

# How are radiologists trained in South Korea?

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**Abstract:** Recently, many excellent doctors want to become radiologists in South Korea. The radiology residency program consists of a 4-year training period and residents need to pass a certifying exam at the end of their training to become board-certified radiologists. The training program consists of several divisions of subspecialties and residents are trained one to several months in one division before rotating to another. They are trained by attending staff to read images and learn to perform various procedures in a man to man environment. Also, residents learn clinically relevant knowledge by participating in intramural or multidisciplinary conferences. Besides in-hospital training, many residents participate in various categorical courses or education programs which are organized by the Korean Society of Radiology (KSR) or other hospitals and residents can attend these courses depending on their individual needs or interests.

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## Introduction

The late 1990s and early 2000s were the dark ages for Korean radiology. At that time, more than half of the resident spots available on the radiology residency program were not filled. In recent times, there has been a complete turnaround with the radiology residency program becoming one of the most popular residency programs among medical specialty training programs and many excellent applicants are competing for limited spots, a phenomenon also seen in other western countries. In this article, we will briefly introduce the radiology training program in South Korea.

## Training system

After graduating from medical college, students have to pass a certifying exam to become doctors. Afterwards, they have to spend at least 1 year in an internship program before they can finally enter a resident training program such as one for radiology. Similar to almost all other residency programs in Korea, the radiology residency program consists of a 4-year training period. The radiology subspecialty in

Korea is divided into several divisions according to various organs such as the neuro, chest, cardiac, musculoskeletal, gastrointestinal, genitourinary, pediatric, interventional, and breast radiology division. Nuclear medicine is usually separated from radiology into a different department. Residents are trained in one division from 1 month to several months depending on the training programs of each hospital and are later rotated to another division. Although there is no regulation for how much training period is mandatory for each division, the training periods for major parts such as the gastrointestinal, chest, and neuro radiology division are usually longer than the others. Although there are variations depending on the subspecialty division, first- and second-year residents are usually trained in ultrasound (US), fluoroscopy and computed tomography (CT), while senior residents take a deeper look at CT and magnetic resonance (MR). In terms of imaging study, residents preview images and make a preliminary report of each examination. Then, the attending staff checks the preliminary report with the resident and corrects them if needed. For US and fluoroscopy, residents first observe examination procedures performed by a senior resident,

fellow or attending staff. After becoming familiar with these examinations, they themselves perform US or fluoroscopy under the supervision of a board-certified radiologist. During their training in interventional radiology, residents usually scrub in on various vascular and non-vascular procedures including general intervention and neuro-intervention. Relatively simple procedures such as fluoroscopy-guided central line insertion, US-guided pigtail catheter insertion or chemoport removal are sometimes performed by a resident under the supervision of a board-certified interventional radiologist. After residents finish 4 years of training, they must pass a certifying exam to become board-certified radiologists. After passing the board exam, they can enter a fellowship training program in a certain subspecialty depending on the area which they wish to gain more expertise.

### Education program

Although case by case teaching is usually done during reviews of preliminary reports by attending staff, there is the need for a generalized form of teaching for residents. Hence, most teaching hospitals have conferences for resident teaching. During a conference, a resident may present educational cases and discuss them with colleagues or attending staff, or may summarize recently published articles to acquire knowledge of recent research trends and to learn how to design future research projects. In addition, residents participate in multidisciplinary conferences with an internal medicine physician, surgeon, oncologist, radiation oncologist, and pathologist. Through such conferences, residents can learn what content needs to be included in future readings and what clinicians expect from radiologists.

