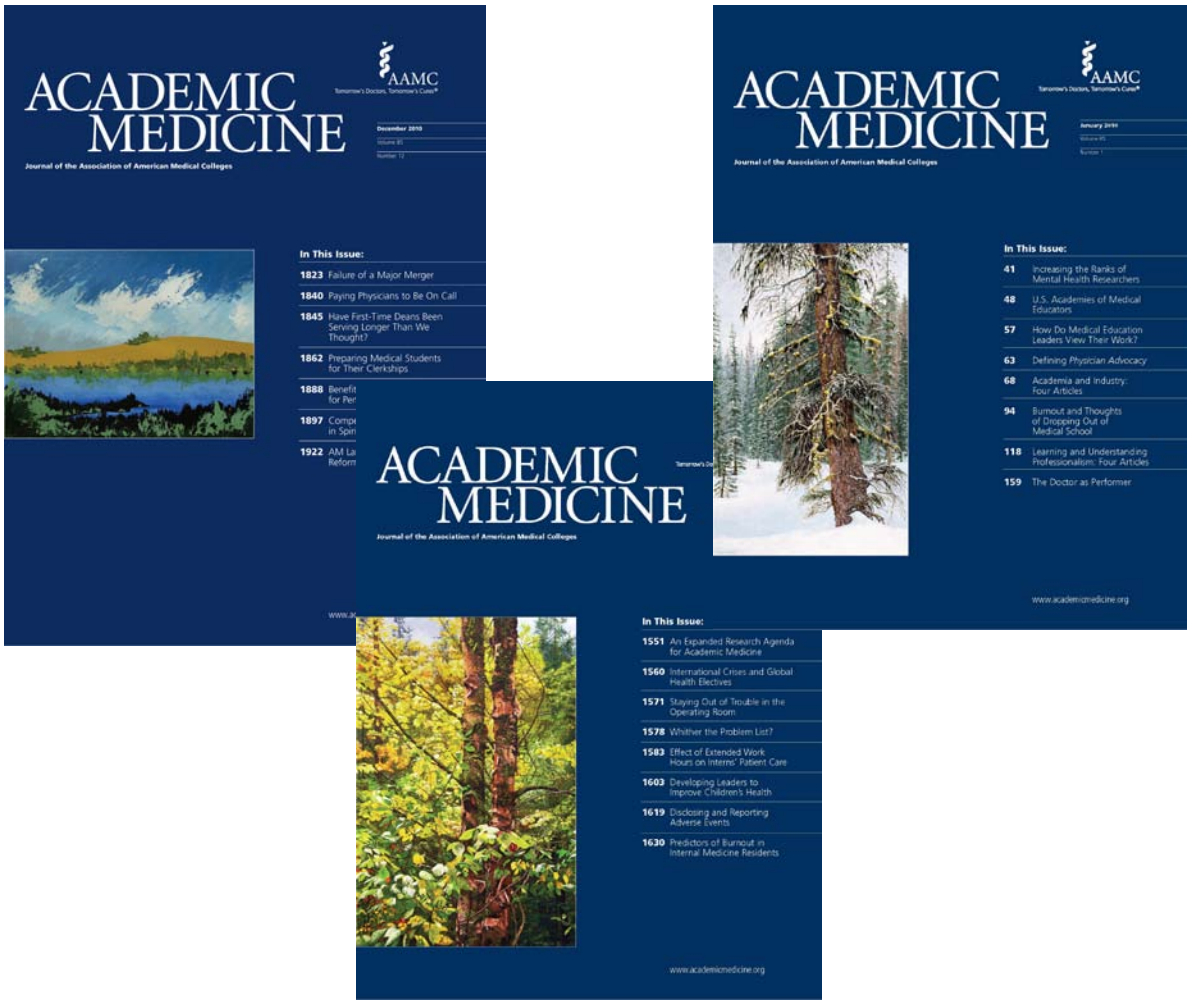
Handbook for *Academic Medicine* Writing Workshop



This reference handbook was compiled and annotated by members of the *Academic Medicine* Editorial Staff.

