How We Teach US Medical Students to Negotiate Uncertainty in Clinical Care: A CERA Study

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BACKGROUND AND OBJECTIVES: The patient relies on the physician to help negotiate medical evidence, particularly when experts disagree. For shared decision making to be most effective, the physician must disclose personal uncertainty. This study proposes to describe how uncertainty management is intentionally and systematically taught to medical students.

METHODS: A cross-sectional survey was administered to all family medicine clerkship directors (FM CDs) at US allopathic medical schools. Items evaluated the teaching of uncertainty in two domains (instruction and modeling).

RESULTS: Eighty-six of 134 (64.18%) FM CDs surveyed completed the survey. Overall, an average of 2.6 hours was devoted to learning about clinical guidelines. The teaching objective addressed least by this sample was discussing uncertainty with the patient. Most curricula do not engage the medical students in how to discuss uncertainty with patients. Hypothesis testing revealed that the clerkship’s general attitude toward the importance of teaching students how to deal with competing medical evidence is associated with both instruction and modeling behavior.

DISCUSSION: FM CDs demonstrate a positive attitude toward teaching students how to deal with competing evidence. Clerkships do provide students with the opportunity to see faculty engage in uncertainty discussions with patients. Opportunities exist to improve medical student competence in discussing uncertainty in a productive manner. Clerkship directors influence curriculum development and implementation but through their attitude also construct a culture that can be positively aligned with teaching medical students how to negotiate uncertainty in clinical care.

Physicians handle different types of uncertainty, including the scientific uncertainty of the efficacy of different testing and treatment options, the systems-centered uncertainty that arises as patients and providers navigate the health care system, and the patient-centered uncertainty of how any given intervention might work for a specific individual. The physician also has to grapple with his/her own personal uncertainty, due to a lack of knowledge or experience. Physicians may hesitate to reveal uncertainties for fear of losing credibility with the patient or because the physician may not know if this uncertainty is shared by other clinicians. However, physicians also lose credibility by not discussing their decision-making.

For shared decision making to be most effective, the physician and the patient must disclose uncertainty so that they can negotiate that uncertainty together. Smith and colleagues recommend focusing on how to communicate the uncertainty to patients in order to help patients manage it. The patient relies on the “trusted” physician to provide expertise in navigating through scientific, systems-centered, and patient-centered uncertainties.

Every published clinical practice guideline acknowledges uncertainty by grading the supporting evidence. Major medical organizations have clinical practice guidelines that differ substantially on common health care recommendations, such as the best approach to breast cancer screening. Different experts can examine the same data...
and come to a variety of interpretations. Adding to the complexity, multiple modalities of breast cancer screening (breast self-examination [BSE], clinical breast examination, and radiography) provide a complex system of screening behaviors, each with their own set of efficacy and guidelines. The US Preventive Services Task Force (USPSTF) attempts to take this uncertainty into account and recommend a personal discussion with patients where medical science cannot offer a clear answer, within the guideline itself, “The decision to start regular, biennial screening mammography before the age of 50 years should be an individual one and take patient context into account, including the patient’s values regarding specific benefits and harms.” Applying personalized medicine to the context of screening, patients must navigate personalized risk probabilities when discussing screening behaviors. It is not clear that the average clinician has been appropriately trained to adequately recognize and discuss the various types of uncertainty surrounding breast cancer screening.

Educators teach clinical decision making, such as heuristics and Bayesian theory, but Hall posits that teaching medical students about the role of uncertainty can improve their clinical decision making. If medical educators are to produce effective physicians, they must also teach learners to negotiate uncertainty in partnership with patients. Previous findings show that when medical students express uncertainty in standardized patient encounters, the patients perceive it negatively. Students must learn to incorporate patient preferences, personal heuristics, and the limits of medical science into their decisions and their discussions. Evans et al propose that the third year of medical school is the optimum time to develop skills for how to react to uncertainty. The family medicine clerkship, traditionally in the third year of medical school, is a student’s first and potentially defining clinical rotation in family medicine. This clinical experience socializes students to the normative behavior of discussing uncertainty with peers and patients in the context of family medicine.

Kanter et al have outlined model curricular components designed to address these principles. However, it is not known how, or how frequently, communicating uncertainty is intentionally and systematically taught to students. This exploratory study was designed to assess how family medicine clerkships teach and/or model communicating uncertainty to medical students.

