

24/7 Attending Coverage:



Fears and Surprises

Stephanie L. Coleman¹, Nagaraj Holalkere¹,
Julie O'Malley¹, Alexander Norbash¹, Nadja Kadom¹

¹Boston Medical Center, Boston University Radiology
Boston, MA



Boston University
Radiology



Purpose



- Investigate resident and faculty opinions regarding the effect of 24/7 in-house attending coverage on resident education before and after implementation.
- Evaluate the effect of 24/7 attending coverage on radiology reports turn-around- time (TAT).
- Discuss cost/benefit of the 24/7 attending coverage system as a means of quality improvement.



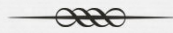
Background



- ☞ There is an increasing trend among academic radiology departments to provide attending coverage 24 hours/7 days a week (24/7).
- ☞ In light of increasing health care emphasis on improving patient care it is conceivable that 24/7 attending coverage would be perceived as leading to improvement in the Institute of Medicine (IOM) areas of patient safety, timeliness of care, ED efficiency, and potentially patient satisfaction.
- ☞ At academic institutions, night call used to be a prime opportunity for radiology residents to perform under the pressure of a preliminary report that affects patient care. Many residents consider this opportunity as crucial in becoming competent and confident as radiologists.



Background



- ☞ In 2013, our hospital administration decided that 24/7 radiology in-house attending coverage was necessary.
- ☞ Night shifts from 7pm to 7am (1 week on, 2 weeks off). Daytime shifts were adjusted to provide continuous coverage of 12 daytime hours.
- ☞ For staffing, 3 FTE with subspecialty training night-time faculty were appointed (2 from existing, 1 new hire).
- ☞ The institution invested \$1M to cover the difference in salaries and the additional FTE.
- ☞ Residents on night shift continued to issue preliminary reports.



Background



- ☞ There was concern that the increased attending presence could diminish residents' opportunities to autonomously manage patients on call at night.
- ☞ We used this opportunity to collect resident and faculty opinions, before and after implementation of the new 24/7 in-house attending coverage system, on how they think the new system could affect resident education, call experience, and patient care.



Methods



- ☞ An 8 items online survey, using Survey Monkey (Palo Alto, CA, US), was constructed and sent out to all radiology residents, fellows, and attending radiologists two weeks prior to the implementation of 24/7 in-house attending coverage.
- ☞ Approximately 6 months after implementation of 24/7 attending coverage, we sent out a second survey to all radiology residents, fellows, and attending radiologists.
- ☞ Each responder gave consent to have their responses anonymously used for publication. There was no benefit or penalty for participation or declining participation.
- ☞ This study did not meet human subjects research criteria.



Pre-Survey Questions



- (1) Level of training? (multiple choice)
- (2) What is your preference regarding the location of the overnight attending?
Same room as residents
Different room than residents
- (3) List which positive and negative effects you anticipate of 24/7 attending coverage for residents
- (4) List which positive and negative effects you anticipate of 24/7 attending coverage for patient care
- (5) What changes do you anticipate in your radiology education with 24/7 coverage?
- (6) What changes do you expect to see in patient care with 24/7 coverage?
- (7) What effects on the radiology residency program do you anticipate from 24/7 attending coverage?
- (8) Please share any comments, concerns, suggestions regarding 24/7 attending coverage



Post-Survey Questions



- (1) What is your level of training? (multiple choice)
- (2) What type of call have you taken since the implementation of 24/7 attending coverage? (multiple choice)
- (3) What is your preference regarding the location of the overnight attending? Please explain why.
In the same room as the residents
In a different room than the residents
- (4) On the matter of on call attendings and residents being together or separated, did you have a different opinion prior to implementation of 24/7 call? (Yes or no; Please explain)
- (5) List and positive and negative effects you experienced with 24/7 attending coverage
- (6) When you think of the positive and negative effects that you considered prior to the implementation of the 24/7 attending coverage, have these changed in any way now that you have experienced the new call system? (Yes or no; please explain)
- (7) Regarding patient care specifically, list the positive and negative effects you experienced with 24/7 attending coverage for patient care
- (8) Regarding patient care specifically, did your opinions change? (Yes or no; Please explain)
- (9) Regarding resident education specifically, list the changes you noticed since the implementation of 24/7 coverage
- (10) Regarding resident education specifically, did your opinions change? (Yes or no; Please explain)
- (11) Please share any other comments, concerns, suggestions regarding 24/7 attending coverage that you have or have experienced