Managing Editor
Anne Farmakidis

Director, Staff Editing
Albert Bradford

Senior Staff Editors
Mary Beth DeVilbiss
Jennifer Campi

Staff Editors
Elizabeth S. Karlin
Toni F. Gallo

Table of Contents

GUIDELINES FOR WRITING GOOD ABSTRACTS

1. **A good abstract gives the reader an accurate idea of the article's content but does not go into detail.** *The content may be information, ideas, or both. Good abstracts are especially important for database users, since they will have only the abstract to gain an impression of the article and whether it will be useful to them.*

EXAMPLE A: The abstract below fulfills this criterion. Because this is an abstract for a research report, it is structured into four categories. Note also that:

- *The year of the study is included; this is an important bit of information for readers, who can then make a judgment about whether the study data are up-to-date enough.*
- *The number of research participants and number of institutions involved are included; readers need this information to form a view of the value of the study, no matter what its findings are.*
- *The findings are not overstated. Overstating findings goes against the scientific caution that is needed in research.*

Abstract

Purpose: Non-teaching services (NTS) are becoming increasingly prevalent in academic hospitals. This study was designed to determine if the presence of an NTS is associated with higher acuity and altered case mix on the teaching service.

Method: The authors carried out a retrospective, cross-sectional analysis of data about all general medical admissions between January 1, 2005 and June 30, 2005 to either of two teaching hospitals in Rochester, New York. A total of 6,907 inpatients were studied, of whom 1,976 (29%) were admitted to medicine resident services and 4,931 (71%) were admitted to an NTS. Hospital billing databases were used to determine patient demographics, ICD-9 diagnoses, Charlson Comorbidity Index scores, and patient disposition.

Results: Compared with NTS patients, patients on resident services had higher median Charlson Comorbidity Index scores (3.0 vs. 2.0, $P < .001$), numbers of comorbidities (9.0 vs. 8.0, $P < .001$), and were more likely to require intensive care (15.5% vs. 7.6%, $P < .001$) and to die in the hospital (8.2% vs. 4.5%, $P < .001$). Patients on the resident services were more likely to have acute renal failure, respiratory failure, septicemia, and HIV. Residents were less likely to care for patients with primary diagnoses of chest pain, cellulitis, alcohol withdrawal, and sickle cell crisis. The differences in patients' conditions between resident and non-teaching services were similar in the two hospitals and also among patients who had not received intensive care. A key limitation of this study is that one of the hospitals temporarily closed for three months during the study.

Conclusions: Patients on resident services may be more medically complex and more likely to have high-acuity diagnoses than patients on NTS. How these differences affect residents' education, residents' career decisions, and practice styles deserves further study.

EXAMPLE B: The abstract below also fulfills this criterion. Since the abstract is for an essay, not a research report, it is unstructured.

Abstract

Despite the need for a robust primary care workforce, the number of students and residents choosing general internal medicine careers continues to decline. In this article, the authors describe their efforts at the University of California, Davis to bolster interest in internal medicine careers and improve the quality of care for medically underserved populations through a tailored third-year residency track developed in partnership with the Sacramento County Department of Health and Human Services. The Transforming Education and Community Health (TEACH) Program improves continuity of care between inpatient and outpatient settings, creates a new multi-disciplinary teaching clinic in the Sacramento County health system, and prepares residents to provide coordinated care for vulnerable populations. Since its inception in 2005, 25 residents have graduated from the TEACH Program. Compared to national rates, TEACH graduates are more likely to practice general internal medicine and to practice in medically underserved settings. TEACH residents report high job satisfaction and provide equal or higher quality diabetes care than that indicated by national benchmarks.

The authors provide an overview of the TEACH Program, including curriculum details (e.g., the program lasts 36 weeks; residents assume a first-contact role with patients), preliminary outcomes (e.g., a much higher percentage of graduates practice general internal medicine; TEACH residents are more satisfied with the practice of medicine and less negative about patient care issues), barriers to continued and expanded implementation (e.g., introducing a new program requires significant trade-offs in other aspects of the larger internal medicine program), and thoughts about the future of the program (e.g., funding remains threatened each year).

