ISHRAD

The International Society
for the History of Radiology

14th Symposium

International Society for the History of Radiology

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Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

President /organiser: **Prof. Mats Geijer** Venue: **Birgit Thilander**

Book of Abstracts

Important memories

09:40

A centenary of the 1925 International Congress of Radiology

Arpan K Banerjee – UK

Arpan Banerjee is co-founder, Past Treasurer and Current Chairman of ISHRAD. Dr Banerjee qualified in medicine from St Thomas's Hospital Medical School in London, UK and trained in Radiology at Westminster Hospital and Guys and St Thomas's Hospital in London. He was a consultant radiologist in Birmingham, UK for 24 years. He is the author/co-author of 8 books including 'The History of Radiology' 2013, "Classic Papers in Diagnostic Radiology" 2005 and the best seller, "Radiology Made Easy"1999, 2006 and 'Radiology of AIDS' 1993. He has authored over 50 peer reviewed papers/articles around 100 abstracts and over 100 essays and reviews on medical historical/ medical humanities topics. From 2005 to 2007 he was President of the Radiology Section of the Royal Society of Medicine, London. From 2011 to 2017 he was Chairman of the British Society of the History of Radiology of which he is a founder member, council member, and Trustee.

The First International Congress of Radiology took place in 1925 in London. It was organised by Thurston Holland a radiologist from Liverpool along with a team that included Alfred Barclay, Stanley Melville and Humphrey Rolleston a distinguished physician. Bragg was involved in the physics section. Papers were presented by radiologists from the USA including Dr Cole, from Europe with Kienböck talking about bone tumours and from Argentina, Hauser talking about radiography in early pregnancy. Until then meetings were often more local or regional affairs as international travel difficult.

The meeting was greatly praised by the Americans with complimentary reports appearing in the journal Radiology and great strides were made in radiation protection and measurement issues which has resulted in great benefit to the radiology community to this day. Gusta Forsell of Sweden was chosen to lead the second congress in Stockholm three years later. The third congress took place in Paris under the Presidency of Béclère. The congress was popular and held three yearly at rotating venues. More latterly the venues included countries in Latin America and Asia where the congress has provided postgraduate education to people worldwide some who would be unable to travel abroad from their own countries.

10:00	**Preserving the past: The inclusion of six iconic X-ray images from Röntgen's estate in the UNESCO Memory of the World Program** Anna-Katharina Kätker, Uwe Busch – DE *Anna-Katharina Kätker studied Geoscience and Geophysics at the Ruhr University Bochum. Since 2018 research associate and X-Lab director at the German Röntgen-Museum. The X-Lab offers experimental workshops for various target groups on topics such as ionising radiation and medical technology. Publications on Röntgen's life and the educational activities of the museum. Since 2024 deputy director at the German Röntgen-Museum.* This presentation explores the inclusion of six iconic X-ray images into the UNESCO Memory of the World Program, highlighting their immense significance in both medical imaging and non-destructive testing. These pioneering images from Wilhelm Conrad Roentgen's estate, captured in the years 1895 and 1896, not only revolutionized medical diagnostics by providing unprecedented insight into the human body but also laid the foundation for non-destructive testing methods that are critical to modern engineering and material science. Their inclusion in the Memory of the World Program in April 2025 underscores their lasting impact on innovation and their historical and cultural importance as key milestones in the evolution of science and technology.
10:20	**Rectification of a priority: Giuseppe Vicentini (1860-1944) published the first X-ray of the opacified gastro-intestinal tract** Robert Dondelinger – BE *Robert F. Dondelinger, born 1949, is a vascular and interventional radiologist. He graduated from the university of Montpellier, France in 1977 and is an honorary full professor of radiology at the university of Liège, Belgium. He is a consultant radiologist at the university hospital Sart Tilman, Liège and Sankt Nikolaus hospital, Eupen, Belgium. He is a former president of ESTI and ESGAR and of the Belgian Society of Radiology and the Belgian Society of Gastro-enterology. His actual field of interest is focused on the history of radiology.* Giuseppe Carlo Antonio Vicentini (1860-1944), professor of experimental physics at the university of Padova, Italy, presented on January 26, 1896, the X-rays he made during a brief pioneering study period. Among those was the first roentgenograph of the opacified gastro-intestinal tract, obtained of an animal model. Wolf Becher published a similar roentgenograph on March 26, 1896, which is wrongly recognized in the literature as the first report.