As exploratory research questions, the individual characteristics of the clerkship director could influence these self-reported outcomes. Therefore, we will assess if gender and years of medical practice are related to the instruction and modeling of uncertainty. We will determine whether there is a relationship between the FM CD gender and years of practice and the clerkship’s instruction and modeling for negotiating uncertainty in clinical care. Since FM CD attitudinal factors influence how medical students are socialized to negotiate uncertainty in clinical care, we will determine whether clerkships that assign importance to teaching students how to deal with competing medical evidence are more likely to devote formal clerkship curriculum time to teaching objectives related to negotiating uncertainty, are more likely to use methods of instruction in teaching objectives related to negotiating uncertainty and competing evidence and if they are more likely to model how to negotiate uncertainty in clinical care than clerkships that do not assign importance.

Methods
This is a cross-sectional survey of family medicine clerkship directors administered by the Council of Academic Family Medicine Educational Research Alliance (CERA). The study was approved by the American Academy of Family Physicians Institutional Review Board.

Participant Recruitment
Family medicine clerkship directors (CDs) at allopathic medical schools in the United States were identified for participation. There is no centralized list of clerkship directors, the following strategy was used to identify potential respondents. Names and contact information of CDs were verified by a task force of the Society of Teachers of Family Medicine (STFM) Group on Medical Student Education. Information about the schools, such as public versus private status and region, was obtained from the Association of American Medical Colleges web site.

Data Collection
The survey was conducted between July and September 2012 through the infrastructure of STFM. The potential respondents were surveyed electronically with an initial email invitation for participation. Nonrespondents were sent up to two follow-up emails encouraging participation. It was possible for respondents to skip questions. We restricted this analysis to individuals who answered the questions about uncertainty in medicine.

Measures
Clerkship structure and clerkship director demographic variables were part of the omnibus survey. These included the CD’s gender, years since residency completion, and years as clerkship director and clerkship-descriptive measures: length of clerkship. A 5-point Likert-type item assessed the value assigned to negotiating competing evidence: “Our program feels that teaching students how to deal with competing medical evidence is important.” For chi-square and analysis of variance (ANOVA) tests, the item was transformed to bimodal (agree/strongly agree versus strongly disagree/disagree/neutral) responses.
To assess instruction of negotiating uncertainty in clinical care, FM CDs were asked the number of hours for this question: “How much formal curriculum time (do not include precepting time) in the family medicine clerkship is devoted to the following objectives?”

- Apply guidelines when guidelines disagree.
- Apply guidelines to the care of a specific patient.
- Debate scientific evidence effectively with peers and faculty.
- Discuss with the patient any uncertainty in the assessment and plan.

- Discuss uncertainty in care of a specific patient with peers and faculty.

For the same set of five course objectives, the second question asked, “What methods of instruction do you use to teach the following objectives? (Check all that apply).” Answer options included lecture/seminar, workshop, simulated patient event, readings, virtual patient cases, project, and N/A. For hypothesis testing, we used two measurements—a bimodal variable (uses a method of instruction to teach objective/does not use a method of instruction) and the continuous outcome of the amount of time devoted to teaching the objective.

Additionally, three Likert-style items assessed modeling behaviors related to competing evidence and uncertainty. Respondents indicated agreement on a 5-point scale, from strongly disagree to strongly agree. (See Table 3.) Three of these items were adapted from the Physicians’ Reaction to Uncertainty Scale to assess the modeling behavior of faculty members.

**Data Analysis**

Descriptive analyses were conducted to describe how much time and what methods of instruction are used to address the teaching objectives. Quantitative analyses were conducted using the SPSS Version 22.0. Tests of statistical significance were set at a predetermined alpha level of 0.05 (two-tailed).

### Results

Eighty-six of 134 (64.18%) family medicine clerkship directors surveyed completed this question set on the online survey. Table 1 presents clerkship and individual CD characteristics. For the research questions, no individual differences were detected on the dependent variables.

Table 2 presents curricular time devoted to teaching objectives and methods of instruction by objective. The teaching objective that received the most devoted curriculum hours was “apply[ing] guidelines to the case of a specific patient.” Conversely, the teaching objective, “discuss[ing] with the patient any uncertainty in the assessment and plan” received the least mean hours of instruction. This indication of lower priority was also indicated by the fact that 38.4% of FM CDs did not report a method of instruction for the teaching objective. The most cited method of instruction was lecture/seminar.