2. **Try hard to make the abstract more than an outline. The abstract should be as substantive as the word limit permits.**

EXAMPLE C: The abstract below fails to be substantive enough because it is only an outline of the study and gives little of the article's information.

Abstract

Purpose: Non-teaching services (NTS) are becoming increasingly prevalent in academic hospitals. This study was designed to determine if the presence of an NTS is associated with higher acuity and altered case mix on the teaching service.

Method: The authors explain when and how they carried out their study, the type of data sought, and where the data were obtained.

Results: The differences and similarities in patients' illnesses and conditions between resident and NTS are presented; a key limitation of the study is also discussed.

Conclusions: The authors summarize the differences between the patients on the two types of services and describe the type of research that is needed to assess the effects of these differences.

3. **Sometimes the outline format is needed when an article is particularly complex and hard to summarize. In such cases, try to give a few examples of the article's information.**

EXAMPLE D: The following sentences, excerpted from an abstract of a non-research article, indicate one way that guideline 3 can be put into practice. Also, the last paragraph of Example B illustrates the use of this guideline.

The new course seeks to perfect four skill areas (e.g., ability to take a good patient history). Several methods of evaluation are used (e.g., multiple-choice exams; tests using standardized patients).

4. **The abstract should not give too much background at the expense of key information that is in the article.**

EXAMPLE E: The abstract below is an example of this problem.

Abstract

Purpose: In the recent past, residents cared for virtually all medical inpatients in many teaching hospitals. However, the volume and complexity of inpatients in teaching hospitals have increased substantially over the past decade. At the same time, there has been increased emphasis on outpatient resident training and limiting resident duty hours. In response to these factors, many teaching hospitals have created *non-teaching services* (NTS), some of which employ mid-level providers (MLPs, i.e., nurse practitioners or physician assistants) to function in the traditional resident's role. In the two hospitals affiliated with our residency programs, independent NTS were created in 1995 and 1999. Both NTS have grown rapidly and now care for the majority of medical inpatients in each hospital.

Residents and MLPs differ in their training, abilities, and goals, so they may not provide completely interchangeable forms of coverage.Randomly dividing patients between teaching and non-teaching services may not be possible in many hospitals for a variety of reasons, including MLPs' comfort managing patients with certain diagnoses or high acuity and the timing of NTS staffing. It is likely that these patient selection pressures could cause teaching services to consist of patients who are sicker and carry different diagnoses than is characteristic of the pool of patients admitted to the hospital.

Method: The authors studied inpatients admitted to either NTS or medicine resident services at two teaching hospitals between January 1, 2005 and June 30, 2005.

Results: Patients' illnesses between resident services and NTS were different in several ways, but their conditions were similar in the two hospitals and also among patients who had not received intensive care.

Conclusions: Patients on resident services may be more medically complex and more likely to have high-acuity diagnoses than patients on NTS. How these differences affect residents' education, residents' career decisions, and practice styles deserves further study.

5. **The abstract must not omit key facts or ideas.** *Examples C and E omit such information. Often, information about study limitations is omitted, which can give readers the idea that the study was more definitive than was actually the case.*

6. **The abstract should not be used as an introduction to the article.** *The abstract is a completely separate, self-contained statement. This means that any introductory material in the abstract, including definitions of terms and acronyms, must be repeated in the article.*

7. **The abstract cannot include *any* material that is not in the article.** *This is because the abstract is a report of the article—thus, its content is determined by the content of the article. For example, if the abstract mentions that the research participants were all from the Midwest but that information is not in the article, either the information should be dropped from the abstract or—better—added to the article and kept in the abstract.*

8. For *major* statements, findings, or limitations expressed in the article, some brief versions of these must be in the abstract if space permits. *For example, if the article mentions that the research failed to demonstrate a difference between two curricula except in one area, some version of that fact must be in the abstract also, since this is a major finding.*

   But if the article mentions that three students were excluded from the study because they did not return their questionnaires, this information is minor and does not have to be in the abstract. However, the reverse does not apply: if the three students are mentioned in the abstract, they must be mentioned in the article.

