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# The Radiology Elective: The Medical Students Perspective

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## Abstract

### ABSTRACT

As the future of radiology depends increasingly on how well it delivers imaging service to the clinical caretakers, we undertook a survey to assess the basic perceptions that medical students have before they do a radiology clerkship to identify those attitudes that we can at least try and influence during a 4 week imaging elective. The greatest danger to radiology's future lies in ignoring that a significant minority of medical students view us as noncontributory, and that our call to arms should be addressed in the rooms of the medical school.

## INTRODUCTION:

Traditionally, in a radiology medical student rotation, whether mandatory (clerkship) or optional in a medical school curriculum, the objectives of the Radiology Department have consisted of three primary goals: 1) demonstrating the complexity of the profession in order to provide useful consultation, 2) teaching respect of the radiology profession and avoid the slightly changing attitudes towards it, and 3) recruitment of top quality potential residents in radiology. These goals have been largely the impetus for determination of the curricula in these electives.

Unfortunately, there has been extensive data indicating that most medical students, (greater than 90%) expect to interpret radiographs or other medical images themselves, with few expecting to correlate their impression with a radiologic report [1]. Longitudinal studies demonstrate surprisingly little change in the perception of radiology throughout the medical school experience [2] and suggest that the basic attitudes concerning radiology are formed early in medical school and are affected only moderately during a senior year imaging elective [3]. Even extensive multi-institutional surveys demonstrated no significant difference in attitudinal change regardless of clerkship, organization or structure [4].

As the future of radiology depends increasingly on how well we deliver imaging service to the clinical caretakers, we undertook this survey to assess the basic perceptions that medical students have before they do a radiology clerkship to identify those attitudes that we can at least try and

influence during a 4 week imaging elective in order to have an end-product of students who will be more mindful of the use and efficacy of radiologic consultation. In particular, rather than an assessment of the profession as other studies have done in the past, the survey was designed to assess each student's learning goals prior to taking the elective. The objective consisted of identifying possible variables and thus be able to improve or modify the attitudes of future medical practitioners towards seeking radiologist consultation in imaging interpretation.

## METHODS:

An open format questionnaire, consisting of 4 questions, was provided to medical students at the beginning of their radiology clerkship as part of their pre-test the first morning of the clerkship. This clerkship is a mandatory rotation, generally taken during the senior year, and is taken after the medical student has taken their core medicine and surgery as well as pediatrics rotations. The questions are delineated in table 1. Over a period of 19 months [1997-1999], a total of 142 students completed the survey and the data was tabulated. The numerical response questions were analyzed by three independent observers and consensus was formed with a simple histogram plotting. The open-ended questions were reviewed by the three observers and a total of 6 categories could be constructed into which the answers could be sorted based on consensus opinion.

## RESULTS

### QUESTIONNAIRE

All 142 questionnaires were filled out correctly with at least

a single response to all questions, none had more than 2 responses.

### **RADIOLOGISTS WORKING HOURS**

The perception of the radiologists working hours were clearly relatively distributed along a bell curve with the mode and mean being approximately 50 hours of work per week. There was a relatively large spread from 30 to 85 hours.

### **RADIOLOGISTS WORK LOAD**

An estimation of the number of cases or films read per day by the radiologists appears to demonstrate a bi-modal response with a majority of students feeling that there was a mean of approximately 55 films that would be read by the typical radiologist per day, but a second significant population having the perception that a radiologist typically interprets over 100 radiographic studies per day.

### **STUDENT EXPECTATIONS FROM THE RADIOLOGY ROTATION**

As many students put down more than one response as to their expectations of radiology the total responses shown in figure 3 add up to greater than 142. The vast majority [133/142] of students do express the desire to learn the interpretation of plain radiographs, with a significant percent [95/142] hoping to be able to learn the cross-sectional imaging studies, such as CT, MR and Ultrasound. Approximately 45% realize that this clerkship is an opportunity to be able to learn decision making skills thus enabling radiology to stress education on the role of the radiologist as a consultant. A minority [35/142] feel that the clerkship is an opportunity to review anatomy and pathology and even physiology, a group of future clinicians that potentially could be a solid advocate for the field of imaging once they enter practice. A very small number feel that the clerkship is an opportunity for career interest [7/142].