Most respondents indicated that their programs felt it was important to teach students how to deal with competing evidence, with 87.3% indicating some level of agreement. The most used modeling behavior was...
medical students seeing faculty talk to patients about non-definite diagnoses. A majority of clerkships also modeled sharing personal uncertainty (77.9%) and discussing competing options with peers (72.1%). Table 3 presents frequencies. For hypothesis one, chi-square tests revealed no association between perceived importance and the instruction of any of the five teaching objectives. However, for hypothesis two, ANOVA showed an association between perceived importance and time devoted to one teaching objective. Clerkships that assigned importance to teaching students how to deal with competing evidence devoted more instruction to “discuss[ing] with the patient any uncertainty in the assessment and plan” (M=1.59 hours) than clerkships that did not assign importance (M=.60 hours), F (1, 79)=5.39, P=.02. For hypothesis three, correlation testing revealed significant associations between perceived importance and two modeling behaviors. Clerkships that assigned greater importance to teaching medical students how to deal with competing medical evidence were more likely to encourage students to debate medical evidence with peers and faculty, Pearson’s r=.634, n=86, P=.000. Second, clerkships that assigned greater importance were more likely to indicate that students see faculty discuss non-definite diagnoses with patients, Pearson’s r=.322, n=86, P=.003.

**Discussion**

As the first study of how clerkships teach students to negotiate uncertainty in clinical care, this study provides novel insight into how family medicine clerkships are teaching guideline use and uncertainty management to medical students. CDs estimated that their curriculum offers an average 2.6 hours devoted to learning about clinical guidelines, the topic with the longest duration. Lectures/seminars, virtual patient cases, and workshops were the most frequently cited methods of instruction. Discussing uncertainty with the patient or with peers and faculty received the least curricular time. For these two teaching objectives, 38.4% of CDs did not include discussing uncertainty with patients and 37.2% of CDs did not include discussing uncertainty with peers and faculty in their curriculum. In terms of methodology, only 14% of CDs reported using SP events, and 24.4% reported using virtual patients cases; therefore, over half of all clerkships are missing an opportunity to use these methods well suited to help learners develop competencies related to guideline recommendations and uncertainty management, such as listening attentively, having a compassionate presence, and providing patient-centered communication.

Similarly, a generally positive attitude toward teaching students how to deal with competing evidence is challenged by less actual learning opportunities. Results here show that clerkships are giving students the opportunity to see faculty engage in uncertainty discussions with patients, but students are less likely to hear faculty share personal uncertainty or see faculty talk to each other about competing options. Increasingly, the outcome of medical evidence debates is guidance for the physician to have an “informed discussion with the patient.”

<table>
<thead>
<tr>
<th>Teaching Objective</th>
<th>Mean Hours (SD)</th>
<th>Lecture/Seminar (%)</th>
<th>Workshop (%)</th>
<th>SP^* Event (%)</th>
<th>Readings (%)</th>
<th>VP† Cases (%)</th>
<th>Project (%)</th>
<th>N/A‡ (%)</th>
</tr>
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<tbody>
<tr>
<td>Apply guidelines when guidelines disagree.</td>
<td>1.18 (1.54)</td>
<td>47.7%</td>
<td>10.5%</td>
<td>5.8%</td>
<td>18.6%</td>
<td>33.7%</td>
<td>10.5%</td>
<td>22.1%</td>
</tr>
<tr>
<td>Apply guidelines to the case of a specific patient.</td>
<td>2.35 (2.61)</td>
<td>43%</td>
<td>12.8%</td>
<td>20.9%</td>
<td>16.3%</td>
<td>43%</td>
<td>10.5%</td>
<td>14%</td>
</tr>
<tr>
<td>Debate scientific evidence effectively with peers and faculty.</td>
<td>1.85 (2.40)</td>
<td>38.4%</td>
<td>16.3%</td>
<td>2.3%</td>
<td>7%</td>
<td>14%</td>
<td>18.6%</td>
<td>32.6%</td>
</tr>
<tr>
<td>Discuss uncertainty in care of a specific patient with peers and faculty.</td>
<td>1.36 (2.13)</td>
<td>31.4%</td>
<td>14%</td>
<td>5.8%</td>
<td>2.3%</td>
<td>19.8%</td>
<td>8.1%</td>
<td>37.2%</td>
</tr>
<tr>
<td>Discuss with the patient any uncertainty in the assessment and plan.</td>
<td>1.16 (1.95)</td>
<td>29.1%</td>
<td>5.8%</td>
<td>14%</td>
<td>4.7%</td>
<td>24.4%</td>
<td>7%</td>
<td>38.4%</td>
</tr>
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^* SP—standardized patient  
† VP—virtual patient  
‡ N/A indicates no instruction of topic
Table 3: Attitude and Modeling Behaviors