9. **The information in the abstract and in the article must match. The article cannot say one thing and the abstract say another thing.** *For example, the abstract cannot say that the authors studied <u>all U.S. and Canadian medical schools</u> if the article says that the authors studied <u>all U.S. medical schools</u>. Either the article or the abstract must be corrected to state the correct study sample of schools.*

10. **The abstract and the article must state the same information *in the same way,* as much as possible.** *For example, if the article mentions a theme that is called <u>student's hesitation before making diagnosis</u>, the same or very similar wording must be used in the abstract to describe that theme, to prevent confusion. Calling the theme <u>initial diagnosis delay</u> in the abstract could be confusing and could also give an impression that the authors were careless in their writing.*

11. **Feel free to borrow language (phrases, sentences) from the article to use in the abstract, and vice-versa.** *This means you don't have to rewrite something that is already effective. This "lifting" from the article to the abstract or vice-versa is allowed because the abstract and the article are considered to be separate documents.*

12. **Feel free to use long, ungainly (but clear enough) sentences in the abstract if that helps you condense your communication.** *The abstract is like a telegram that describes the article in a condensed way. The writing does not have to be as easily read and elegant as the writing in the article.*

13. **In the abstract, feel free to use lists (1) in the (2) text like (3) this if that helps you provide more information in fewer words.**

When you have written the abstract of your article, ask yourself: "If someone saw only the abstract, would they have at least a fair, if not good, understanding of what my article is about and what its main message or finding is?" If the answer is "yes," then your abstract is probably excellent.

# # #

Commentary: Lowly Interns, More Is Merrier, and the Casablanca Strategy

Comment [t1]: The title is engaging and descriptive.

Pat Croskerry, MD, PhD

Dr. Croskerry is professor, Department of Emergency Medicine and Division of Medical Education, Faculty of Medicine, Dalhousie University, Halifax, Nova Scotia.

Correspondence should be addressed to Dr. Croskerry, QE II Health Sciences Center, Halifax Infirmary, Ste. 355, 1796 Summer St., Halifax, Nova Scotia B3H 3A7; email: croskerry@eastlink.ca

Abstract

Test ordering is an integral part of clinical decision making. Variation in test-ordering behavior appears to reflect uncertainty in the clinical reasoning and decision making process. Among decision makers, novices function mostly in the analytic mode of reasoning, experiencing high levels of uncertainty and, therefore, account for the most variance. While less discriminate test ordering has both economical and clinical downsides, it nevertheless remains a rite of passage along the road towards expertise.

In response to the article by Iwashyna and colleagues, the author of this Commentary reflects on the implications of test-ordering behavior in the academic medicine setting. The process of ordering tests can serve purposes other than the obvious, not the least of which allows the decision maker additional time for reflection in the decision making process, perhaps leading to a less mindless and more mindful approach.

The author observes that test-ordering behavior of novitiates might be optimized through a variety of strategies that improve both active and passive learning in the clinical environment. In addition to specific education around costs, as well as Bayesian considerations, active learning importantly requires exposure to those processes that may subvert clinical reasoning, notably cognitive biases. Passive learning is enhanced in supportive environments. Throughout, those who supervise and teach should provide effective models.

Editor's note: This is a commentary on Iwashyna TJ, Fuld A, Asch DA, Bellini LM. The impact of residents, interns and attending on inpatient laboratory ordering patterns. Acad Med. 2011; 86:XXX-XXX.

Comment [t2]: The Abstract gives little background information, instead focusing on summarizing the content of the Commentary.

Comment [t3]: The "target" manuscript is acknowledged, but the Abstract adheres strictly to the manuscript at hand.

Comment [t4]: The manuscript is identified as a Commentary. Readers can easily distinguish it from research reports or traditional descriptive articles.

In this issue Iwashyna and colleagues [1] provide insights into the test-ordering behavior of interns. Interns are responsible, it seems, for a modest but significant excess in laboratory utilization, yet this overuse comes with a diminished sense of control over resource utilization, and with little accompanying awareness. The authors describe a novel method to assess laboratory utilization using the amount of variance accounted for by the test orderer, which, at the same time, may provide a surrogate measure of clinical supervision. To many, test ordering will be perceived as a low profile, low risk feature of clinical behavior, but it may offer unique opportunities to further examine the process of, and attainment of expertise in, clinical decision making.

