Occupational Radiation Exposure in Hong Kong (2023)

Radiation Monitoring Service
Radiation Health Division
Department of Health, HKSAR

Occupational Radiation Exposure in Hong Kong (2023)

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 2023. 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 2023, the RMS provided whole body type individual monitoring dosimeters to 13,461 named persons and 1,095 unnamed users at 940 sites. The named persons could be grouped into 57 different job types in one of the following four job categories: *dental* (8.28%), *industrial* (6.80%), *medical* (66.34%) and *others* (18.58%). 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 0.11 mSv, which was slightly higher than the value in 2022. No person's dosimeter recorded dose higher than the statutory limit of 20 mSv in a year. 83.4% of the monitored persons 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. One person's dosimeter received dose exceeding 6 mSv, which was 7.22 mSv.

For individual job categories, the average annual doses for dental, industrial, medical and others were respectively 0.09, 0.11, 0.12 and 0.10 mSv.

Among the monitored users, about 46.6% worked in the public sector (including staff in hospitals of Hospital Authority), the rest of about 53.4% worked in the private sector. By gender, 6,576 (48.9%) were male and 6,885 (51.1%) were female (Figure 5). The dose distribution by gender is at Table 5.

Extremity radiation monitoring

In 2023, the RMS also provided extremity (finger) dose monitoring service to 424 workers at 69 sites in Hong Kong. The average annual finger dose was about 4.34 mSv. Four workers received annual finger doses exceeding 100 mSv and the highest dose recorded was 218.04 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 0.00, 4.27, 4.78 and 3.40 mSv. By gender, 339 (80.0%) were male and 85 (20.0%) were female (Figure 6). The dose distribution by gender is at Table 6.

