose distribution by gender is at Table 5.

### **Extremity radiation monitoring**

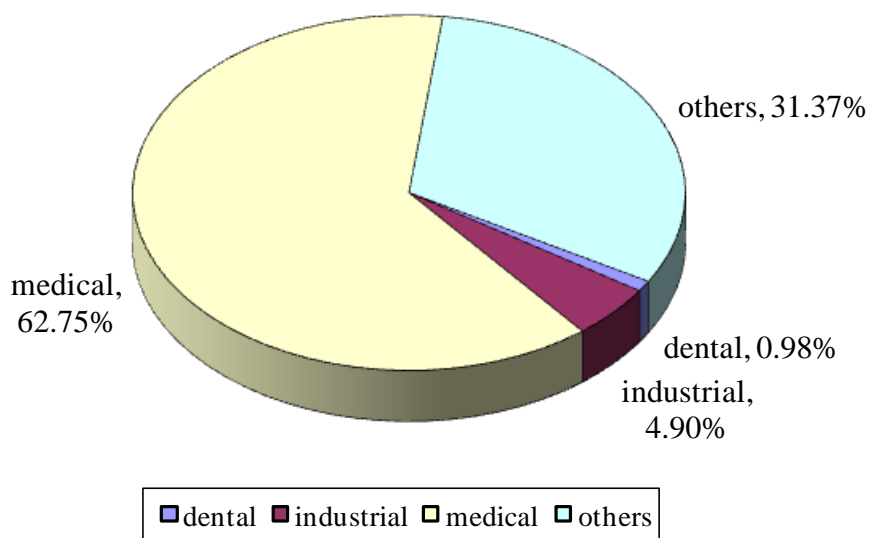
In 2014, the RMS also provided extremity (finger) dose monitoring service to 204 workers in Hong Kong. The average annual finger dose was about 4.10 mSv. Three workers received an annual finger dose exceeding 100 mSv and the highest dose recorded was 188.11 mSv against the annual limit of 500 mSv prescribed by the Radiation Ordinance. A summary of the dose distribution tabulated separately by job category and by job type is at Table 2 and 4 respectively.

For individual job categories, the average annual extremity doses for dental, industrial, medical and others were respectively 0.05, 0.24, 1.26 and 10.49 mSv. By gender, 158 (77.5%) were male and 46 (22.5%) were female (Figure 6). The dose distribution by gender is at Table 6.

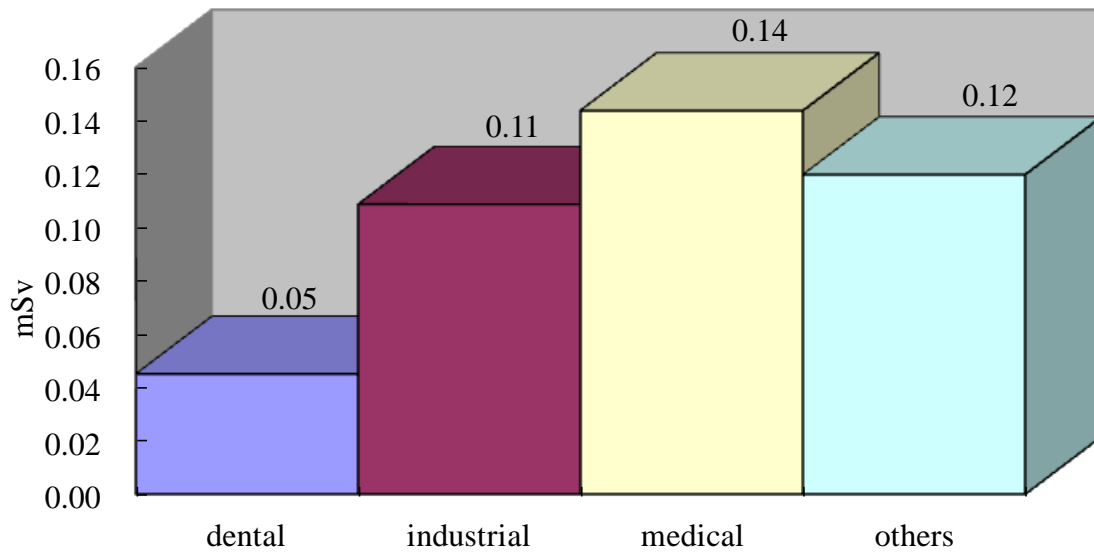
**Figure 1**  
**The Distribution of Whole Body Dosimeter Users by Job Categories, 2014**