10:40	**Follow-up: Granddaughters of Dr Weiss Miklos, one of the radiologists from Zsidokorhaz who was taken to Auschwitz in 1944 have come forward because they saw an article about this tragedy in Radiographics and presentation at ISHRAD** Judith Amorosa – USA *My mother was a Rontgen (X-ray) technologist in the Jewish Hospital in Budapest, Hungary. We emigrated from Hungary to US when I was a preteen. Inspired by her I became a Radiologist. When I was a child, she told me a story about how most of the Rontgen technologists and Radiologists were taken to Auschwitz in 1944. I wrote about this department on the 100th anniversary of Rontgen's discovery in 1995. I spoke about this tragedy at the ISHRAD meeting. Several months ago I received a letter from the granddaughters of one of the Radiologists who was taken from the Zsidokorhaz in 1944: Dr Weiss Miklos. They saw the article. The granddaughters live in Malmo, 200 miles from Gothenburg. I invited them.* The history of the tragedy in the Rontgen Department was reported in 1995 in Radiographics (JK Amorosa et al: Tragedy in the Radiology Department, Budapest, Hungary. Radiographics (1996;16:1505-1508). This was also presented at the ISHRAD meeting. On the morning of May 11, 1944, the Nazis came into the Rontgen Pavillion which was a separate building from the rest of the Zsidokorhaz. They lined up all the technologists, Radiologists, took them away and eventually to Auschwitz. One of the Radiologists was Dr Weisz. Couple of people escaped, the rest eventually were taken to Auschwitz and never came back. A couple of years ago I received a letter from Malmö, Sweden where the granddaughters of Dr Weisz Miklos had seen the article about their grandfather. They have been able to fill in a lot about him even though they never met him, through their grandmother and other family members. They have given pictures and stories about him and some background about him. Based on their historical materials and additional data we will be able to see him as a Radiologist, husband, father instead of only as a martyr. Even more amazing is that the granddaughters: Sofia Elg and Charlotta Holmström live 200 miles from where we are having ISHRAD meeting this October.

Medical physics

11:20 **Walter Friedrich (1883-1968): The first German medical physicist**

Uwe Busch, Anna-Katharina Kätker – DE

Uwe Busch studied physics and educational science at the Ruhr University Bochum. Doctorate in medical physics at the medical faculty of the Friedrich-Alexander-University Erlangen. Since 1990 research associate and from 2015 museum director at the German Röntgen Museum. Publications on Röntgen's life and scientific work, scientific biographies and the history of the technical and medical application of X-rays. Co-founder of the International Society for the History of Radiology and the Historical Commission of the German Röntgen Society.

Walter Friedrich was the first person to build a device that successfully achieved diffraction of X-rays by a crystal, and he was the first to observe the diffraction pattern produced.

In 1911, he obtained his doctorate under Wilhelm Conrad Röntgen with his dissertation "Spatial intensity distribution of X-rays emanating from a Platina anticathode". He then worked as an assistant at the Institute for Theoretical Physics in Munich. There, Max von Laue had suggested that the interference of X-rays on crystals could be demonstrated experimentally. Röntgen himself and the director of the institute, Arnold Sommerfeld, thought this was impossible. Walter Friedrich and Paul Knipping succeeded in proving it.

In 1914, Friedrich went to the University Hospital in Freiburg as an assistant. There he took over the management of the laboratory and established the first research centre for biophysics at a German university. After his habilitation in physics, the university appointed him professor. In 1923, the University of Berlin appointed him full professor of medical physics and director of the Institute for Radiation Research at the Charité.

11:40 **Iser Solomon and the physical measurement of the of X-rays**

Denis Krausé, Frédéric Roz, France

Denis Krausé is University Hospital Radiologist, Member of the scientific Commission of the French Museum of Radiology

Shortly after the discovery of X-rays by W.C. Röntgen (1895), pioneers became interested in measuring radiation, while others warned of the complications associated with irradiation, both in radiodiagnostics and radiotherapy.

