



## **Occupational Radiation Exposure in Hong Kong (2021)**

Radiation Monitoring Service  
Radiation Health Division  
Department of Health, HKSAR

## Occupational Radiation Exposure in Hong Kong (2021)

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 2021. The data were obtained from individual occupational monitoring using thermoluminescent dosimeters (TLD) provided by the Radiation Monitoring Service (RMS) of the Radiation Health Division, Department of Health, the Government of the Hong Kong Special Administrative Region.

### **Whole body radiation monitoring**

In 2021, the RMS provided whole body type individual monitoring dosimeters to 12,738 named persons and 1,239 unnamed users at 918 sites. The named persons could be grouped into 57 different job types in one of the following four job categories: *dental* (9.54%), *industrial* (8.24%), *medical* (64.36%) and *others* (17.87%). A summary of the annual dose distribution tabulated separately by job category and by job type is at Table 1 and 3 respectively. In previous reports, radiochemist was included in the job type chemist. In this report, radiochemist is separated into a distinct job type under the category of medical as shown in Table 3.

The average annual dose of all the monitored persons was 0.10 mSv, which was the same as in 2020. All monitored persons had doses within the statutory limit of 20 mSv in a year. 85.3% 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. No one received doses exceeding 6 mSv. The highest whole body dose recorded was 4.69 mSv.

For individual job categories, the average annual doses for dental, industrial, medical and others were respectively 0.05, 0.09, 0.11 and 0.09 mSv.

Among the monitored users, about 47.9% worked in the public sector (including staff in hospitals of Hospital Authority), the rest of about 52.1% worked in the private sector. By gender, 6,242 (49.0%) were male and 6,496 (51.0%) were female (Figure 5). The dose distribution by gender is at Table 5.

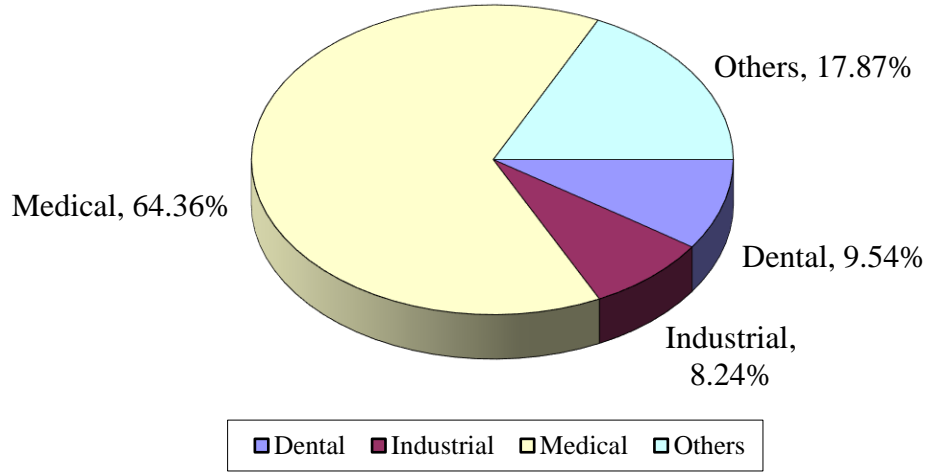
### **Extremity radiation monitoring**

In 2021, the RMS also provided extremity (finger) dose monitoring service to 382 workers at 61 sites in Hong Kong. The average annual finger dose was about 6.55 mSv. Eight workers received annual finger doses exceeding 100 mSv and the highest dose recorded was 231.60 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. The new job type radiochemist is also included in Table 4.

For individual job categories, the average annual extremity doses for dental, industrial, medical and others were respectively 0.00, 3.55, 7.28 and 5.46 mSv. By gender, 311 (81.4%) were male and 71 (18.6%) were female (Figure 6). The dose distribution by gender is at Table 6.

