



Models Help to Provide 24/7 Radiology Coverage in Academic Medical Centers

Written by Emma Hitt Nichols, PhD

There is increasing demand for round-the-clock radiology coverage in academic medical centers, which poses a range of challenges. In this session, presenters reviewed the issues of staffing including scheduling and staff retention, clinical coverage, resident autonomy and training, financial considerations, and balancing clinical needs with academic demands.

ER RADIOLOGY COVERAGE WITH A TELERADIOLOGY BUSINESS

Aaron Sodickson, MD, PhD, Brigham and Women's Hospital (BWH), Boston, Massachusetts, USA, discussed a coverage model in which a teleradiology business is used to support expanded 24/7 radiology coverage at a tertiary, academic, level 1 trauma center.

The emergency radiology section at BWH provides coverage to the emergency department (ED) and multiple other regional hospitals and urgent care centers. Shifts have been added over the years to include round-the-clock attending coverage, with an overlap shift during the busiest period.

The expansion of coverage was made possible by the teleradiology business, which provided increased work volume and revenues to support the hiring of additional attending radiologists at BWH, while also enhancing care at surrounding facilities and strengthening the regional reputation of BWH. However, the teleradiology business adds complexity to the workflow, a need for more information technology support, and new business challenges associated with program administration and customer service. In addition, competition within the mature teleradiology market has resulted in downward price pressures, imparting risk of relying on this source of revenues to maintain 24/7 coverage at BWH itself.

Dr Sodickson presented 3 staffing models to achieve 24/7 coverage, including the option initially used at BWH in which there are separate day and night crews (Table 1). He commented that he would consider a second model, in which all staff members work all shifts, if he were setting up a new program from the beginning. The third model is a hybrid of the first two.

Dr Sodickson also addressed issues of scheduling and compensation. For those working purely overnight shifts, he recommended a 1-in-3 model, with 3 radiologists who cover all nights between them. A 1-in-2 model is not considered sustainable. Because night work must be compensated with time or money, BWH uses an

increasing hourly differential compensation rate from daytime hours (8 AM to 4 PM), to evening hours (4 PM to midnight), and overnight hours (midnight to 8 AM). To support the academic mission, Dr Sodickson encourages use of a hybrid staffing model instead of pure night work. He emphasizes that if academic productivity is expected, it is crucial to hire highly motivated staff, provide sufficient academic time with adequate recovery time after night shifts, and suggest that an academic incentive plan may be helpful to recognize academic effort.

OVERNIGHT RADIOLOGY COVERAGE

Next, Lovleen Kaur Cavanagh, DO, North Shore-Long Island Jewish Health Systems, Manhasset, New York, USA, explained the overnight model used by the North Shore-Long Island Jewish Emergency Radiology Section. They have 12 emergency radiologists who work nights and have radiologists with training in neuroradiology, body imaging, and musculoskeletal imaging; 6 (4 emergency radiologists and 2 residents) work as a team each night. Their current coverage model consists of a cycle of 1 week of work followed by 2 weeks off, for a total of 17 weeks worked each year plus additional bridge shifts. Shifts are 9 and 12 hours for weekdays and weekends, respectively, with staggered coverage during the busiest times.

Using dedicated on-site reading rooms, the emergency radiologists read all ED and inpatient community hospital cross-sectional imaging (not plain radiographs); they also do preliminary reads on tertiary inpatient imaging. Subspecialists in neuroimaging, body imaging, and musculoskeletal imaging divide up the reading according to their specialties. This results in an overall load of approximately 60 and 90 cross-sectional reads per ED radiologist for weekdays and weekends, respectively.

The work is divided up so that 2 ED radiologists at the main campus tertiary hospitals supervise residents, 2 radiologists are assigned to read cases and handle phone calls for the 7 community hospitals in the system, and a teleradiology group is used if there is an overload or other problem. The residents at the tertiary hospitals read cases under supervision and handle phone calls, but their preliminary reports are not sent out. During the middle shift (5 to 9 PM), subspecialists in neuroimaging and body imaging are available at the tertiary hospitals in a staggered shift until 8:30 PM while emergency radiologists arrive at 8:30 PM.

