

A remarkable journey: the development of radiographer training in Hong Kong

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Hong Kong's first X-ray machine, the Roentgen Ray apparatus, was introduced to the territory in 1910.¹ Appropriately trained technicians were essential to operate the machine safely and ensure the production of high-quality, diagnostically valuable radiographs. Before the 1950s, diagnostic radiographic assistants were trained by individual hospitals through in-house apprenticeships.² As a result, radiographic assistants' capabilities and qualities were highly variable. Training requirements and standards were inconsistent, and there was no widely recognised qualification.

Among Hong Kong's healthcare institutions, the Ruttonjee Sanatorium boasted exceptional radiography services, supervised by Sister Basil, a qualified radiographer who also conducted in-house training for local radiographic assistant apprentices (Fig). Originally established as the Royal Naval Hospital, a generous donation of HK\$800 000 from Mr Jehangir Hormusjee Ruttonjee in 1949 transformed the premises into the Ruttonjee Sanatorium with the aim of treating tuberculosis.^{3,4} At the time, tuberculosis was prevalent and frequently fatal (404 cases per 100 000 people and causing 2611 deaths).³ From 1949 onwards, physician Sister Mary Aquinas Monaghan led a team

of medical professionals, including Sister Basil, from the Missionary Sisters of St Columban from Ireland in running the Sanatorium.^{3,4} The Sisters contributed unwaveringly to the Sanatorium until 1988.³

The X-ray machine shown in the Figure was used for plain radiographs but also featured a sophisticated function for its time: X-ray tomography. X-ray tomography allows focus on a specific body plane while obscuring unwanted shadows through diffusion. This was achieved by accurately coordinating various machine components—specifically, the X-ray tube, bucky, and film—using a pivoted metal bar. The bucky moved in the opposite direction to a designated place while the tube moved in an arc to ensure proper alignment. When a particular body plane was selected, a graduated depth scale was used to measure the alignment between the selected layer's depth and the centre of movement.⁵ The centre of movement remained in focus, while other structures were blurred. Multiple layers of interest could be generated by adjusting the depth and corresponding tube movements.

X-ray tomography was primarily used for lung examinations, for example, to localise lesions in the anterior or posterior lung fields.⁵ This function made the machine invaluable at the Sanatorium in fighting

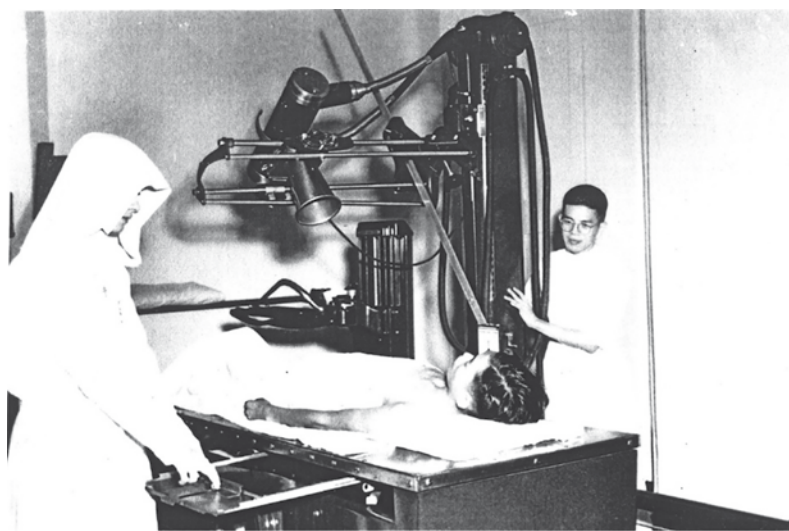


FIG. A sister radiographer performs X-ray on a patient using an X-ray imaging machine at Ruttonjee Hospital. Photo donated by the Hong Kong Tuberculosis, Chest and Heart Diseases Association to the Hong Kong Museum of Medical Sciences

against lung diseases, including tuberculosis. Eventually, X-ray tomography was phased out and replaced by computed tomography (CT), following the release of the first commercial axial CT scanner (EMI scanner), designed by British electrical engineer Godfrey Hounsfield in 1972.⁶ Today, X-ray tomography is obsolete due to its inferior image quality and precision compared to more advanced imaging technologies.