Methods



- ☞ We collected turn-around-time (TAT) data (elapsed time from initiation of a study by the technologist to final dictated report status) for all night-time studies (ED, inpatients, and scheduled outpatients completed between 7 pm and 7 am).
- ☞ We compared TAT before implementation (January 2013-June 2013) and post implementation (July 2013-November 2013).
- ☞ The TAT was tabulated by the following modalities: CT, Radiograph, MRI, and Ultrasound.
- ☞ We determined the percentage of pre-versus post-implementation change in average TAT for each modality.



Pre-Survey Results



Prior to 24/7 in-house attending coverage, the survey showed the following comments on:

- ☞ Preferred attending location
- ☞ Effects on resident education: Attending and resident responses
- ☞ Effects on patient care: Attending and resident responses
- ☞ Open comments: Attending and resident responses



Attending location



Training level	Same room (%)	Different room (%)
Attending	64	36
PGY-5	11	89
PGY-4	33	67
PGY-3	25	75
PGY-2	63	37



Table 1a. Positive and negative comments regarding resident education: Attending Responses

Positives	Negatives
“better education”	“residents less mature in reading and problem solving”
“better real time feedback”	“less daytime education secondary to less attendings around during the day”
“questions and uncertainty can be answered quickly”	“interesting cases may be considered solved at night and not integrated with daytime care” “residents less involved”
“residents less stressed with attending support”	“less opportunity to give feedback/teach from overnight cases”
“assist residents in guiding appropriate imaging and support against inappropriate imaging”	“loss of autonomy and learning curve”
	“less resident learning from overnight experience, too much supervision”

Table 1b. Positive and negative comments regarding resident education: Resident Responses

Positives	Negatives
“more teaching during the day and night”	“less overnight autonomy”
“better understanding of ER radiology”	“less daytime teaching due to fewer attendings around”
“more feedback”	“loss of subspecialty feedback”
“less anxiety”	“less independent reading overnight”
“less attending availability to give conferences”	“less chance for independent learning and reading”
	“reduction in speed and confidence”
	“less ownership in making diagnosis”
	“less opportunity to work through tough cases”

Table 2a. Positive and negative comments regarding patient care: Attending Responses

Positives	Negatives
“faster, more accurate reads, and less changes”	“loss of subspecialty reads”
“reduce patient callbacks”	“down the road poorer patient care because residents not as well trained”
“less time spent in ED by patients”	“increased cost to the health care system”
“fewer delays in diagnoses, missed diagnoses or changes in reports”	“reads being done by two people who are tired”
“improved patient management”	“may drain attending talent with broad cross training needed by overnight attendings”
“better communication/discussion between radiologists and clinical attendings”	“increased use of more complex cross sectional imaging with more false positives”

Table 2b. Positive and negative comments regarding patient care: Resident Responses

Positives	Negatives
“faster diagnoses”	“lose out on sub specialized expertise”
“improved patient care and safety”	“potential for less resident communication”
“finalized reads, improved error rate”	“none”
Reads may be more accurate for complex cases”	“potentially more necessary studies being ordered to ‘rule out’ all possible diagnoses”
“less missed diagnoses, less patient callbacks”	“rush to get studies read may decrease quality of care”
“avoid resident misses that result in adverse patient outcomes”	“increase rate of subtle misses from non subspecialty reads”
“quicker more accurate reads”	
“improved care secondary to fewer over calls and misses leading to more rapid clinical decision-making”	

Table 3a. Positive and negative comments regarding the overall experience of 24/7 call coverage: Attending Responses

