



Occupational Radiation Exposure in Hong Kong (2020)

Radiation Monitoring Service
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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 2020. 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 2020, the RMS provided whole body type individual monitoring dosimeters to 12,009 named persons and 1,195 unnamed users at 900 sites. The named persons could be grouped into 57 different job types in one of the following four job categories: *dental* (9.70%), *industrial* (8.26%), *medical* (64.44%) and *others* (17.60%). 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 0.10 mSv, which slightly decreased from 0.11 mSv in 2019. All monitored persons had doses within the statutory limit of 20 mSv in a year. 84.4% 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 person received annual doses exceeding 6 mSv. The highest whole body dose recorded was 5.39 mSv.

For individual job categories, the average annual doses for dental, industrial, medical and others were respectively 0.06, 0.08, 0.11 and 0.11 mSv.

Among the monitored users, about 51.0% worked in the public sector (including staff in hospitals of Hospital Authority), the rest of about 49.0% worked in the private sector. By gender, 5,875 (48.9%) were male and 6,134 (51.1%) were female (Figure 5). The dose distribution by gender is at Table 5.

Extremity radiation monitoring

In 2020, the RMS also provided extremity (finger) dose monitoring service to 345 workers at 57 sites in Hong Kong. The average annual finger dose was about 7.08 mSv. Eight workers received annual finger doses exceeding 100 mSv and the highest dose recorded was 208.55 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 industrial, medical and others were respectively 2.96, 3.70 and 14.97 mSv. By gender, 281 (81.4%) were male and 64 (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, 2020