### **THE STUDENTS VIEW ON RADIOLOGISTS RESPONSIBILITY**

Again, note the number of responses is greater than 142, due to the fact that many students put down multiple responses on this question. The vast majority felt that the radiologists function consists of reviewing imaging studies and in essence provide their interpretation. Approximately 45% recognized the role of the radiologist as a consultant, but the majority not noting this demonstrates a gap to be filled by the radiology clerkship. Though approximately one-third felt that radiologists are available to perform interventional

studies of any kind, a number this small raises concern for how visible interventional aspects of imaging are. Most concerning however, is the approximately 10% that indicate that radiologists provide no significant contribution to patient care! Which was explicitly stated as 'noncontributory', 'none', 'not important' or 'nonsignificant' in all of these responses. Two percent felt that radiologists had responsibility in teaching and research and that this was one of their main contributions.

### **DISCUSSION**

Longitudinal studies demonstrate that approximately 70% of students will change their choice of medical specialty after entering medical school [2], with a small percent choosing radiology, and that these choices are based on multi-dimensional factors that may be related to personality issues [5], inherent personality orientation, [6] as well as actual recruitment of students within the medical school. The radiology elective does not appear to have an impact on this process [7]. There is some evidence that student indebtedness does not appear to affect the choice of radiology in particular as a career [8], neither is there a significant difference in honors graduates choosing one specialty over another [9, 10]. There is a relatively persistent percent (7.4%) of students that, based on inherent personality characteristics rather than recruitment factors, will select radiology. This decision is self-initiated and seems to be made well before exposure to the radiology elective or the particular faculty [11].

The literature data further suggests a weak impact of the medical student radiology elective [1] on the attitudes among medical students that, despite taking a 4 week elective in imaging, they expect to independently interpret their own radiographs in their clinical practice. Even though mandatory clerkships have demonstrated to the students that being familiar with what happens in a radiology department may be very useful and important for their practice and their patients, the change from a mandatory clerkship to an imaging elective at schools such as Albert Einstein College of Medicine, have been shown to not affect student career choice [12]. As to the potential impact on future turf protection, some students completing their clerkship have been quite convinced that it enhances patient care if radiologists play an increasingly active role as an imaging consultant [4]. Finally, others suggest that clerkship learning actually may contribute to a reduction in overall medical costs as the ordering of more appropriate radiology procedures may be more efficient, in the end resulting in improving overall cost management within a hospital [13]. As

student interaction with faculty increases [14] to a more one-on-one interaction with faculty this appears to improve the reputation of the radiology elective, as does a direct contact approach [15]. A study by du Cret [16] further demonstrated retrospectively that prior imaging knowledge, however basic, was noted to be indispensable for when the medical student became a house officer, as the majority of attending clinicians assume a modicum of imaging knowledge already present. Having this knowledge at their fingertips at the appropriate time then boosts the fledgling house officer's medical decision making confidence.

Our objective for the radiology clerkship at our School of Medicine is communicated at the beginning of each clerkship by the director and can be found on the website: 1. to gain an appreciation of what an imager does and can do for you, the clinician, 2. to begin to realize how inculcation of clinical facts can lead to more efficient and directed imaging studies, and 3. to become familiar with the radiologist as a consultant. Our results seem to show that we have a difficult task before us. We need to become more visible, lead by example and generally start to function more as a part of the clinical care taking team. Only when medical students see how useful a well-integrated imaging specialist can be from day one of their medical school career can we hope to achieve the two goals of any academic radiology department with regard to medical student education: attract the best and the brightest to a career in radiology and establish the imaging department as the central hub of medical decision making.

The greatest danger to radiology's future lies in ignoring that a significant minority of medical students view us as noncontributory, and that our call to arms should be addressed in the rooms of the medical school; not the clinical wards of the hospital. In particular radiology should be more involved in the boardroom of the admissions committee and in the classrooms of the first year medical students. Through aggressive teaching of preclinical medical students do we have the best opportunity to inculcate a respect of the radiologist as a consultant. Similar integration with anatomy and physiology courses gives us the opportunity to convey the complexities of imaging to foster future turf protection. Lastly by demonstrating our problem solving expertise- perhaps with integration of decision analysis we establish the need for consultation prior to rather than after imaging has begun.