Their work was devoted to understanding and measuring the harmful effects of X-rays. Some of these pioneers of radiation protection are recalled here: G. Holzknecht and his chromoradiometer (1901), the recommendations of W.H. Rollins (1901), J. Belot and his leaded glass cup (1902), Guilleminot's fluorometer (1905), R. Kienböck and the quantimeter (1905), P. Villard and ionisation (1908), and a few years later, Iser Solomon and his ionometer.

The aim of this work is to explain the functioning of this radiological ionometer, used from 1921 onwards, which was very suitable for everyday radiological practice.

	It consists of an electroscope enclosed in a lead shield and connected to earth, a flexible conductor at both ends and an ionisation chamber (real radiation exploration probe). The equipment and methodology used make it possible to understand the dosimetry, quality and quantity of Röntgen radiation and to demonstrate the considerable importance of scattered radiation. Iser Solomon, a student assistant to Antoine Béclère, who began using X-rays in 1911 and was a military radiologist from 1914 to 1918, succeeded his mentor at the Saint-Antoine Hospital in 1921. His device was an international success, and he became a member of the International Committee for Protection against X-rays and Radium when it was founded in 1928. He's considered one of the martyrs of X-rays.
12:00	**From the birth of radiation protection to Dr. Belot's Integral Protector** Frédéric Roz, Denis Krausé – FR *Frédéric Roz is in charge of the French Museum of Radiology since its creation in 2018, where he oversees the enrichment, conservation, and presentation of its collections. He welcomes visitors and maintains relations with other institutions.* One hundred and thirty years after the discovery of X-rays, and one hundred years after the 1st International Congress of Radiology was held in London, the Musée Français de la Radiologie recalls how the discipline organized itself to protect patients and physicians in its early decades. This is illustrated by a presentation of Dr Belot and his "Integral Protector" designed in 1930.
12:20	**Dr Sebastian Gilbert Scott (1879-1941) and early recording media in radiography - film, plates and paper to the 1930s** Adrian Thomas – UK *Adrian Thomas is Honorary Historian to the British Institute of Radiology. He is Visiting Professor at the Faculty of Medicine, Health and Social Care, Canterbury Christ Church University in Canterbury, UK. He lectures on the Diploma Course for the History of Medicine (DHMSA) of the Society of Apothecaries in London. Adrian is Chairman of the Historical Medical Equipment Society, Past-President of the British Society for the History of Medicine and of the Section of Radiology of the Royal Society of Medicine, and Past-President and current Council Member of the Osler Club of London.* Sebastian Gilbert Scott (1879-1941) was a pioneer radiologist at the Royal London Hospital. Scott qualified in medicine in 1904 and started X-ray and electro-therapeutic work at King's College Hospital. He was appointed as Radiologist to the Royal London Hospital in 1909, holding the post until 1930. Scott is remembered for his interest in gastro-intestinal radiology, pituitary radiology, musculo-skeletal radiology, ankylosing spondylitis and whole-body radiation. He was a teacher and a supporter of the Cambridge X-ray diploma, the DMRE. I knew his radiologist son Dr Michael Gilbert Scott, and he gave me his father's photographic material and books.

	This material comprises: • Radiographs on glass plates. • Radiographs on paper - several collections including Great War injuries (shrapnel etc). • Radiographs on film - particularly rich in musculoskeletal radiograms. There are also many fluoroscopically acquired barium/bismuth meals. • An album with a very varied collection of clinical photographs. Much of this is pre- Great War material. • Scott's teaching collection of slides (traditional large format slides on glass). • His own magic lantern that he used for lectures. • A collection of radiological books including his own publications. The talk will describe this collection and will emphasise the photographic aspects, and the development of early radiographic photography.
12:40	**The radiological industry in Belgium in the early 1900s: Gevaert, De Man and Balteau as showcases** Renaat Van den Broeck – BE *Currently vice-president of ISHRAD* *Voluntary collaborator of the Belgian Museum of Radiology in Brussels, consulting in matters of education, organizing scientific sessions, managing administration. Retired Senior Lecturer Medical Imaging from the UC Odisee Brussels.* *Former senior radiographer at the UH of KULeuven, principal radiographer and analyst at UH VUBrussels.* *One of the founders of the undergraduate's program Medical Imaging and Radiotherapy Technologist at the UC Odisee in 1998.* *Joined in 2000 Kodak Healthcare as PACS consultant until 2003.* *Became a full-time lecturer in medical imaging technology in 2003, implemented a digital imaging environment, and coordinated the final thesis program at the UC Odisee.* The story of three people who founded the radiological industry in Belgium. Lieven Gevaert started a photographic film and paper company in Antwerp in 1894. He was asked to produce radiographic plates in 1915. Thus began the history of a company that plays a global role in the radiological image, now under the name Agfa. Robert De Man founded a company that bore his name in 1919. He specialised in radiological devices. The company developed several ones, where a lot of them did not make it beyond prototype, but a few reached the global market. This by incorporating into the multinational group C.G.R. Marcel Balteau begun a workshop for electric motors in Liege in 1919. A little later, in 1930, he started building radiological generators and x-ray devices. At the Loncin factory, they developed tele-operated tables, and, under the wings of GE, those also entered the world market.