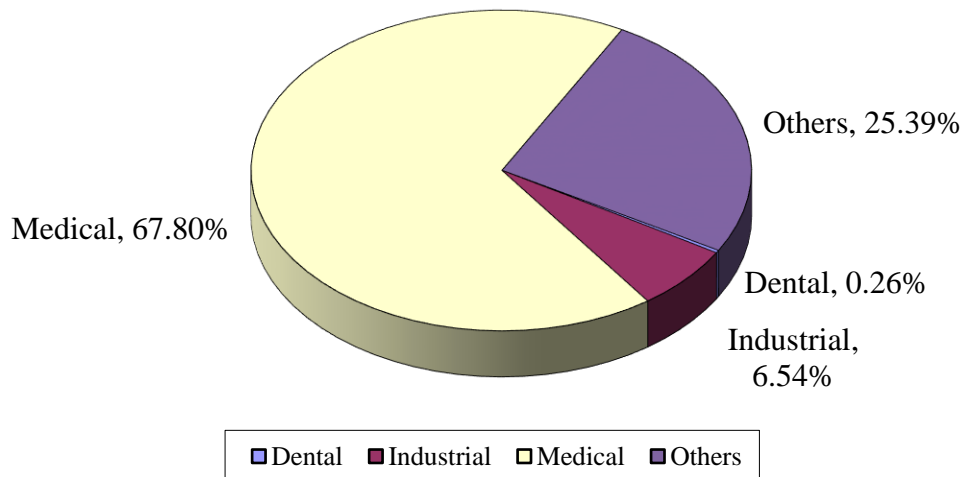
**Figure 1**

**The Distribution of Whole Body Dosimeter Users by Job Categories, 2021**



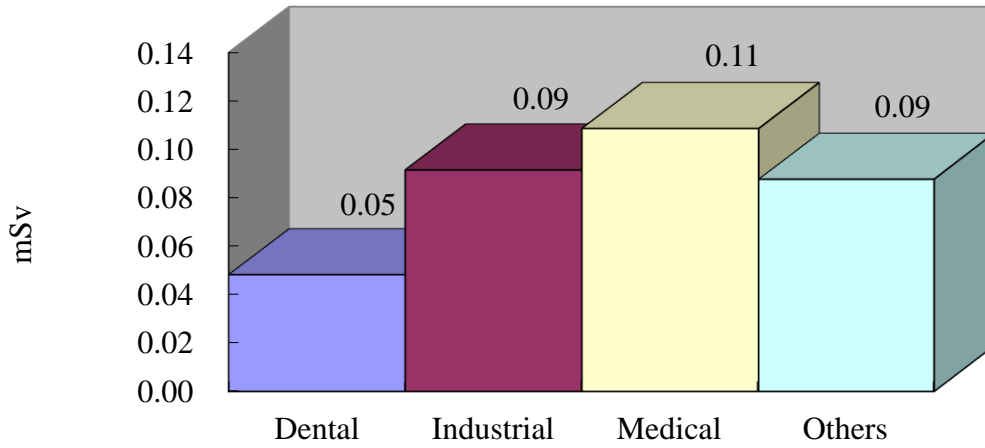
**Figure 2**

**The Distribution of Finger Dosimeter Users by Job Categories, 2021**



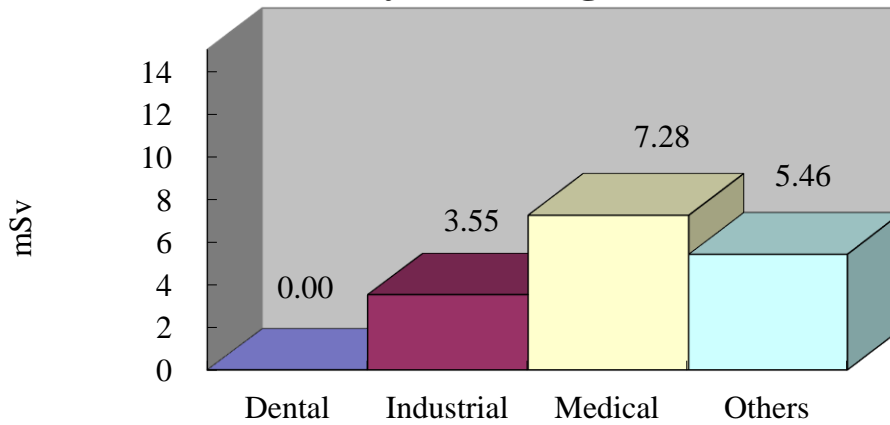
**Figure 3**

**The Average Annual Occupational Whole Body Dose by Job Categories, 2021**



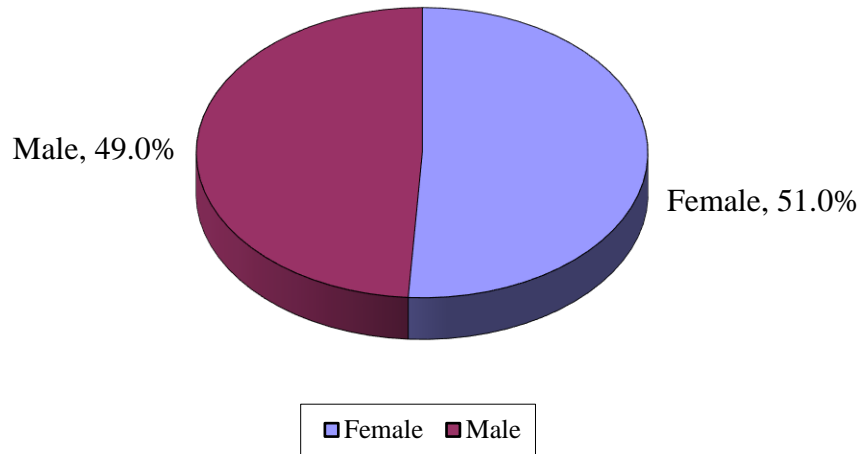
**Figure 4**

**The Average Annual Occupational Finger Dose by Job Categories, 2021**



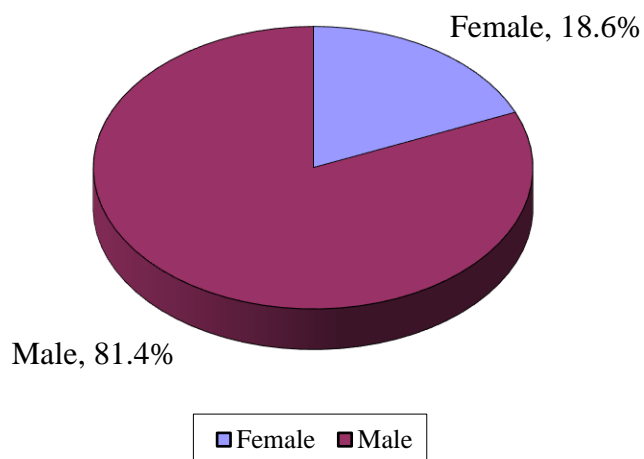
**Figure 5**

**The Distribution of Whole Body Dosimeter Users by Gender, 2021**



**Figure 6**

**The Distribution of Finger Dosimeter Users by Gender, 2021**



**Table 1**

**The Distribution of Whole Body Dose  
by Job Categories, 2021**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Dental	1109	106	0	0	0	0	0
Industrial	894	134	15	4	2	0	0
Medical	6884	1103	133	60	18	0	0
Others	1982	258	20	9	7	0	0