We invariably experience our first real contact with test ordering as novitiates in the clinical setting. Mine came as a lowly clerk on an internal medicine service. Alongside an only slightly less lowly intern, our task was the inglorious "scutwork" of admitting patients from the emergency department. The important decision to admit the patient having been made by the senior resident, our job was to write the admission orders. I scribed as the intern dictated one test after another, an endless list that unraveled in seemingly mindless fashion. At one point, I impertinently questioned if the patient really needed all these tests. Weren't they expensive? First, said the intern, if we don't do it we might miss something; second, this is a teaching hospital and ordering tests is expected; third, the Chief Resident likes to see a thorough work-up on everyone; fourth, the patients like to see something concrete being done; and finally (because we are in Canada) we are not paying for them. Having just finished reading *The House of God*,[2] I was starting to understand that medicine did indeed move in mysterious ways. We were on a third sheet when we were done, with almost 30 orders written. The Chief Resident positively beamed.

Comment [t5]: The "target" article is mentioned and described BRIEFLY. The purpose of mentioning and describing it is to provide context for the Commentary's central argument.

Comment [t6]: The purpose of the Commentary is to advance the scholarly discussion about the topic at hand. This author has provided context for his own argument by very briefly describing the target article, and with this clause he clearly identifies the direction of his own Commentary. It uses the subject of the target article (here, test-ordering behavior of interns) to advance the scholarly discussion about that topic (specifically, how test-ordering behaviors may be able to enlighten us about the development of clinical decision-making skills).

Comment [t7]: The author uses a personal anecdote, relayed in a narrative, informal style to illustrate a common experience. Commentaries can and should use personal experience and impressions to support the central argument, and this story is effective because of its immediate relevance to the relationship between novitiate test ordering and clinical decision making.

In contrast, a more rational approach would follow hypothetico-deductive reasoning, establishing a differential diagnosis and ordering only those tests deemed necessary, taking care to avoid various biases. Particularly attention should be paid to the pervasive confirmation bias, which is, as Francis Bacon observed, "the peculiar and perpetual error of the human understanding to be more moved and excited by affirmatives than by negatives."[3] Doing a test that dis-confirms a hypothesis is far more powerful than a confirmatory test, yet, invariably, we are more interested in, and emotionally attached to, what supports our thinking than what challenges it. Countless other biases enter our decision making –cognitive psychologists have spent almost half a century describing them, and it would be irrational to believe that we gain immunity from them through medical training. We have to tread carefully in all aspects of our decision making, test-ordering included.

As Sackett and colleagues [4] observed, the novice medical decision maker typically engages the very non-Bayesian strategy of exhausting all possibilities: "the painstaking, invariant search for (but paying no immediate attention to) medical facts about the patient, followed by sifting through the data for the diagnosis". [4] The first stage in this process is to collect any data that might be remotely relevant, then search through it to find a diagnosis that fits. Also, as Sackett and colleagues note, there persists a tendency in most clinical laboratories to provide the decision maker with the results of many unsolicited tests – a veritable *embarras de richesse* and sometimes confusing overabundance of information. Few of us, for example, will ever use the red blood cell distribution width or other indices that are routinely provided when all that is needed may only be the white blood cell count or hemoglobin level. Though there is very little added cost to providing an automatic calculation of an index, the tacit message is that more is merrier and there can't be too much of a good thing. One worries a little about what Signor Bonferroni might have thought – the more tests you do, he pointed out, the more likely you are to get a spuriously "significant" result.[5]

Comment [t8]: Relevant literature is used effectively but sparingly to support the author's argument.

The other feature of novice clinical decision making is that more time is spent in the analytic (Type 2) mode and less in the intuitive (Type 1) mode of reasoning and decision making. This is as it should be - an unavoidable rite of passage on the road towards expertise. In medicine, we earn our intuitive sense by accumulating time in the analytic mode.[6] With experience, we come to recognize patterns, scripts, syndromes, stigmata of specific diseases, and specific flags that allow us to short-circuit the process and selectively test for what we really need to know. In the study by Iwashyna and colleagues, the progressive drop in variation from interns through residents to attendings provides an interesting barometer of the development of expertise. With experience, we generate less variance.