Early clinical use of radiotherapy and radiography

14:00	**Dr Sebastian Gilbert Scott (1879-1941) and his contributions to the radiation treatment of ankylosing spondylitis and to the development of whole-body radiation** Adrian Thomas – UK Sebastian Gilbert Scott qualified in medicine in 1904 and started the X-ray and electro-therapeutic work at King's College Hospital. He was appointed as Radiologist to the London Hospital in 1909 and held the post until his resignation and appointment as Consulting Radiologist in 1930. Scott was a pioneer radiologist particularly interested in gastro-intestinal radiology, pituitary radiology, ankylosing spondylitis, and whole-body radiation. He helped to develop the barium meal (opaque meal) in Britain. He was an expert on congenital variations and medico-legal aspects of radiology. He used wide field low dose radiotherapy for rheumatic diseases (the X-ray bath) particularly ankylosing spondylitis and believed that small doses of radiation stimulated immunity. In the period before the Second World War when many modern medicines and treatments had not been devised, he believed that radiotherapy was probably of even more value for benign than malignant disease. He was on the staff of the British Red Cross Clinic for the treatment of Rheumatism (Peto Place) and was the Director of the Nuffield Wide Field x-ray Research. His views may seem controversial today, but he was deeply respected before the Second World War. His many contributions will be described and assessed.
14:20	**The early history of brachytherapy in the UK** Edwin Aird – UK *Edwin Aird has had a long and inspiring career in medical physics, as director and medical physicist at Mount Vernon Hospital and at St. Bartholomew's Hospital and Newcastle General as head of radiotherapy and radiation physics. For his work, he received the British Institute of Radiology (BIR) Roentgen Prize, the Silvanus Thompson Award, and the Eponymous Lecture of the same name. He has been a Chief Examiner for the Institute of Physics and Engineering in Medicine (IPEM) and has held various roles in many other associations, including BIR and the International Atomic Energy Agency (IAEA). His main research and teaching areas are radiation dosimetry, quality assurance in clinical trials, radiation protection, and bone mineral measurements. Dr. Aird was also a founding member of RTTQA and the Global Harmonisation Group, and in addition to many articles on his research, he has published two books and many book chapters. He is currently interested in the history of medical physics.* Establishing Brachytherapy in the UK: the timescale and people involved in bringing UK to World Class level. Although Brachytherapy was widely used in France, Sweden, and USA in the 1920s, UK had fallen behind, apart from a few innovators. The "National Radium Trust and Commission" was formed following a speech in the House of Commons by Mr Churchill on April 16th 1929 (giving the main aim to elevate the UK to the standard of the Foundation Curie in Paris and that of the Radiumhemmet (Gosta Forsell and others) in Sweden.