Total	10869	1601	168	73	27	0	0

Remark: x represents the dose values in mSv

**Table 2**

**The Distribution of Finger Dose  
by Job Categories, 2021**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Dental	1	0	0	0	0	0
Industrial	19	4	2	0	0	0
Medical	207	28	18	4	2	0
Others	81	8	6	2	0	0
Total	308	40	26	6	2	0

Remark: x represents the dose values in mSv

**Table 3****The Distribution of Whole Body Dose  
by Job Types, 2021**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Administrator	11	2	0	0	0	0	0
Artisan	34	6	0	0	0	0	0
Chemist	15	4	0	0	0	0	0
Clerk	32	1	0	0	0	0	0
Consultant (Medical)	19	4	0	0	0	0	0
Delivery	2	1	0	0	0	0	0
Dental Assistant	438	30	0	0	0	0	0
Dental Hygienist	24	2	0	0	0	0	0
Dental Therapist	191	37	0	0	0	0	0
Dentist	456	37	0	0	0	0	0
Department Manager	1	1	0	0	0	0	0
Driver	11	9	4	1	0	0	0
Engineer	204	36	2	0	1	0	0
Experimental Officer	1	0	0	0	0	0	0
Fire Safety Worker	3	2	0	0	0	0	0
Laboratory Attendant	23	6	3	1	0	0	0
Lecturer	11	1	0	0	0	0	0