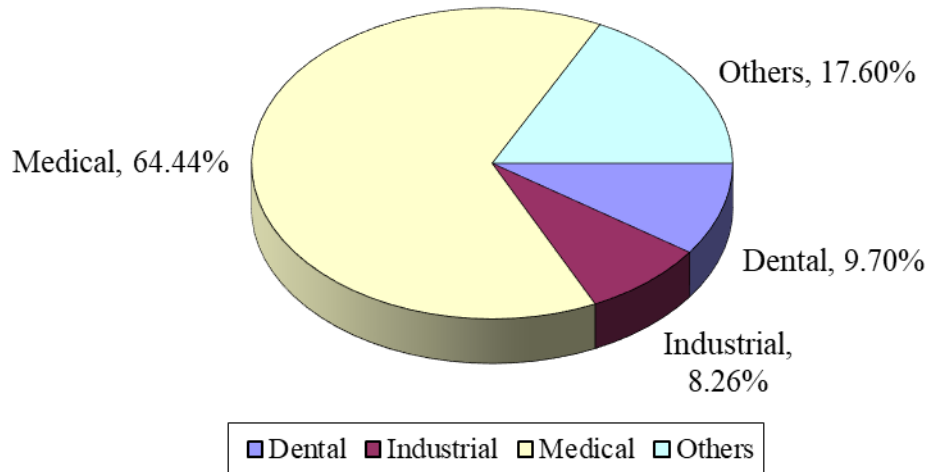


Figure 2

The Distribution of Finger Dosimeter Users by Job Categories, 2020

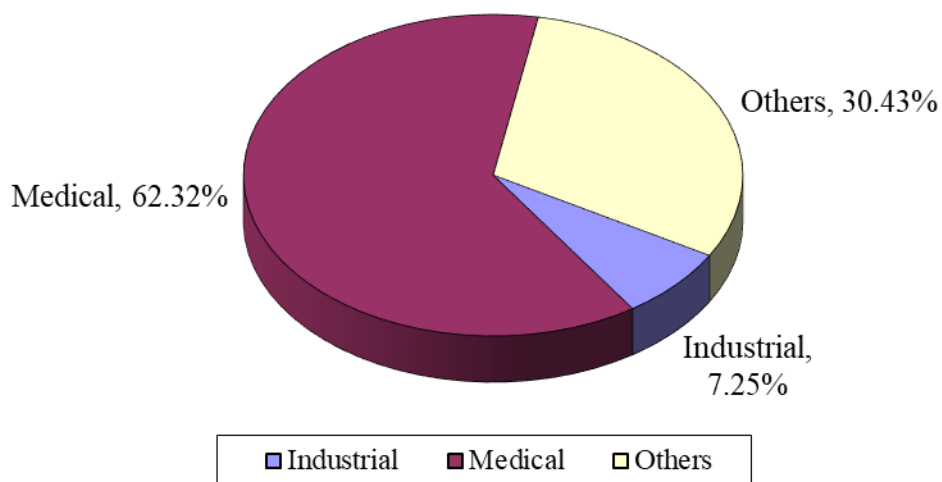


Figure 3

The Average Annual Occupational Whole Body Dose by Job Categories, 2020

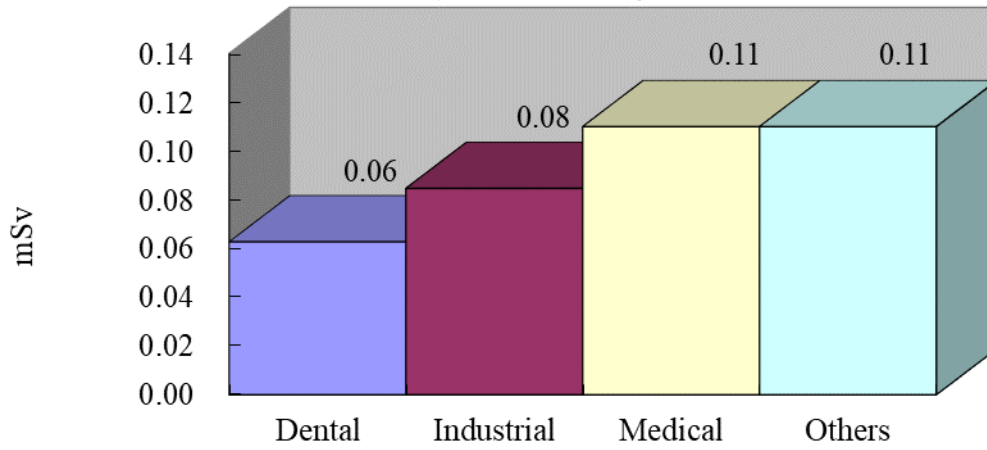


Figure 4

The Average Annual Occupational Finger Dose by Job Categories, 2020

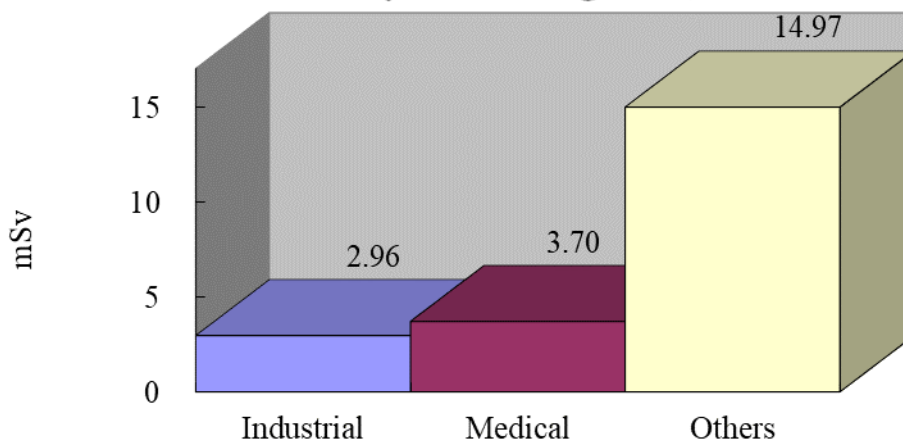


Figure 5

The Distribution of Whole Body Dosimeter Users by Gender, 2020

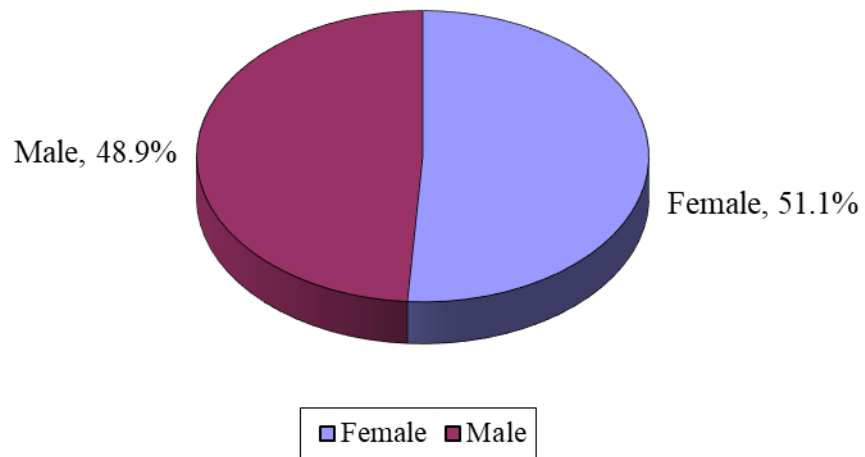


Figure 6

The Distribution of Finger Dosimeter Users by Gender, 2020

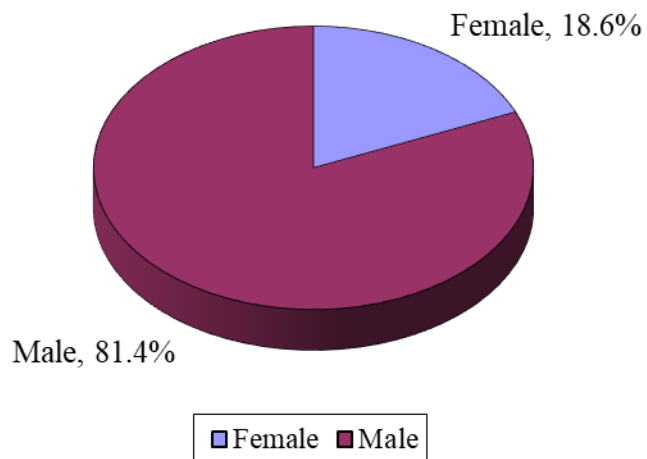


Table 1

**The Distribution of Whole Body Dose
by Job Categories, 2020**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Dental	1039	126	0	0	0	0	0
Industrial	838	140	12	2	0	0	0
Medical	6443	1120	113	49	13	0	0
Others	1810	259	26	8	11	0	0
Total	10130	1645	151	59	24	0	0

Remark: x represents the dose values in mSv

Table 2

**The Distribution of Finger Dose
by Job Categories, 2020**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Industrial	20	3	2	0	0	0
Medical	179	21	14	1	0	0
Others	82	7	9	6	1	0
Total	281	31	25	7	1	0

Remark: x represents the dose values in mSv

Table 3**The Distribution of Whole Body Dose
by Job Types, 2020**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Administrator	10	2	0	0	0	0	0
Artisan	45	6	0	0	0	0	0
Chemist	21	11	3	4	5	0	0
Clerk	31	4	0	0	0	0	0
Consultant (Medical)	22	3	2	0	0	0	0
Delivery	1	2	0	0	0	0	0
Dental Assistant	416	29	0	0	0	0	0
Dental Hygienist	18	2	0	0	0	0	0
Dental Therapist	184	45	0	0	0	0	0
Dentist	421	50	0	0	0	0	0
Department Manager	0	2	0	0	0	0	0
Driver	12	7	2	0	0	0	0
Engineer	202	40	2	1	0	0	0
Experimental Officer	1	0	0	0	0	0	0
Fire Safety Worker	3	2	0	0	0	0	0
Laboratory Attendant	25	5	1	0	0	0	0
Lecturer	12	1	0	0	0	0	0