<table>
<thead>
<tr>
<th></th>
<th>Mean* (SD)</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our program feels that teaching students how to deal with competing medical evidence is important.</td>
<td>4.17 (.71)</td>
<td>0</td>
<td>2.3%</td>
<td>10.5%</td>
<td>54.7%</td>
<td>32.6%</td>
</tr>
<tr>
<td>Our faculty physicians tell medical students when they (faculty) don’t know the “right” answer about diagnosis and/or treatment.</td>
<td>4.07 (.72)</td>
<td>0</td>
<td>0</td>
<td>22.1%</td>
<td>48.8%</td>
<td>29.1%</td>
</tr>
<tr>
<td>Our medical students see faculty physicians talk to each other about competing options when trying to figure out a diagnosis or treatment.</td>
<td>3.81 (.73)</td>
<td>0</td>
<td>4.7%</td>
<td>23.3%</td>
<td>58.1%</td>
<td>14%</td>
</tr>
<tr>
<td>Our medical students have the opportunity to see faculty physicians discuss non-definite diagnoses with their patients.</td>
<td>4.15 (.71)</td>
<td>0</td>
<td>2.3%</td>
<td>11.6%</td>
<td>54.7%</td>
<td>31.4%</td>
</tr>
</tbody>
</table>

* Scale of 1 to 5 where 1 is strongly disagree and 5 is strongly agree.

common answer sounds simple at face value but does not acknowledge questions of how the physician negotiates uncertainty prior to or following that medical discussion. Wear observed, “Too often, students witness attending physicians who are struggling with their own feelings of uncertainty and vulnerability, for themselves and their patients, and fail to communicate such feelings with students who are learning from them.”

Through observational learning, when a learner sees the actions of another person and the reinforcement responses that person receives, medical students can begin to develop skills of communication about uncertainty with patients. Here also lies an opportunity for interactive experiences with standardized patients as medical students can apply lessons learned through discussions with peers and faculty in an observed clinical encounter. Instruction should be informed by evidence-based recommendations on how to express uncertainty.

In the learning environment, some students may not be ready, because of their beginning clinical knowledge, to discuss uncertainty with patients. Therefore, the first finding in interpersonal contexts may be an indicator of appropriately tailoring learning to the learner. Innovative techniques such as structured debate can provide an opportunity for students to increase knowledge while practicing communication skills.

Hypothesis testing revealed that the clerkship’s general attitude toward the importance of teaching students how to deal with competing medical evidence is associated with both instruction and modeling behavior. Students who complete clerkships in programs that have a positive attitude are more likely to receive instruction on how to discuss uncertainty with patients and are more likely to have seen models of debating medical evidence among peers and of faculty who discuss uncertainty with patients. Although these tests are not able to establish causality, they do show the connection between the values of a clerkship director and curriculum design. This finding could have implications for the criteria medical schools or family medicine departments use to select clerkship directors.

Family medicine clerkships must also consider that their approach to uncertainty is socializing the medical student to the specialty. Medical student personality traits and role characteristics that are associated with an aversion to uncertainty motivates the student to avoid matching to primary care. As medical students progress through medical school and develop preferences for specialization, a better understanding of this specialty’s approach to uncertainty can facilitate better matches, whether through self-reflection exercises or quantitative testing. Evans and colleagues argue that the third year of medical school is the opportune time to begin that discussion.

Results are limited by self-selection and social desirability bias. Also, this methodological approach assumes that as director, the respondent is the ideal opinion leader to represent the clerkship in this domain. Therefore, results are limited by clerkship director knowledge and perception of the individual clerkship curriculum and learner experience.

Our findings suggest that, despite the relative importance of competence in handling uncertainty for practicing physicians, the family medicine clerkship curriculum does not emphasize this content fully. Typical barriers to changing the curriculum include limited availability of curricular time, faculty expertise, and existing curricula. Some clerkships use virtual patient cases,
a curriculum innovation that has prompted student attention. Virtual patient cases typically do not require additional faculty expertise and could be adapted to this topic for relatively low cost.

Another important barrier is the variable level of readiness of learners. Some learners may not have the requisite clinical knowledge and interpersonal communication skills to address uncertainty during patient care. Curriculum innovations, such as a teaching Objective Structured Clinical Exam (OSCE) could guarantee a standard level of competence at the beginning of the clerkship and might prepare the student better to recognize and reflect upon clinical situations where uncertainty plays an important role.

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The opinions and assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the US Army, the Uniformed Services University of the Health Sciences, or the Department of Defense at large.

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References
35. Ledford CJ, Seebusen DA, Cazona MR, Cafferty LA. Using a teaching OSCE to prompt learners to engage with patients who talk about religion and/or spirituality. Acad Med 2014 Jan;89(1):89-5.