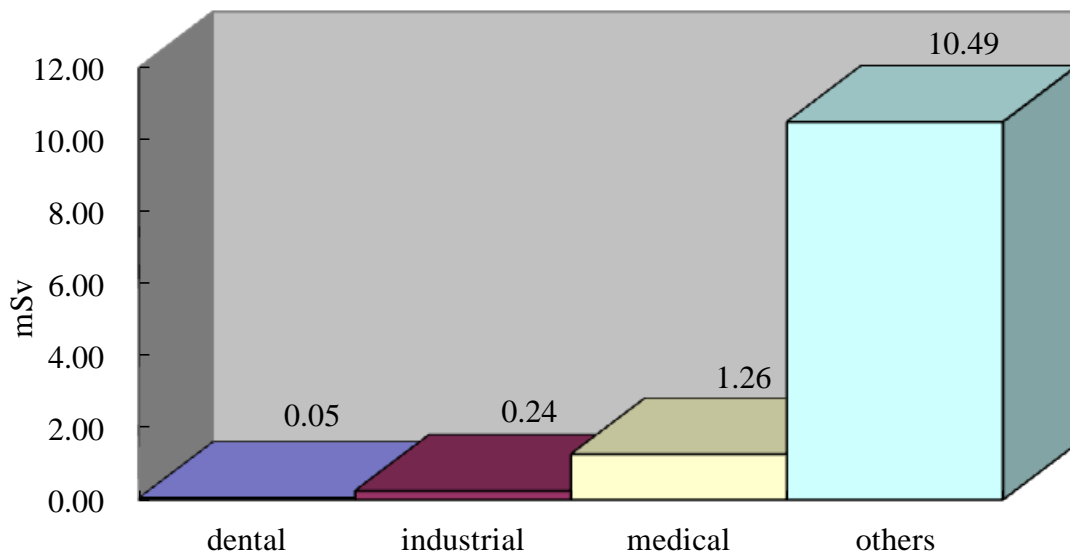
**Figure 2**  
**The Distribution of Finger Dosimeter Users by Job Categories, 2014**



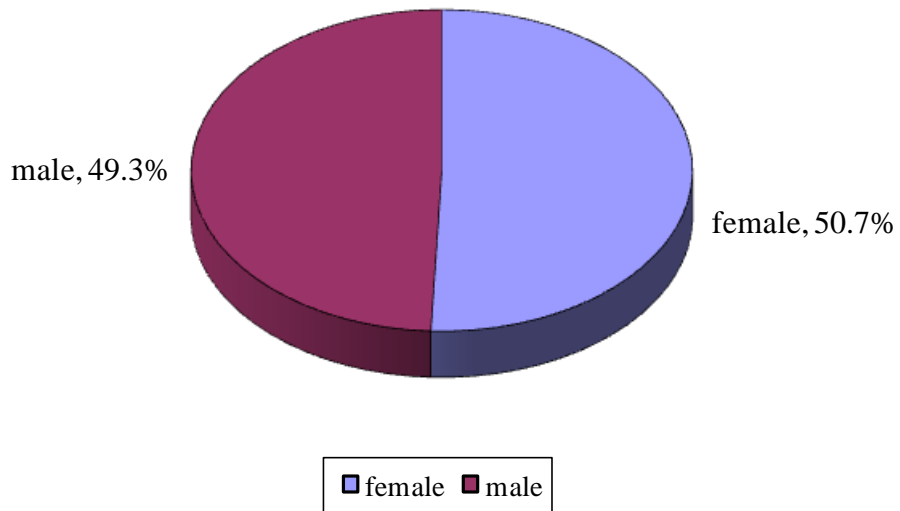
**Figure 3**  
**The Average Annual Occupational Whole Body Dose by Job Categories, 2014**