Even in the hands of experts, rational approaches to test ordering may be subverted by off-label purposes, such as the Casablanca Strategy,[7] which takes its name from the closing scenes of the movie *Casablanca.* When the chief of police orders his men to "round up the usual suspects," it is not because it will help find the killer (he knows who did it) but merely to gain some time. Subjecting patients to routine test ordering allows the clock to tick a little and provides a tincture of time. Perhaps, too, it allows disengagement from the reflexive, intuitive mode and provides opportunity for reflection. It also serves several other purposes: it keeps the patient occupied,[5] it allows a little extra time for other ideas to percolate in the decision maker's mind, and it generates a sense of something being done. Most patients seem to approve of physicians collecting a variety of their bodily fluids for analysis (as well as subjecting them to doses of radiation). The perception is that something tangible is being done along the diagnostic way. However, indiscriminate test ordering does not appear to be a good thing. An Australian study found that patients given a routine battery of about 50 tests on admission to the hospital fared no better than those who were not, and achieved an overall cost increase of about 5%.[8] Further, given that overall laboratory error (pre-analytic, analytic, and post-analytic) has been variously estimated to be between 0.1% and 9.3%,[9] the more tests ordered, the greater chance of false negatives

Comment [t9]: After the introductory paragraph target article is used only to advance the author's unique argument, not as a crutch or framework for the Commentary.

Comment [t10]: The author looks at the topic from a different angle than did the authors of the target article. This angle may provide an alternative or a complementary view of the topic, but the Commentary should add depth—not necessarily volume—to the reader's understanding of the topic.

and positives. False negatives may lead to a delayed or missed diagnosis and false positives to further unnecessary testing, not to mention some anxieties on the patient's part.

What can be done? The inexperience and uncertainty that characterizes the novice approach to test ordering and which lead to excessive testing are difficult to get around. There appears to be no easy shortcut to the attainment of expertise. Exhaustion strategies in the novice are to be expected and serve a necessary purpose. As sailors need time on the water and skaters time on the ice, medical novices need time in the clinical environment. Being there allows two types of learning. An *active* part that is deliberate, purposeful, and structured, and a *passive* part that simply involves being present, what psychologists have called the "mere exposure" effect.[10] Frequency of exposure leads to increasing familiarity and comfort with the clinical environment. Thus, efforts should be made to increase the value of both active and passive experiences of learners. Hogarth's [11] advice would be to put more effort into shaping this exposure – create a more friendly and supportive learning environment, provide expert high-level mentoring and teaching about various test-ordering biases and Bayesian basics, teach about specific cognitive and affective biases, educate and inform about laboratory error, provide many opportunities for practice, give explicit feedback about the test results and their limitations, and offer immediate feedback about the real costs of specific tests. The latter might be particularly effective in cultivating understanding of the big-picture implications of test-ordering behavior, akin to getting the bill at check-out time. The ability to compare one's own practices with those of one's peers is also a great motivator for change and compliance.

Residents and attendings in supervisory and teaching roles should not underestimate the extent to which their behaviors might be mimicked, even for such low profile activities as cost-appropriate care. If their attitudes and behaviors signify that test ordering is of little importance in clinical practice, residents and attendings should expect them to be mimicked lower down the hierarchical order. All

Comment [t11]: After introducing new ideas to consider about the topic at hand, the author offers reflection and recommendations about what to do next. Just as this Commentary has advanced the scholarly discussion, the author offers suggestions about how to advance it further. Think of the Commentary as an idea's transition rather than as its punctuation.

mentors, teachers, and supervisors need to be constantly aware of the model they provide for learners, especially during the critical acquisition period for clinical practice patterns and habits. All adjuncts and accessories to clinical decision making should follow a well-known adage: take only what you need and leave the rest.

Overall, as Iwashyna and colleagues note,[1] most of the variance in laboratory utilization is accounted for by the patient's disease and co-morbidities, and relatively little by trainees in this teaching environment. Nevertheless, this novel measure (if it can be effortlessly factored in at minimal cost) may provide a useful surveillance marker for the efficacy of clinical supervision, as well as further insights into medical decision making.