To accomplish academic work, the radiologists have to be motivated to work on their weeks off. However, all

Table 1. Models of 24/7 Coverage

Model	Pros	Cons
Model 1: separate staff work during the day and night shifts	Scheduling is relatively simple	Night crew is under more physiologic stress than day crew Night crew has increased burnout and lower retention (3- to 7-y longevity) Night crew is less academically engaged Limited group cohesion between the 2 separate groups, with potential for conflict about compensation, scheduling, and scope of work
Model 2: night and day shifts shared equally	Easier physiologically than working nights only May improve productivity and engagement (compared with nights alone)	More difficult physiologically than working days only May decrease productivity and engagement (compared with days alone) Scheduling is more difficult. Recovery time after night blocks must be maintained Switching to this model from separate crews may be difficult
Model 3: hybrid of models 1 and 2, partial overlap between groups	Improved group cohesion, understanding of the challenges of all shifts	Scheduling is complex

members are involved in academics. For example, they supervise residents, participate in conferences, and teach medical students. With the addition of a new chair and vice chair of research, they plan to increase research and build the academics over the next few years.

Dr Cavanagh concluded by summarizing advantages and challenges of night work. Benefits include compensation, good workflow, and interesting cases. Challenges include building a sustainable model, handling tight turnaround times, and meeting demands of heavy shifts while balancing home and family responsibilities.

24/7 SUBSPECIALTY COVERAGE USING A HYBRID MODEL

Finally, Syed A. Jamal Bokhari, MBBS, Yale University School of Medicine, New Haven, Connecticut, USA, discussed ways to move to 24/7 subspecialty coverage using a hybrid model while focusing on staffing models and on the academic mission. There is increased demand for imaging in EDs [Levin DC et al. *J Am Coll Radiol.* 2014], combined with pressure for short stays and rapid treatment. Additionally, much of the need for imaging occurs after regular business hours or on weekends; there is a morning peak as imaging may be needed in preparation for morning discharges. Changes in the work done by residents and needs of hospitalists to work throughout the day also affect imaging needs. Even electronic medical records are driving this trend, as clinicians do not want patients to see

Table 2. Coverage at Yale Medical Center

Time Period	Staffing	Subspecialists' Readings Available
Weekdays	1 attending physician in emergency room (moving to 2)	Ultrasounds Pediatric imaging Body imaging Neuro computed tomography angiography Magnetic resonance imaging Nuclear medicine imaging Interventional radiology
Weekends and holidays	2 attending physicians in emergency room 1 neuro fellow and attending physician in house	Subspecialty service available from 8 AM until 12 or 1 PM Chest imaging Ultrasounds Body imaging Musculoskeletal imaging Pediatrics
Evenings	2 attending physicians in emergency room 1 attending available remotely (teleradiologist) 1 neuro fellow and attending physician in house	
Overnights	2 attending physicians in emergency room 1 neuro attending physician in house	

preliminary reports; it is important to be careful regarding what is in the electronic medical records.

As the model at Yale has changed, reliance on generalists and specialists has changed. There is a hybrid model of generalists, subspecialists, and teleradiologists available remotely. Generalists are attending physicians who usually work in a different specialty but sometimes cover the emergency room (ER) or a fellow working in the ER. Non-ER subspecialists provide coverage in areas such as body imaging, pediatrics, musculoskeletal systems, ultrasound, neuroimaging, and nuclear medicine. Emergency radiology subspecialists have fellowship training in the ER and work there predominantly. On weekdays, weekends, and holidays, Yale has subspecialists available and 1 to 2 attending physicians in the ER (Table 2).

Dr Bokhari concluded by addressing the implications of these changes for the academic mission. Reduced need for fellows reduces their workload but also limits their ability to supplement their salaries. It is important to consider ways to increase autonomy for residents [Collins et al. *Acad Radiol.* 2014], to involve residents in as many cases as possible, and to create teaching opportunities for residents. By using creativity and thoughtful planning of educational opportunities, it is possible to maintain the academic mission.