Figure 1

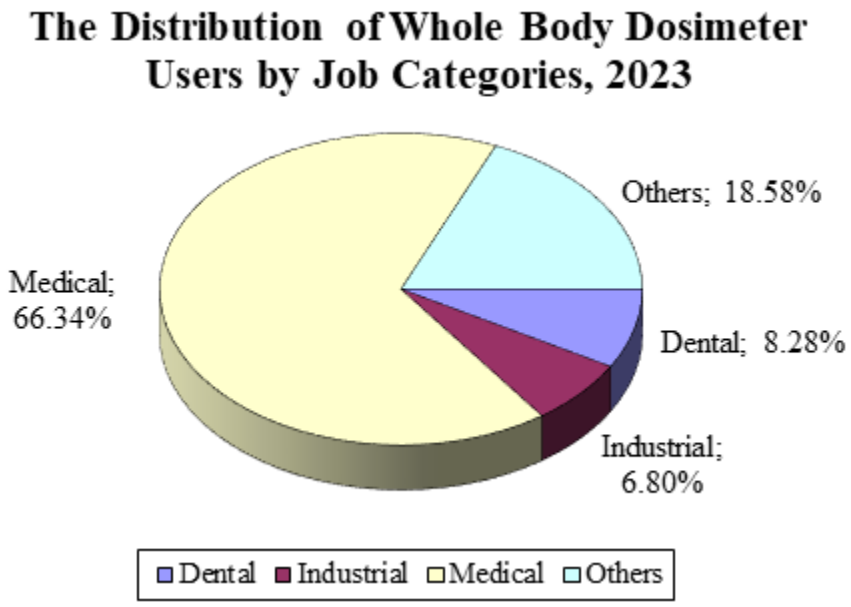

Figure 2

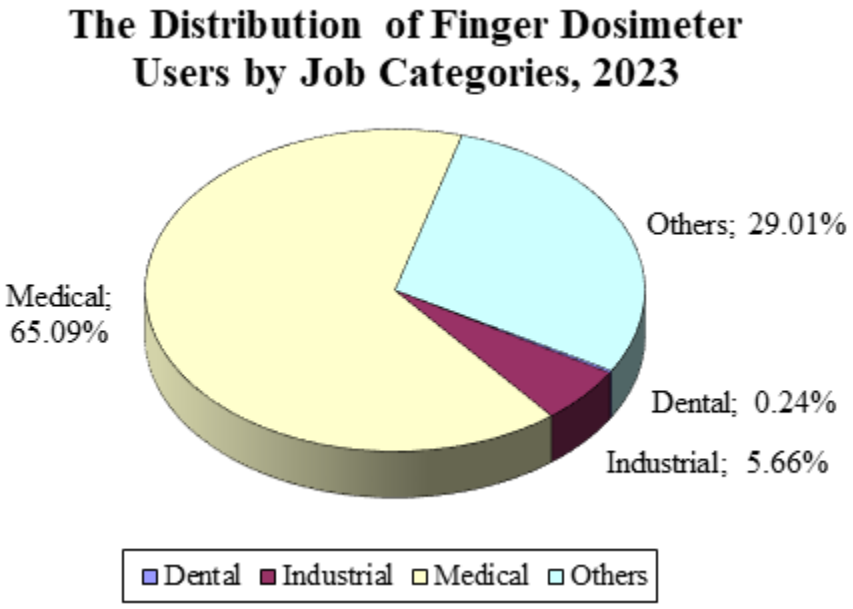

Figure 3

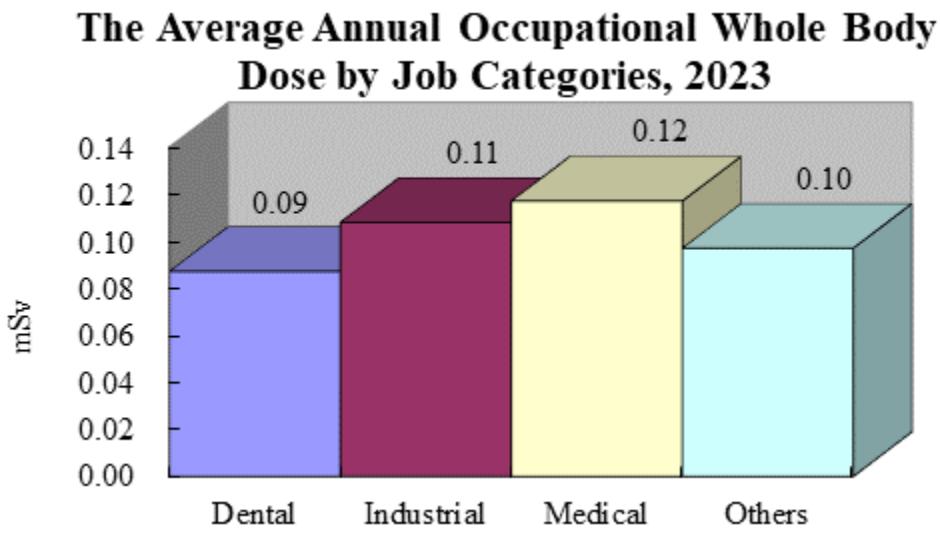

Figure 4

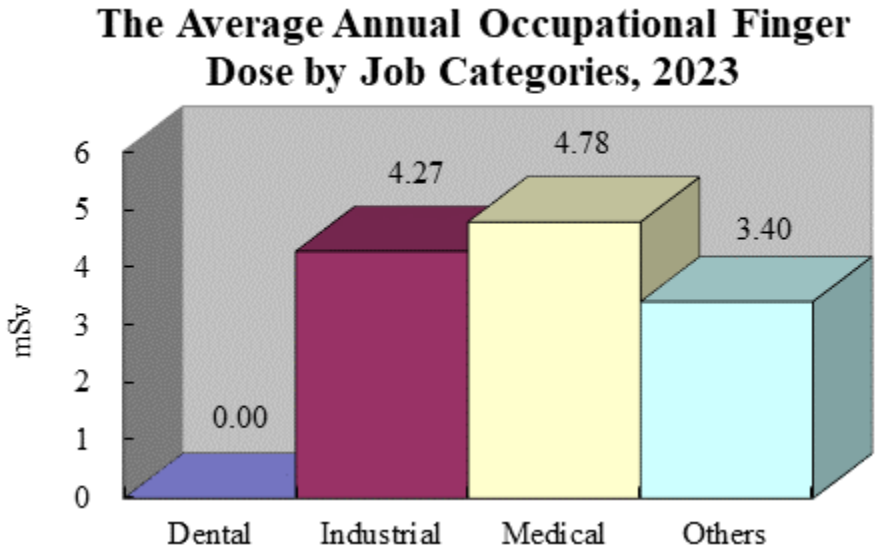

Figure 5

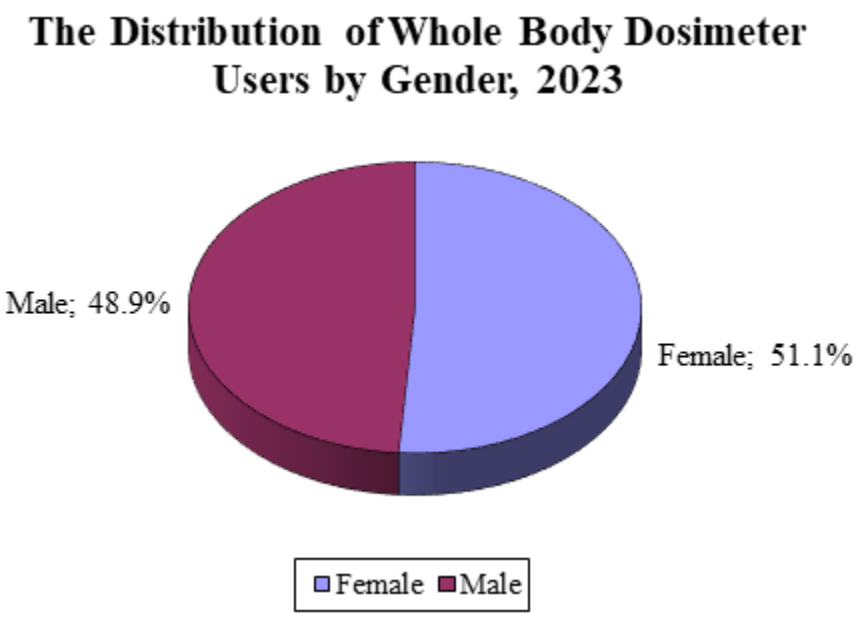

Figure 6

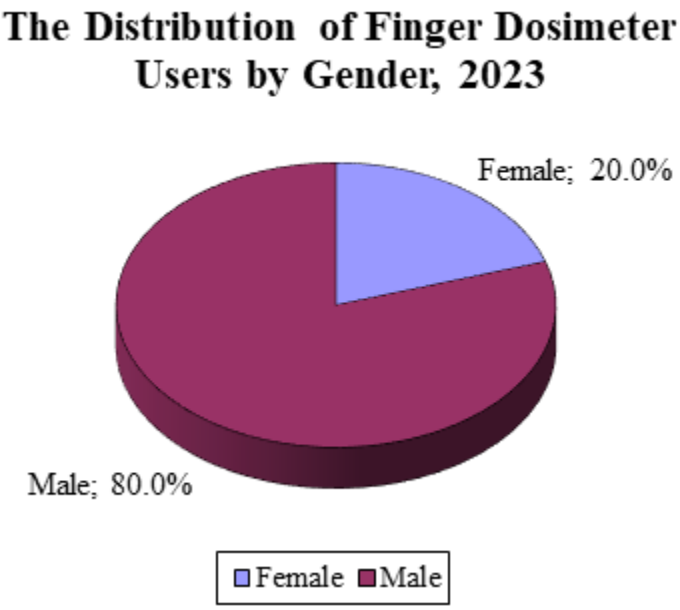

Table 1

The Distribution of Whole Body Dose by Job Categories, 2023

Job Category	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Dental	927	180	6	1	0	0	0
Industrial	753	137	22	4	0	0	0
Medical	7381	1291	173	69	15	1	0
Others	2159	293	24	19	6	0	0
Total	11220	1901	225	93	21	1	0

Remark: x represents the dose values in mSv

Table 2

The Distribution of Finger Dose by Job Categories, 2023

Job Category	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Dental	1	0	0	0	0	0
Industrial	20	2	2	0	0	0
Medical	234	19	20	2	1	0
Others	110	5	7	1	0	0
Total	365	26	29	3	1	0

Remark: x represents the dose values in mSv

Table 3

The Distribution of Whole Body Dose by Job Types, 2023

Job Type	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Administrator	5	2	0	0	0	0	0
Artisan	30	1	0	0	0	0	0
Chemist	10	6	0	0	0	0	0
Clerk	26	1	0	0	0	0	0
Consultant (Medical)	10	6	1	0	0	0	0
Delivery	1	1	0	1	0	0	0
Dental Assistant	368	60	2	0	0	0	0
Dental Hygienist	25	1	0	0	0	0	0
Dental Therapist	141	67	0	0	0	0	0
Dentist	393	52	4	1	0	0	0
Department Manager	0	1	0	0	0	0	0
Driver	11	11	1	0	0	0	0
Engineer	202	43	7	2	0	0	0
Experimental Officer	1	0	0	0	0	0	0
Fire Safety Worker	3	1	0	0	0	0	0
Laboratory Attendant	21	4	0	2	0	0	0
Lecturer	8	1	0	0	0	0	0

The Distribution of Whole Body Dose by Job Types, 2023 (Continued)