Comment [t12]: The conclusion is concise, but it revisits the original inspiration for this Commentary and ends on a forward-looking note. Ideas are not left unresolved. The essay feels "finished."

Funding/Support: None

Other disclosures:None

Ethical approval: Not applicable.

References

Comment [t13]: The reference list is limited. It includes a reference to the target article.

1. Iwashyna TJ, Fuld A, Asch DA, Bellini LM. The impact of residents, interns and attending on inpatient laboratory ordering patterns. Acad Med. 2011; 86:XXX-XXX.
2. Shem S. The House of God. New York: Dell Publishing, 1978.
3. Bacon F. Novum Organum (1620). Aphorism 46. Reprinted in Burtt EA. (ed). The English philosophers from Bacon to Mill. New York: Random House, 1939.
4. Sackett DL, Haynes RB, Guyatt GH, Tugwell P. Clinical epidemiology: A basic science for clinical medicine (2nd Edition). Boston: Little, Brown and Company, 1991. Pp 3-18.
5. Bland JM, Altman DG. Multiple significance tests: The Bonferroni method. BMJ 1995; 310: 170.
6. Croskerry P**.** A universal model for diagnostic reasoning. Acad Med. 2009; 84: 1022-28. http://journals.lww.com/academicmedicine/Fulltext/2009/08000/A_Universal_Model_of_Diagnostic_Reasoning.14.aspx. Accessed September 30, 2010.
7. Croskerry P. Diagnostic failure: A cognitive and affective approach. In *Advances in Patient Safety: From Research to Implementation.* AHRQ Publication Nos. 050021. 2005; Vol 2 pp 241-254. Agency for Health Care Research and Quality, Rockville, MD.
8. Durbridge TC, Edwards F, Edwards RG, Atkinson M. An evaluation of multiphasic screening on admission to hospital. Precis of a report to the National Health and Medical Research Council. Med J Aust. 1976; 1: 703.
9. Bonini PA, Plebani M, Ceriotti F, Rubboli F. Errors in laboratory medicine. Clin Chem 2002; 48:691-698.
10. Zajonc RB. Attitudinal effects of mere exposure. Journal of Personality and Social Psychology Monograph Supplement. 1968; 9: 1-27.
11. Hogarth RM. Educating intuition. Chicago: University of Chicago Press, 2001.

Promoting Self-Directed Learning Skills in Residency: A Case Study in Program Development

Melissa Nothnagle, MD, MSc, Roberta Goldman, PhD, Mark Quirk, EdD, and Shmuel Reis, MD, MHPE

Dr. Nothnagle is assistant professor of family medicine, Alpert Medical School of Brown University, Providence, Rhode Island.

Dr. Goldman is professor of family medicine, Alpert Medical School of Brown University, Providence, Rhode Island.

Dr. Quirk is professor of family medicine and community health, University of Massachusetts Medical School, Worcester, Massachusetts.

Dr. Reis is professor and chair of family medicine, Technion-Israel Institute of Technology, Haifa, Israel.

Correspondence should be addressed to Dr. Nothnagle, Department of Family Medicine, 111 Brewster St., Pawtucket, RI 02860; telephone: (401) 729-2236; fax: (401) 729-2923; e-mail: Melissa_Nothnagle@brown.edu

Abstract

Self-directed learning (SDL) skills are essential for the formation and ongoing competence of today's physicians who work in the context of expanding scientific knowledge and changing health care systems. In 2007-2008, the authors developed a program to promote SDL in the Brown University Family Medicine Residency. Through an iterative process, the project team juggled learning theories (i.e., Knowles' SDL model, Collins' cognitive apprenticeship model, and Quirk's expertise development model) with curricular goals, instructional options, and local constraints in order to design a practical and theoretically robust intervention.