	Two surgeons in particular will be studied in this presentation: **Sir Stanford Cade (**already active before the Radium Commission was formed)**:** was influenced by Claudius Regaud (In Paris), who had developed his own techniques in all modalities: *interstitial; intracavitary, and mould/plaque treatments*. Cade wrote these up in a text book: **"The Radium Treatment of Cancer"** (Churchill 1929), by which time the Roentgen was well established, along with the concept of mg.hours as a quantity of "dose", for radium treatments. **Ralston Paterson**: who visited Paris and Sweden as well and worked at the Mayo clinic under Arthur Desjardins. He became director of the Holt Radium Institute in Manchester (which later joined with the Christie hospital to become the most important centre in NW England). He realised the importance of the need for a physicist to understand fully the science of radium treatments, and appointed Herbert Parker. Together they developed the Manchester system of dosimetry (Radium Dosage the Manchester System. Edited by WJ Meredith 1st edition 1947), or "The Paterson-Parker Rules" as they were commonly known, for all types of radium treatments.
14:40	**The life of Dr Alan L. Hart: A transgender radiologist who pioneered the use of X-rays in tuberculosis detection.** Lucy McGowan – UK *Lucy McGowan is In Internal Medicine Trainee (Stage 1) based in Glasgow, Scotland, with a strong aspiration to pursue radiology training within Scotland. She graduated from the University of Dundee in 2021 with an MBChB and a BMSc in Forensic and Legal Medicine. Her interests include medical education, and she has completed a diploma in this field at the University of Glasgow in 2024. Beyond medicine, she enjoys playing golf and the flute.* Dr. Alan L. Hart (1890–1962) was a pioneering American physician and radiologist whose innovative use of X-ray technology revolutionized the early detection of tuberculosis (TB) (1). Recognizing the limitations of sputum testing, Hart pioneered the use of chest radiography to identify asymptomatic TB cases, significantly advancing public health outcomes. While working with the Connecticut State Tuberculosis Commission, his leadership in mass X-ray screening and public health campaigns contributed to a marked decline in TB mortality, particularly among vulnerable populations (1,2). Hart was also one of the first known transgender men in the United States to undergo gender-affirming surgery, transitioning in 1917–18 (3). Despite societal and professional challenges related to his gender identity, he maintained a distinguished medical career and authored several novels that subtly reflected his experiences. His resilience and advocacy for equitable healthcare have inspired generations of LGBTQ+ medical professionals (4). Dr. Hart's groundbreaking efforts laid the foundation for modern TB screening protocols, demonstrating the critical role of radiology in disease prevention and public health—a legacy that continues to influence global health strategies today.

15:00	**Sven Johansson's technique for operating on fractures of the neck of the femur** Lisa Sputnes Mouwitz – SE

Lisa Sputnes Mouwitz is director of the Medical History Museum in Gothenburg since 2009. She has through the years reflected on and highlighted the possibilities and challenges of museum collections in exhibitions, collaborative research projects, publications and presentations, often from the perspective of the specific knowledge of the museum professional.

In 1932, the Sahlgrenska surgeon Sven Johansson (1880-1959) introduced a new technique for operating on fractures of the neck of the femur. The basis of the new technique was to cannulate Smith-Petersen's collum nail. Using x-ray by the operating table and controlling the placement of the cannulated nail made it possible for shorter time in bed rest after surgery as well as a quicker recovery for the patient.

In the presentation my aim is to show a film (13 min) from the collections of the Medical History Museum dated to 1937 where Johansson displays the technique, as well as doing a short introduction to his work. I would also like to give some insight into the international knowledge exchange that went on at the surgical department. This will be based on my research on a guest book that was used there during the period. A study that I am conducting within the framework of a master's thesis in History of Ideas and Science at University of Gothenburg.

Regional development of early radiology

15:45 **Polish radiology in the interwar period 1918-1939**

Andrzej Urbanik – PL

Specialist radiologist, Prof. MD, PhD
1998-2022 - Head of the Diagnostics Imaging Department at the University Hospital in Krakow
1998-2022 - Head of the Chair of Radiology at the Jagiellonian University Medical College; from 2022 at the position of senior professor
2013-2022 - Head of the Radiography Department at the University of Rzeszów; from 2022 at the position of senior professor
2016-2019 – president of the Polish Medical Society of Radiology
Since 2016 - President of the Polradiologia Viva foundation (www.inforadiologia.pl)

After World War I, Poland regained its independence after 123 years of captivity (since 1795 it had been divided between Austria, Prussia, and Russia). Difficult years of rebuilding statehood followed. After the destruction of war, radiology was also rebuilt and developed. In 1925, the Polish Medical Radiological Society was established and in 1926 the Polish Review of Radiology began to be published. The issue of regular professional training and awarding the title of specialist were regulated. Several radiology textbooks were published. Compulsory teaching of radiology for medical students was introduced, and the first schools were organized for radiographers. X-ray machines from foreign manufacturers began to be assembled, as well as own designs from foreign elements. The production of X-ray tubes, accessories and materials (including films and reagents) was also launched. In the examination technique, own ideas were introduced, such as endoradiology, introvision and the protocol of radiological examination of the eye sockets in the location of foreign bodies in the eyeball. It is worth recalling that prof. Januszkiewicz obtained a patent for a collimator with illumination of the examination field and Dr. Matuszek began work on the technique of orthopantomography.