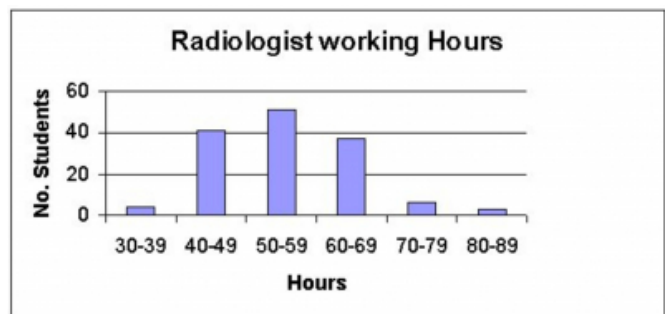
Table 1:

Table 1: Questions in survey.

1. A radiologist is someone who...
2. A radiologist reads .... studies a day
3. A radiologist works ..... Hrs a week
4. I expect to learn .... During my elective.

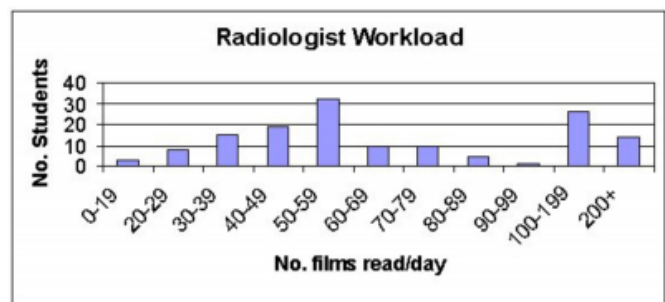
**Figure 1**

Figure 1: Medical students perception of workload, in terms of hours worked per week



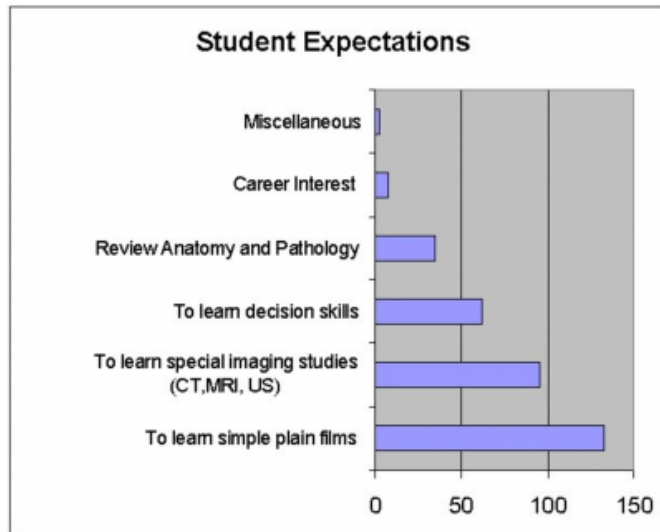
**Figure 2**

Figure 2: Medical students perception of workload, in terms of number of films read per day



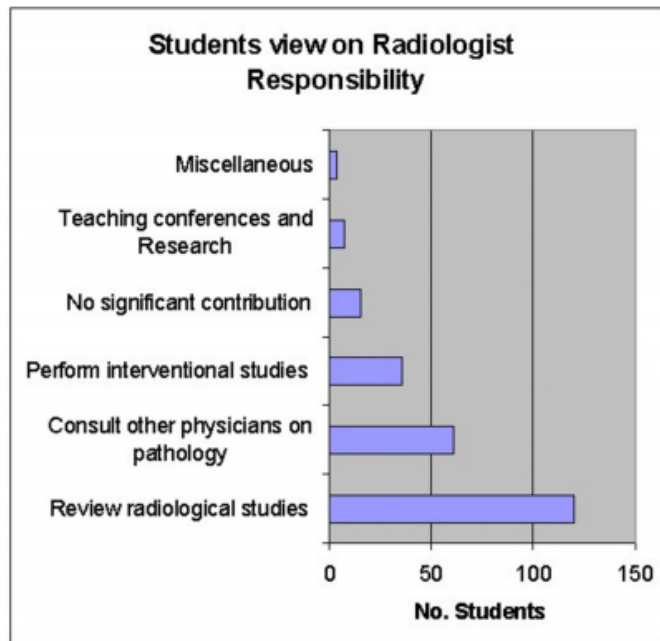
**Figure 3**

Figure 3: Medical students expectation of learning goals during radiology rotation



**Figure 4**

Figure 4: Medical students perception of what the responsibilities of a radiologist are prior to a Radiology rotation



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