Job Type	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Luminous Watch Assembly Worker	4	1	0	0	0	0	0
Mechanic	23	3	1	0	0	0	0
Medical Officer	1475	317	29	3	1	0	0
Medical Officer (Therapeutic)	30	8	0	0	0	0	0
Medical Technologist	78	17	2	1	0	0	0
Nurse	2261	325	28	8	1	0	0
Nurse (Veterinary)	123	8	2	0	0	0	0
Operator	178	29	2	0	0	0	0
Pharmacist	17	6	1	1	0	0	0
Physicist (Health)	11	8	1	0	0	0	0
Physicist (Medical)	93	21	10	1	0	0	0
Physiotherapist	2	2	0	0	0	0	0
Police	0	11	0	0	0	0	0
Quality Assurance	12	4	0	0	0	0	0
Radiochemist	8	6	4	7	1	0	0
Radiographer (Diagnostic)	1594	288	58	41	8	1	0

The Distribution of Whole Body Dose by Job Types, 2023 (Continued)

Job Type	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Radiographer (Industrial)	41	13	0	0	0	0	0
Radiographer (Therapeutic)	227	46	5	0	0	0	0
Radiologist	136	25	6	2	0	0	0
Research Assistant	138	16	0	0	0	0	0
Safety Officer	8	4	0	0	0	0	0
Scientific Assistant	5	0	0	0	0	0	0
Scientific Officer	7	2	0	0	0	0	0
Security Officer	1	0	0	0	0	0	0
Speech Therapist	69	8	0	0	0	0	0
Store Keeper	3	0	0	0	0	0	0
Student	153	6	0	2	0	0	0
Teaching Assistant	1	1	0	0	0	0	0
Technical Officer	88	11	3	0	0	0	0
Technician (Electrical)	151	27	9	0	0	0	0
Technician (Laboratory)	188	35	1	2	1	0	0
Technician (X-rays)	32	4	0	0	0	0	0
Trainee	13	2	0	0	0	0	0
Vet	227	20	3	0	0	0	0

The Distribution of Whole Body Dose by Job Types, 2023 (Continued)

Job Type	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Vet Assistant	173	16	0	0	0	0	0
Ward Attendant	807	164	24	4	4	0	0
Workman	29	10	1	0	0	0	0
X-ray Assistant	19	3	0	1	0	0	0
X-ray Crystallographer	1	0	0	0	0	0	0
No Job Code	1539	176	20	14	5	0	0
Total	11220	1901	225	93	21	1	0

Remark: x represents the dose values in mSv

Table 4

The Distribution of Finger Dose by Job Types, 2023

Job Type	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
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	79	0	0	0	0	0
Medical Officer (Therapeutic)	11	0	0	0	0	0
Medical Technologist	1	0	0	0	0	0
Operator	2	0	0	0	0	0
Pharmacist	5	4	2	0	0	0
Physicist (Health)	1	0	0	0	0	0
Physicist (Medical)	20	0	0	0	0	0
Radiochemist	10	1	12	1	1	0
Radiographer (Diagnostic)	93	14	6	0	0	0
Radiographer (Therapeutic)	1	0	0	0	0	0
Radiologist	9	0	0	1	0	0
Research Assistant	3	0	0	0	0	0
Safety Officer	3	0	0	0	0	0

The Distribution of Finger Dose by Job Types, 2023 (Continued)

Job Type	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Scientific Officer	0	2	1	0	0	0
Speech Therapist	2	0	0	0	0	0
Store Keeper	4	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)	6	1	1	0	0	0
Vet	1	0	0	0	0	0
Ward Attendant	2	0	0	0	0	0
No Job Code	91	2	5	1	0	0
Total	365	26	29	3	1	0

Remark: x represents the dose values in mSv

Table 5

The Distribution of Whole Body Dose by Gender, 2023

Gender	$x \leq 0.17$	$0.17 < x \leq 0.75$	$0.75 < x \leq 1.5$	$1.5 < x \leq 3.0$	$3.0 < x \leq 6.0$	$6.0 < x \leq 10$	$x > 10$
Male	5421	957	129	54	15	0	0
Female	5799	944	96	39	6	1	0
Total	11220	1901	225	93	21	1	0

Remark: x represents the dose values in mSv

Table 6

The Distribution of Finger Dose by Gender, 2023

Gender	$x \leq 1$	$1 < x \leq 10$	$10 < x \leq 100$	$100 < x \leq 200$	$200 < x \leq 500$	$x > 500$
Male	291	20	24	3	1	0
Female	74	6	5	0	0	0
Total	365	26	29	3	1	0

Remark: x represents the dose values in mSv