In Korea, there are many education programs or categorical courses available to residents on both specific knowledge of each subspecialty and basic quality education such as physics and quality assurance (QA). First, the Korean Society of Radiology (KSR) organizes official educational programs for residents. These programs were set up because the KSR wants all board-certified radiologists to have a basic knowledge of physics and hopes that with these programs radiologists will be better able to control the quality of their work in their individual positions. These programs consist of 6 parts including physics (3 parts), QA (1 part) and anatomy (2 parts). Courses for these parts are held 3 times a year with different topics and the entire program cycles every 2 years. To apply for the board-

certifying examination, a resident must complete these programs at least once before the end of their resident training. Besides the official educational program designed by the KSR, there are many other educational programs held by different societies of associated subspecialties of radiology (such as the Korean Society of Abdominal Radiology) and hospitals. They organize educational programs on specific topics and residents can attend these programs depending on the level of their interest. Imaging conferences are another part of the educational program and are held once or twice a year by every society of each radiology subspecialty. One or two cases are given to 5 to 10 representative residents or junior board-certifying radiologists several weeks before an imaging conference, and these residents or radiologists have to study each case and present how they diagnosed the disease at the imaging conference, similar to the image interpretation sessions during the annual meeting of the KSR (Korean Congress of Radiology, KCR) or the Radiologic Society of North America (RSNA). Through imaging conferences, residents can learn how other residents or junior attending staff are approaching and differentiating diseases based on a certain set of given clues.

There is a nationwide examination for radiologic residents every year in May. This exam consists of an objective test including all subspecialties of radiology, physics, and QA. All residents are evaluated with the same questions regardless of their level of training and are notified of their individual scores after a few months. These results are also sent the chief of their radiology department. Through this exam, the department chair and each resident can see which part an individual resident shows weakness in and can figure out what area needs more study.

### Research activity

Because all residents have to publish at least one article in a Science Citation Indexsci (Expanded) [SCI (E)] indexed journal or radiology-related Korean journal such as the Korean Journal of Radiology (KJR), Ultrasonography, or Journal of the KSR, a resident should perform either clinical or experimental research with attending staff. They may participate in study design, data collection, statistical analysis and manuscript editing. Due to this obligation and opportunity, many residents in Korea have experience in preparing, editing and publishing articles in English journals during their resident training program and finish the program with a foundation for future research activity.

They are also encouraged to submit abstracts to Korean and worldwide annual meetings such as the KCR, Asian Oceanian Congress of Radiology (AOCR), European Congress of Radiology (ECR), or RSNA. If an abstract is accepted, they may receive travel grants from the KSR or their hospital to attend these meetings to present their work and to expand their experiences.

### Optional training activity

Although this is not a generalized training program and training formats may vary, some specific optional training programs are available in certain hospitals. In terms of our hospital training program, residents can further study molecular imaging and physics. Each program consists of a 1-month training period. For the molecular imaging program, a resident is trained in the labs of the radiology department or the medical imaging lab of Yonsei University. Introduction and basic lectures are given by postdoctoral or senior researchers in each lab and sometimes residents participate in recently performed experiments or research. For the physics training course, a resident can study the physics behind MR, CT or US for 1 month and present what they have studied in a bi-weekly conference in front of other residents. By this training program, residents can learn more about medical physics in a broader scope with more depth. There is another opportunity to broaden

knowledge. Our training program gives residents in their fourth year a chance to choose a 1 month elective course. During this elective course, each resident can choose an area for which they have studied or trained and choose to learn anything as long as it is related to radiology. They can train in a specific division of the radiology department, or in another department such as surgery, pathology or internal medicine either in our hospital or in other hospitals. They can also spend 1 month at a local radiology clinic or at a law firm which deal with medical lawsuits. This opportunity may expand the horizon of their work. After 1 month of training, they must give a presentation on their experience in front of other residents and attending staff, resulting in the sharing of diverse experiences. This, in turn, leads to discussions on how our system can be improved by adapting strong advantages of other organizations.

### Summary

The radiology residency program in Korea aims to train residents into not only clinical radiologists, but also researchers and educators and tries to provide various opportunities to expand the knowledge and experience of residents so they can become better radiologists and by doing so, lead to improvement in healthcare service for patients.

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