16:05 **Interbellum and the official onset of teaching of medical radiology at the universities in Belgium**

Philippe Uytterhaegen, René Van Tiggelen – BE

Graduated as a general radiologist from the University of Gent.
Worked as a radiologist successively at the Institut Moderne, the Volkskliniek and the AZ Jan Palfijn in Ghent. Served as vice-president of the medical board of AZ Jan Palfijn.
Author of several chapters in books on phlebography and a co-author of the Atlas for the Diagnosis and Treatment of Venous Diseases.
Member of the Belgian Society of Radiology BSR, Belgian Society of Senology, European Society of Radiology ESR, Radiological Society of Northern America RSNA, Société Française de Radiologie SFR, and Benelux Society for Phlebology.
Started as scientific advisor to the Belgian Museum of Radiology since November 2023.

At the time of the discovery of X-rays, there are in Belgium four universities with a faculty of medicine. The Catholic University of Leuven is the oldest, founded in 1425. Next, in 1817 the State Universities of Ghent and Liège are created. Finally, in 1834, the Free University of Brussels is founded. After recalling the beginnings of medical radiology in these different cities, we see the slow emergence of lectures, then free and still optional courses on this subject. It is only after the First World War that

	mandatory teaching, sanctioned by an examination, is added to the curriculum of these four universities. It is also during this period that diagnostic radiology slowly separates from radiation therapy along with the creation of various University Cancer Centers and a more specific approach. To fully understand something, one needs to learn its history!
16:25	**A brief history of neuroimaging: How the Beatles, Hounsfield and the computer sparked an imaging revolution** Jessica Matschek – CA *Jessica Matschek is a final year medical student at McGill University, with a strong interest in Radiology and the history of medicine. She is particularly intrigued by the historical development of minimally invasive procedures and how these advances have impacted patient outcomes.* In the early 20th century, neuroimaging was limited by poor visualization of brain tissues on radiographs. Techniques such as ventriculography and pneumoencephalography allowed for some visualization of cerebral structures but were invasive and uncomfortable. These issues were addressed by Godfrey Hounsfield, inventor of the EMI scan—now known as Computerized Tomography (CT). A popular tale suggests the CT scanner got by "with a little help from [its] friends"—The Beatles. It is widely believed that the Beatles' music profits funded the research behind the CT scanner. This exhibit explores the history of neuroimaging, focusing on Hounsfield's life and the funding behind the CT. In the 1960s, Hounsfield, working for EMI, developed the CT concept after a physician criticized existing brain imaging. Despite setbacks, his project advanced with funding from EMI and the UK Department of Health and Social Security. When EMI later withdrew support, Hounsfield had to restructure financing. While The Beatles did not directly fund the CT scanner, profits from their albums likely helped EMI afford the initial £17,996 needed for his groundbreaking project. As The Beatles sang, "you say you want a revolution, well, you know, we all wanna change the world"—and they did.
16:45	**Early radiology in Gothenburg, Sweden** Mats Geijer SWEDEN *Mats Geijer is professor of radiology at Sahlgrenska Academy at the University of Gothenburg. After graduating from the University of Gothenburg, he has worked in Sweden, Denmark, and the USA. He is the author and co-author of more than 120 papers and several book chapters. One current project is a book about the history of Swedish radiology.* In Gothenburg, Ivar Bagge was one of the three early pioneers of radiology in Sweden. He opened his X-ray institute in 1899, being the only radiologist on the west coast of Sweden. The Sahlgrenska Hospital opened at its current location in 1900 with an X-ray service starting the year after, run by junior surgeons. Only in 1911 did Fredrik von Bergen become the director of the newly opened Radiology department. Fredrik von Bergen was followed by Gösta Runström as director in 1931. Runström became professor of radiology at the newly opened University in 1952. During his time, radiology expanded in Gothenburg with X-ray equipment available at more institutions with eventually more full-time radiologist. Expansion of radiology in Gothenburg was slower than in Stockholm and the university cities in Sweden (Uppsala, Lund) due to the more provincial nature of hospital health care from the lack of a medical school, medical education and research.