**The Distribution of Whole Body Dose
by Job Types, 2020 (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	7	0	0	0	0	0	0
Mechanic	28	3	1	0	0	0	0
Medical Officer	1380	262	14	4	3	0	0
Medical Officer (Therapeutic)	40	7	2	0	0	0	0
Medical Technologist	17	5	0	0	0	0	0
Nurse	1986	299	19	2	2	0	0
Nurse (Veterinary)	81	4	1	0	0	0	0
Operator	198	16	0	0	0	0	0
Pharmacist	9	10	3	0	0	0	0
Physicist (Health)	11	10	0	0	0	0	0
Physicist (Medical)	76	21	6	0	0	0	0
Physiotherapist	5	1	0	0	0	0	0
Police	0	5	1	0	0	0	0
Quality Assurance	22	3	1	0	0	0	0
Radiobiologist	0	0	0	0	0	0	0
Radiographer (Diagnostic)	1478	244	48	37	7	0	0
Radiographer (Industrial)	40	18	3	0	0	0	0

**The Distribution of Whole Body Dose
by Job Types, 2020 (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)	124	47	3	0	0	0	0
Radiologist	132	44	4	1	0	0	0
Research Assistant	157	14	1	0	0	0	0
Safety Officer	11	3	0	0	0	0	0
Scientific Assistant	7	0	0	0	0	0	0
Scientific Officer	10	1	0	0	0	0	0
Security Officer	1	0	0	0	0	0	0
Speech Therapist	59	12	0	0	0	0	0
Store Keeper	4	1	0	0	0	0	0
Student	131	10	0	0	0	0	0
Teaching Assistant	2	1	0	0	0	0	0
Technical Officer	112	16	0	1	0	0	0
Technician (Electrical)	156	31	4	0	0	0	0
Technician (Laboratory)	213	54	2	0	1	0	0
Technician (X-rays)	42	3	1	0	0	0	0
Trainee	17	2	0	0	0	0	0
Vet	160	16	2	0	0	0	0

**The Distribution of Whole Body Dose
by Job Types, 2020 (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	164	12	0	0	0	0	0
Ward Attendant	627	124	8	5	1	0	0
Workman	43	13	0	0	0	0	0
X-ray Assistant	41	4	0	0	0	0	0
X-ray Crystallographer	1	0	0	0	0	0	0
No Job Code	1114	118	17	4	5	0	0
Total	10130	1645	151	59	24	0	0

Remark: x represents the dose values in mSv

Table 4**The Distribution of Finger Dose
by Job Types, 2020**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Chemist	8	4	4	4	1	0
Engineer	16	1	1	0	0	0
Laboratory Attendant	2	1	0	0	0	0
Lecturer	1	0	0	0	0	0
Medical Officer	69	1	0	0	0	0
Medical Officer (Therapeutic)	15	0	0	0	0	0
Medical Technologist	1	0	0	0	0	0
Operator	1	0	0	0	0	0
Pharmacist	3	0	5	1	0	0
Physicist (Health)	0	0	0	0	0	0
Physicist (Medical)	12	0	0	0	0	0
Physiotherapist	0	0	0	0	0	0
Quality Assurance	0	1	0	0	0	0
Radiographer (Diagnostic)	68	20	8	0	0	0
Radiographer (Therapeutic)	1	0	0	0	0	0
Radiologist	6	0	1	0	0	0
Research Assistant	4	0	2	0	0	0

**The Distribution of Finger Dose
by Job Types, 2020 (Continued)**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Scientific Officer	0	0	1	0	0	0
Speech Therapist	3	0	0	0	0	0
Store Keeper	5	0	0	0	0	0
Student	1	0	0	0	0	0
Technical Officer	0	0	1	0	0	0
Technician (Electrical)	1	0	0	0	0	0
Technician (Laboratory)	7	1	1	0	0	0
Ward Attendant	1	0	0	0	0	0
Workman	1	0	0	0	0	0
No Job Code	55	2	1	2	0	0
Total	281	31	25	7	1	0

Remark: x represents the dose values in mSv

Table 5

**The Distribution of Whole Body Dose
by Gender, 2020**

	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Male	4839	883	96	40	17	0	0
Female	5291	762	55	19	7	0	0
Total	10130	1645	151	59	24	0	0

Remark: x represents the dose values in mSv

Table 6

**The Distribution of Finger Dose
by Gender, 2020**

	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Male	225	27	21	7	1	0
Female	56	4	4	0	0	0
Total	281	31	25	7	1	0

Remark: x represents the dose values in mSv