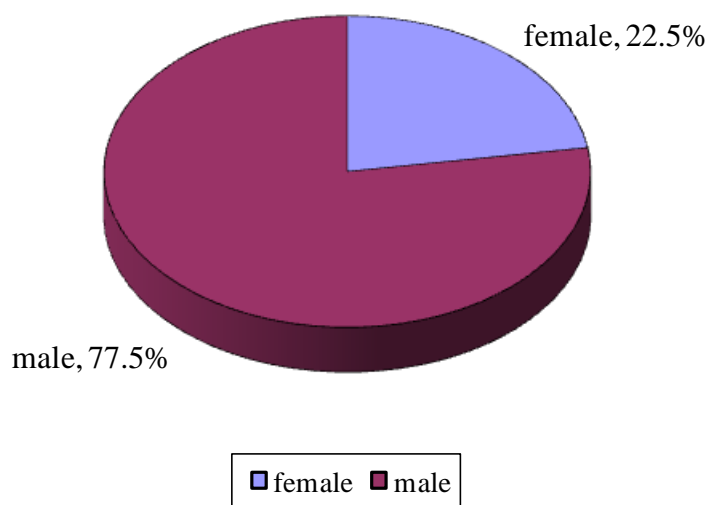
**Figure 4**  
**The Average Annual Occupational Finger Dose by Job Categories, 2014**



**Figure 5**  
**The Distribution of Whole Body Dosimeter Users by Gender, 2014**



**Figure 6**  
**The Distribution of Finger Dosimeter Users by Gender, 2014**



**Table 1**

**The Distribution of Whole Body Dose  
by Job Categories, 2014**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$10 < x$
Dental	1015	75	5	0	0	0	0
Industrial	794	149	18	7	0	0	0
Medical	4902	961	173	63	16	2	0
Others	1595	263	36	16	6	0	0
Total	8306	1448	232	86	22	2	0

Remark: x represents the dose values in mSv

**Table 2**

**The Distribution of Finger Dose  
by Job Categories, 2014**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$500 < x$
Dental	2	0	0	0	0	0
Industrial	10	0	0	0	0	0
Medical	103	22	3	0	0	0
Others	43	10	8	3	0	0
Total	158	32	11	3	0	0

Remark: x represents the dose values in mSv

**Table 3****The Distribution of Whole Body Dose  
by Job Types, 2014**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$10 < x$
Administrator	16	4	0	0	0	0	0
Artisan	67	14	1	0	0	0	0
Chemist	19	8	1	3	1	0	0
Clerk	48	8	4	1	0	0	0
Consultant (Medical)	27	7	4	1	0	0	0
Delivery	3	0	0	1	0	0	0
Dental Assistant	384	17	2	0	0	0	0
Dental Hygienist	13	3	0	0	0	0	0
Dental Therapist	222	18	0	0	0	0	0
Dentist	396	37	3	0	0	0	0
Department Manager	2	1	0	0	0	0	0
Driver	18	4	1	1	0	0	0
Engineer	185	29	4	2	0	0	0
Experimental Officer	2	0	0	0	0	0	0
Fire Safety Worker	4	4	0	0	0	0	0
Laboratory Attendant	26	5	0	3	0	0	0
Lecturer	31	1	0	0	0	0	0

**The Distribution of Whole Body Dose  
by Job Types, 2014 (Continued)**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$10 < x$
Luminous Watch Assembly Worker	7	2	0	0	0	0	0
Mechanic	32	6	2	1	0	0	0
Medical Officer	1019	234	53	7	2	0	0
Medical Officer (Therapeutic)	52	11	5	0	0	0	0
Medical Technologist	30	4	0	0	0	0	0
Nurse	1537	257	30	5	1	0	0
Nurse (Veterinary)	38	5	2	1	1	1	0
Operator	256	8	0	0	0	0	0
Pharmacist	6	2	2	2	0	0	0
Physicist (Health)	7	8	0	0	0	0	0
Physicist (Medical)	53	17	9	2	0	0	0
Physiotherapist	4	0	0	0	0	0	0
Police	8	2	0	0	0	0	0
Quality Assurance	49	13	2	0	0	0	0
Radiobiologist	2	1	0	0	0	0	0
Radiographer (Diagnostic)	1208	219	35	38	10	0	0
Radiographer (Industrial)	21	31	2	0	0	0	0