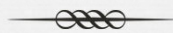
Positives	Negatives
“Improved experience for residents”	“residents will not have the same sense of independence on call, which helps to build confidence”
“possible attract more radiology candidates to the program”	“Shifts are too long for overnight attendings”
“decrease resident stress”	“fixes the problem of resident errors, but replaces it with the problem of loss of subspecialty read”
	“less autonomy for residents”
	“Not truly better for patient care, just shifts liability”
	“could degrade opportunity for consultations with referring services”
	“poorer overall experience and less training of how to handle emergencies”
	“expectation of no errors is unrealistic”



Table 3b. Positive and negative comments regarding the overall experience of 24/7 call coverage: Resident Responses

Positives	Negatives
“less stressful”	“limits resident autonomy and independence”
“ more teaching, 24/7 education”	“ change in dynamic between residents and attendings”
“ good back up for high volume call”	“less confidence for residents at night making final reads”
“improved clinical judgment and real time feedback”	“possibly less volume for residents”
“ able to ask questions directly, especially for more complex cases”	“confidence built more slowly knowing there is always someone over reading your study”
“less stress for second year residents”	“clinicians may bypass residents for consults”
“faster turnaround, backup, increased attending-clinician communication, certainty for clinicians/patients, fewer callbacks”	“residents can punt difficult calls to the attending”
“ more teaching on acute/emergency radiology”	“feedback to residents will be less educational, not subspecialist read”
“more teaching at the workstation”	“attendings doing primary reads off the list, decrease resident experience”
“improved clinical decision making”	“less real time pressure for residents”
“better for patient care”	“attending presence can be distracting”

Post Survey Results



After implementation of 24/7 in-house attending coverage, the post survey showed the following comments on:

- ☞ Preferred attending location
- ☞ Effects on resident education: Attending and resident responses
- ☞ Effects on patient care: Attending and resident responses
- ☞ Open comments: Attending and resident responses



Attending location



Training level	Same room (%)	Different room (%)
Attending	50	50
PGY-5	29	71
PGY-4	33	67
PGY-3	75	25
PGY-2	75	25



Table 4a. Positive and negative comments regarding resident education: Attending Responses

Positives	Negatives
“one to one live feedback”	“fewer attendings during the daytime for resident interaction and to attend conferences”
“review of even small misinterpretations”	“less daytime attending coverage”
“loss of resident independence”	“resident speed and autonomy take longer to develop”
“increased willingness to consult on difficult cases prior to dictating”	“less reading and studying by residents”
“less anxiety to take call”	
“better resident education”	



Table 4b. Positive and negative comments regarding resident education: Resident Responses

Positives	Negatives
“fewer changes in final dictations”	“lack of subspecialty teaching, residents can get away with being less specific”
“more teaching by attendings”	“loss of resident independence on making decisions”
“immediate feedback”	“residents are less likely to look things up on their own”
	“call is no longer the same growing experience”
	“decreased responsibility of the resident”
	“younger residents with lower motivation”
	“residents are relying on having an attending read their study shortly after they dictate, less struggle or concern for being wrong”

Table 5a. Positive and negative comments regarding patient care: Attending Responses

Positives	Negatives
“final reads”	“decreased day time coverage”
“less misses, no recalls, flexible protocols”	“non specialist reads for complex cases”
“fewer false negatives”	“none”
“quicker attending reads”	“less specialized reads creates more errors”
“patients may be receiving needed care quicker”	
“efficient patient care”	
“less addendums and problems with patient management”	
“fewer callbacks”	
“fewer resident misses”	



Table 5b. Positive and negative comments regarding patient care: Resident Responses

Positives	Negatives
“prompt attending read”	“lack of subspecialist reads”
“attending picks up misses quicker”	“changes to reports by attendings that are inaccurate or subspecialist changes to reports the next day”
“patient benefits due to fewer delays and missed diagnoses”	“possibility of long term misses or never calls by non-subspecialty read”
“less overnight misses by residents”	“no negative effects”
“no more changes to the read in the morning that result in a delay of care”	“overnight attendings are less willing to challenge inappropriate studies”
“subtle findings caught by attendings”	
“increased turn around and more than one set of eyes on emergent cases”	



Table 6a. Positive and negative comments regarding the overall experience of 24/7 call coverage: Attending Responses