The first significant advancement in local radiographer training was spearheaded by Prof John Hung-chiu Ho, an influential figure in the development of radiology and oncology in Hong Kong.⁷ Prof Ho assumed leadership of the radiological sub-department (RSD) in 1950 and negotiated with the London Society of Radiographers to secure recognition for the RSD as a qualified training institute for diagnostic radiographers.² The RSD initially set up a local training centre at Queen Mary Hospital, later expanding to Queen Elizabeth Hospital, which was established in 1963.²

The professional team at RSD comprised radiologists, expatriate radiographers, and a physicist. Mr F Wilsher, a qualified trainer radiographer, was appointed to educate and guide the local trainees employed under RSD in the training centres.² From the late 1970s onwards, there were quotas for trainees from subvented hospitals, such as the Tung Wah Group of Hospitals. Other training staff included Mr O'Conner, Mr Risk, and several local radiographers who had trained overseas. Initially, the training standard was equivalent to Membership of the Society of Radiographers (MSR), which later became a Diploma of the College of Radiographers (DCR), a subsidiary of the Society established in 1976.² Although the training and examinations were conducted locally in Hong Kong, the examination papers were prepared and marked in London and delivered via diplomatic bags.² The transition from apprenticeships to the DCR marked a significant advancement in professional development for radiographers. Trainees could receive standardised training and graduate with a widely recognised qualification.

Despite the establishment of a government training programme to attain the DCR qualification, most radiographers in subvented hospitals continued to learn their trade via in-house apprenticeships. With government support, Mr Andrew Chak-man Tsui, one of the first two locally trained professionals to obtain an MSR in diagnostic radiography, founded the Hong Kong Radiological Technologists' Association (HKRTA) in 1965 along with other colleagues, including Mr Robert Wai-man Leung, Mr Ian Wai-pong Tsang, and Dr Paul Muk-wah Chan.^{2,8} To offer an additional training pathway, the HKRTA introduced its own programme, covering essential subjects including general physics,

radiographic techniques, radiographic equipment, human anatomy, and human physiology. Teaching was primarily conducted by RSD training centre staff on a part-time basis. Graduates were equipped with basic professional skills and qualified as radiographic assistants.

In 1972, the Hong Kong Polytechnic was officially established to provide vocational education.⁹ Six years later, it introduced a Higher Diploma in Diagnostic Radiography to replace hospital-based training, including the DCR and in-house apprenticeships.^{2,10} By 1983, in response to the rapid growth in demand for diagnostic radiographers, the Hong Kong Polytechnic replaced the Higher Diploma with a Professional Diploma in Diagnostic Radiography.¹⁰ Both the DCR and HKRTA programmes were phased out.

Debate about whether radiography should become a degree-level qualification began in the United Kingdom in the 1970s, as other allied health professions, such as physiotherapy, rapidly advanced and raised their qualification standards. Despite initial resistance, the first radiography honours degree was validated in 1989 at Portsmouth Polytechnic.¹¹ Following this validation, formal clinical assessments of practical skills were incorporated into radiographer training.¹¹ These developments in the United Kingdom inspired the introduction of Hong Kong's Bachelor of Science in Radiography programme in 1992 by the Hong Kong Polytechnic.¹⁰ This programme was further upgraded to the Bachelor of Science (Honours) in Radiography in 1999, after the Hong Kong Polytechnic attained full university status in 1994.¹⁰ Today, supported by professional development initiatives from the Hospital Authority, many radiographers pursue master's degrees and doctorates to advance their expertise. Key areas of specialisation include medical physics and advanced medical imaging, ultrasonography, CT, and magnetic resonance imaging.

With more formal education and higher training standards, greater professional regulation came. In 1981, the Radiographers Board was established under the Supplementary Medical Professions Ordinance (Cap 359), marking a critical milestone.¹² Registration for the profession commenced in 1995 after the enactment of the Radiographers (Registration and Disciplinary Procedure) Regulation (Cap 359 subsidiary legislation H), further strengthening regulation.¹²

Radiographer training in Hong Kong has undergone rapid evolution since 1910. Thanks to the significant contributions of Prof Ho, in-house apprenticeships were replaced with a more structured and professional training framework (DCR) within government institutes. This laid the foundation for the subsequent transition from the DCR to honours degrees at the Hong Kong Polytechnic University.

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