**The Distribution of Whole Body Dose  
by Job Types, 2021 (Continued)**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Luminous Watch Assembly Worker	6	1	0	0	0	0	0
Mechanic	25	5	1	0	0	0	0
Medical Officer	1373	285	24	5	1	0	0
Medical Officer (Therapeutic)	40	5	3	0	0	0	0
Medical Technologist	28	5	1	0	0	0	0
Nurse	2143	284	13	6	1	0	0
Nurse (Veterinary)	79	4	0	0	0	0	0
Operator	257	13	1	1	0	0	0
Pharmacist	13	6	6	0	0	0	0
Physicist (Health)	12	10	0	0	0	0	0
Physicist (Medical)	84	23	6	0	0	0	0
Physiotherapist	4	1	0	0	0	0	0
Police	0	6	2	1	0	0	0
Quality Assurance	17	3	1	0	0	0	0
Radiochemist	5	6	5	6	2	0	0
Radiographer (Diagnostic)	1609	238	52	40	11	0	0
Radiographer (Industrial)	48	19	0	0	0	0	0



**The Distribution of Whole Body Dose  
by Job Types, 2021 (Continued)**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Radiographer (Therapeutic)	166	48	2	1	0	0	0
Radiologist	146	32	5	0	1	0	0
Research Assistant	147	22	0	0	0	0	0
Safety Officer	11	4	0	0	0	0	0
Scientific Assistant	7	0	0	0	0	0	0
Scientific Officer	12	2	0	0	0	0	0
Security Officer	1	0	0	0	0	0	0
Speech Therapist	64	9	0	0	0	0	0
Store Keeper	2	3	0	0	0	0	0
Student	118	9	0	0	0	0	0
Teaching Assistant	2	1	0	0	0	0	0
Technical Officer	107	12	0	1	1	0	0
Technician (Electrical)	170	31	7	1	0	0	0
Technician (Laboratory)	214	49	1	1	0	0	0
Technician (X-rays)	41	2	1	0	0	0	0
Trainee	18	2	0	0	0	0	0
Vet	172	9	0	1	0	0	0

**The Distribution of Whole Body Dose  
by Job Types, 2021 (Continued)**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Vet Assistant	166	12	0	0	0	0	0
Ward Attendant	696	127	15	1	2	0	0
Workman	41	12	0	0	0	0	0
X-ray Assistant	35	2	0	0	0	0	0
X-ray Crystallographer	1	0	0	0	0	0	0
No Job Code	1313	120	13	6	7	0	0
<b>Total</b>	<b>10869</b>	<b>1601</b>	<b>168</b>	<b>73</b>	<b>27</b>	<b>0</b>	<b>0</b>

Remark: x represents the dose values in mSv

**Table 4****The Distribution of Finger Dose  
by Job Types, 2021**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Dentist	1	0	0	0	0	0
Engineer	17	0	0	0	0	0
Laboratory Attendant	0	2	1	0	0	0
Lecturer	1	0	0	0	0	0
Medical Officer	72	1	0	0	0	0
Medical Officer (Therapeutic)	14	0	0	0	0	0
Medical Technologist	1	0	0	0	0	0
Operator	1	1	0	0	0	0
Radiochemist	11	2	6	2	2	0
Pharmacist	2	3	4	1	0	0
Physicist (Medical)	14	0	0	0	0	0
Quality Assurance	0	1	0	0	0	0
Radiographer (Diagnostic)	76	22	8	0	0	0
Radiographer (Therapeutic)	2	0	0	0	0	0
Radiologist	10	0	0	1	0	0
Research Assistant	6	0	2	0	0	0
Scientific Officer	0	0	3	0	0	0

**The Distribution of Finger Dose  
by Job Types, 2021 (Continued)**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Speech Therapist	2	0	0	0	0	0
Store Keeper	5	0	0	0	0	0
Student	2	0	0	0	0	0
Technical Officer	0	0	1	0	0	0
Technician (Electrical)	1	0	0	0	0	0
Technician (Laboratory)	5	1	1	0	0	0
Vet	1	0	0	0	0	0
Ward Attendant	2	0	0	0	0	0
Workman	1	0	0	0	0	0
No Job Code	61	7	0	2	0	0
Total	308	40	26	6	2	0

Remark: x represents the dose values in mSv

**Table 5**

**The Distribution of Whole Body Dose  
by Gender, 2021**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Male	5220	848	105	54	15	0	0
Female	5649	753	63	19	12	0	0
Total	10869	1601	168	73	27	0	0

Remark: x represents the dose values in mSv

**Table 6**

**The Distribution of Finger Dose  
by Gender, 2021**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Male	248	34	21	6	2	0
Female	60	6	5	0	0	0
Total	308	40	26	6	2	0

Remark: x represents the dose values in mSv