**The Distribution of Whole Body Dose  
by Job Types, 2014 (Continued)**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$10 < x$
Radiographer (Therapeutic)	105	16	12	1	1	0	0
Radiologist	103	26	2	0	0	0	0
Research Assistant	208	22	0	0	0	0	0
Safety Officer	9	2	0	0	0	0	0
Scientific Assistant	7	0	0	0	0	0	0
Scientific Officer	13	3	0	1	0	0	0
Security Officer	1	0	0	0	0	0	0
Speech Therapist	56	17	0	0	0	0	0
Store Keeper	2	1	0	0	0	0	0
Student	210	13	0	0	0	0	0
Teaching Assistant	3	0	0	0	0	0	0
Technical Officer	66	14	1	0	0	0	0
Technician (Electrical)	81	23	6	1	0	0	0
Technician (Laboratory)	267	67	5	0	2	0	0
Technician (X-rays)	53	12	3	1	0	0	0
Trainee	18	4	1	0	0	0	0
Vet	143	28	1	1	0	1	0

**The Distribution of Whole Body Dose  
by Job Types, 2014 (Continued)**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$10 < x$
Vet Assistant	90	18	1	0	1	0	0
Ward Attendant	344	83	14	4	0	0	0
Ward Manager	2	0	0	0	0	0	0
Workman	63	26	4	2	0	0	0
X-ray Assistant	28	3	0	0	0	0	0
X-ray Crystallographer	1	0	0	0	0	0	0
No Job Code	641	90	20	7	3	0	0
Total	8306	1448	232	86	22	2	0

Remark: x represents the dose values in mSv

**Table 4****The Distribution of Finger Dose  
by Job Types, 2014**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$500 < x$
Chemist	3	0	4	3	0	0
Consultant (Medical)	1	0	0	0	0	0
Dental Assistant	1	0	0	0	0	0
Dentist	1	0	0	0	0	0
Engineer	8	0	0	0	0	0
Laboratory Attendant	2	0	0	0	0	0
Lecturer	1	0	0	0	0	0
Medical Officer	33	0	0	0	0	0
Medical Officer (Therapeutic)	18	0	0	0	0	0
Medical Technologist	1	0	0	0	0	0
Pharmacist	1	1	1	0	0	0
Physicist (Medical)	5	1	0	0	0	0
Radiographer (Diagnostic)	35	20	2	0	0	0
Radiographer (Therapeutic)	1	0	0	0	0	0
Radiologist	4	0	0	0	0	0
Research Assistant	1	0	0	0	0	0
Scientific Officer	1	0	1	0	0	0

**The Distribution of Finger Dose  
by Job Types, 2014 (Continued)**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$500 < x$
Speech Therapist	1	0	0	0	0	0
Technician (Laboratory)	9	1	1	0	0	0
Ward Attendant	3	0	0	0	0	0
Workman	1	0	0	0	0	0
No Job Code	27	9	2	0	0	0
Total	158	32	11	3	0	0

Remark: x represents the dose values in mSv

**Table 5**

**The Distribution of Whole Body Dose  
by Gender, 2014**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$10 < x$
Male	3994	772	139	56	16	1	0
Female	4312	676	93	30	6	1	0
Total	8306	1448	232	86	22	2	0

Remark: x represents the dose values in mSv

**Table 6**

**The Distribution of Finger Dose  
by Gender, 2014**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$500 < x$
Male	121	23	11	3	0	0
Female	37	9	0	0	0	0
Total	158	32	11	3	0	0

Remark: x represents the dose values in mSv