Positives	Negatives
“more supervision”	“decreased daytime teaching in trauma”
“good one to one education and improved patient care”	“less independence for residents to formulate opinion on cases”
“fewer delays in diagnosis”	“loss of subspecialty interpretation”
“increased direct resident supervision off hours”	“loss of resident autonomy and speed”
“errors caught sooner”	“decreased RVUs for daytime staff”
“rapid turn around of reports”	“less responsibility for residents”
“direct resident feedback”	



Table 6b. Positive and negative comments regarding the overall experience of 24/7 call coverage: Resident Responses

Positives	Negatives
“less stress”	“less learning all around”
“additional daytime teaching with the attendings more available”	“less motivation to find the answer yourself”
“instant feedback”	“increased work for residents with the removal of the 5-9 attending to read plain films”
“decrease the amount of call backs”	“attendings overnight create more busy work for residents”
“a sense of improved patient safety”	“overnight attendings are distracting to residents”
“easy to ask questions, which are answered quickly”	“loss of more accurate subspecialty read”
“back up if needed”	“less resident independence”
“improved educational experience, especially for feedback on minor details”	“attendings don’t let residents form opinions on cases on their own”
	“attendings disrupt overnight resident workflow”
	“decreased learning experience, responsibility, and critical thinking of residents”
	“attendings too available to ask questions”
	“over night resident feels second guessed, useless, unnecessary”

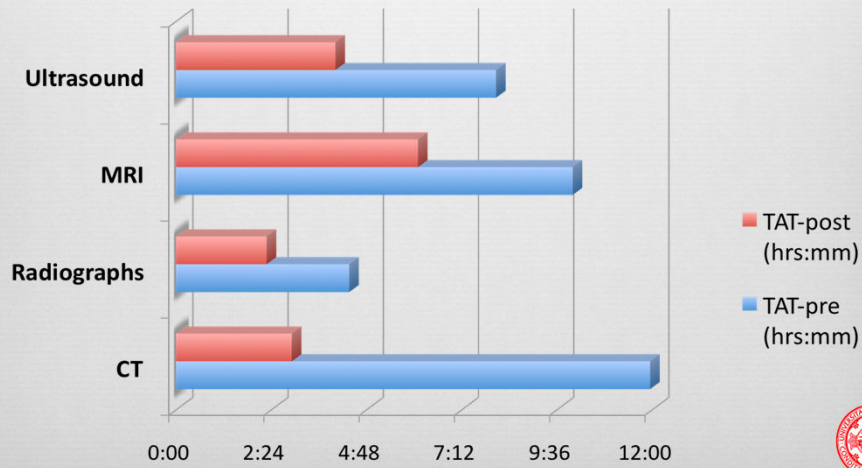
Results:

Turnaround time for reports by imaging modality

Modality	TAT pre (hrs:mm)	TAT post (hrs: mm)	Percent change (%)
CT	11:57	2:55	-76
Radiographs	4:22	2:17	-48
MRI	10:00	6:06	-39
Ultrasound	8:04	4:01	-50

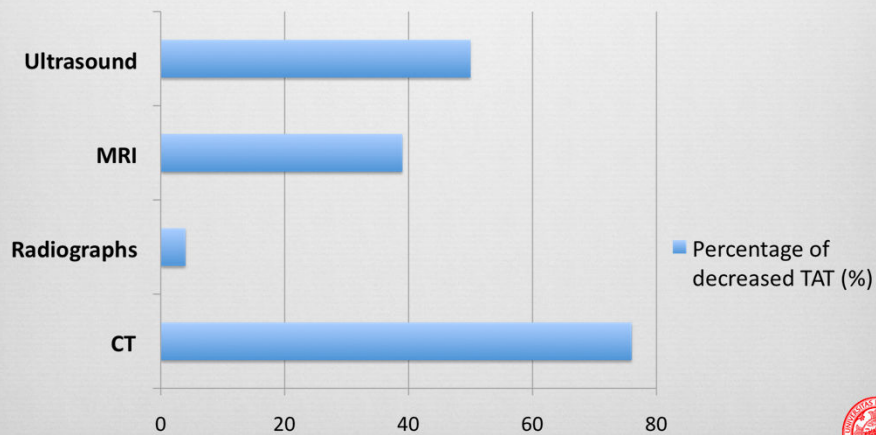
Results:

Turnaround time for reports



Results:

% of decreased TAT



Results Summary



- ❧ There is a mixed response on the overall experience of 24/7 in house coverage by both attendings and residents.
- ❧ Post implementation, there was an increase in the percentage of attendings who felt the location of the overnight attending should be a different room. Where an increased percentage of junior residents (PGY-2 and PGY-3) on the post survey, thought the attending should be in the same room.
- ❧ Both residents and attendings stated they noticed decreased independence, autonomy, self motivation, and speed of junior residents.
- ❧ There was significant decrease in TAT in every measured modality, the greatest difference seen in CT.



Discussion



- ❧ The 24/7 in-house attending coverage system was successfully implemented, eliminating overnight pager, except for pediatric and interventional radiology.
- ❧ The system required a significant financial commitment investment from the institution (\$1M).
- ❧ The impact on resident education is currently not measurable, but it was observed that there was decreased autonomy, self-motivation, and speed of residents during night call.
- ❧ TAT were dramatically improved, which could result in decreased length of stay for patients in the ED and improve timeliness of care, ED efficiency, and potentially patient satisfaction.



Discussion



It is not clear if patient care was improved because:

- ❧ We could not measure how many errors the attendings corrected in residents' preliminary reports. The literature regarding clinically important missed findings in preliminary radiology reports shows a very low "miss" rate for residents between 0.5% to 2% [Ruutiainen 2011] and one study demonstrated a small, but statistically significant, decrease in discrepancy rates by R3 and R4s compared to R1 and R2s [Tomich 2013].
- ❧ We were unable to establish an overnight attending error rate. A study showed when night-time subspecialist attendings reading studies that are not their specialty, they have error rates similar to radiology residents [Branstetter 2007].



Limitations



- ❧ We were unable to track times from study completion to preliminary report.
- ❧ Direct effect on quality of patient care in terms of morbidity, mortality, wait times in the emergency department, or length of hospital stay could not be determined as we did not have access to those metrics.
- ❧ We did not have an assessment tool for measuring level of confidence and autonomy in radiology residents on night call.



Conclusions



- ❧ The 24/7 in-house attending coverage system can be successfully implemented but requires a significant financial commitment.
- ❧ The opportunity for radiology residents to practice independently and at a higher level of responsibility is severely compromised in a 24/7 in-house attending coverage system. This is due to the physical availability of the attending to whom all questions can now immediately be escalated.
- ❧ Report TAT can be dramatically improved, but it is difficult to link this improvement to improved patient care (decreased length of stay, timely care, efficiency in the ED, patient satisfaction).



Future Challenges



- ❧ Within our own institution, there have now been requests to completely prevent residents from issuing preliminary reports on call at night.
- ❧ This would further diminish resident opportunities to develop the skills of practicing and thinking independently. Medical educators need to develop alternate methods of building these skills in our trainees.
- ❧ In addition, placing the burden of preliminary reports entirely on the attending could result in delay of finalized reports, increased time pressure for the attending, and potentially thereby increasing attending errors.



References



- ☞ Ruutinen A.T., Scanlon M.H., Itri J.N. Identifying benchmarks for discrepancy rates in preliminary interpretations provided by radiology trainees at an academic institution. *JACR*. September 2011 8;9:644-648.
- ☞ Tomich J., Retrouvey M., Shaves S. Emergency imaging discrepancy rates at a level 1 trauma center: identifying the most common on call resident “misses”. *Emerg Radiol*. 2013 20:499-505.
- ☞ Branstetter IV B.F., Morgan M.B., Nesbit C.E., Phillips J.A., et al. Preliminary Reports in the Emergency Department: Is a Subspecialist Radiologist More Accurate Than a Radiology Resident? *Academic Radiology*. February 2007 14;2:201-206.
- ☞ **Contact Information:** Stephanie L. Coleman MD, MPH
scoleman82@gmail.com