The intervention that emerged from this process features a faculty physician serving as a learning coach who meets individually each month with all second-year residents to assist them in generating learning goals, reflecting on their learning experiences, and practicing evidence-based medicine (EBM) skills. An electronic portfolio serves as a documentation tool that supports reflection; residents record their goals and reflections in the portfolio, which also contains their formative assessments, procedure logs, and special projects. To address the hidden curriculum, the program designers took special care to avoid increasing faculty and resident workload and created a forum for discussion and group reflection.

Program evaluation combines qualitative and quantitative methods, such as surveys of and interviews with residents and faculty, to assess changes in residents' SDL and EBM skills and in the program's educational culture.

The authors use Kern et al's six-step model for curriculum development to describe both the unfolding of this complex project and the choices that resulted in the current program design.

Today's physicians practice in an environment characterized by increasingly rapid change; they must adapt to changes in community health needs while assimilating and applying expanding scientific knowledge.[1] Self-directed learning (SDL) is an essential component of this required flexibility. According to the prevailing model described by Malcolm Knowles, SDL is a process in which learners actively manage their own learning through the following steps: they (1) diagnose their learning needs, (2) formulate learning goals, (3) identify resources for learning, (4) select and implement learning strategies, and (5) evaluate learning outcomes.[2,3] In this model the educator serves as a facilitator, teaching skills for learning, rather than content.[3] Considered critical to the development of expertise through lifelong learning, SDL has the potential to optimize performance in practice and to improve learning during medical training.[4,5]

In this article, we describe the development of a curriculum to promote SDL skills among family medicine residents. Through the curriculum, we aimed to optimize learning not only *during* but also *beyond* residency. Though we frame the description using Kern's and colleagues' six-step model for curriculum development (problem identification and general needs assessment, needs assessment of targeted learners, goals and objectives, educational strategies, implementation, and evaluation and feedback),[6] for us the steps were not linear. The project team refined the program through iterative discussions of relevant theoretical models and educational strategies and through dialogue on how to best adapt these models and strategies to our program setting. We describe the choices we made during the development process, the plan that emerged, and our plans for implementing and evaluating the new program.

Comment [esk1]: I've read several curriculum development articles, but this is the only one I recall that is based on a recognized, academic model.

Comment [esk2]: I love the fact that the six steps that follow the name of the model in parentheses are reflected perfectly in the next six major headings.

Problem Identification and Needs Assessment

Much of medical education consists of apprenticeship and immersion in clinical learning environments. However, trainees rarely receive explicit instruction in how to manage their own learning. Some have described the culture of medicine as "dominated by unreflective doing."[7] This description may be particularly true of residency, during which long work hours and clinical service burdens may limit time for reflection on experience. Experience alone, without personal reflection and mentoring, may be suboptimal for forming a well-rounded independent practitioner.[8]

In addition to neglecting the reflective process, traditional medical education may fail to address individual learning differences. As fewer U.S. medical school graduates enter family medicine,[9] competition for positions decreases and residency programs accept more applicants with histories of academic difficulty, as well as more international medical school graduates whose language skills, acculturation, and preparation for practice in the U.S. system vary widely. The typical one-size-fits-all residency curriculum may not meet the variable needs of today's learners. In fact, in our own residency program, we have noted great variability among the residents in their preparedness for their roles in the clinic and in their skills to manage their own learning.

The medical education community needs new models that encourage reflection, address the wide array of trainees' learning needs, and prepare future physicians to deal with constant change in health care delivery and scientific knowledge; SDL curricula have the potential to accomplish these goals. Recognizing the need for SDL skills among future physicians, the Accreditation

Comment [esk3]: This provides some of the *evidence-based* reason for the need for a curricular innovation. In his August 2008 editorial, "Toward Better Descriptions of Innovations," Dr. Kanter proposed that such descriptions include the reasons the innovation is needed.

The long sentence highlighted below accomplishes the exact same thing.

Council for Graduate Medical Education (ACGME) specifies that residents must be able to "continuously improve patient care based on constant self-evaluation and lifelong learning."[10]

Targeted Needs Assessment

The Brown University Family Medicine Residency Program is a three-year training program with 13 residents per year based at a 300-bed, urban community hospital. The Department of Family Medicine includes 13 full-time and 7 part-time hospital-based faculty as well as over 175 community-based faculty. Resident training involves hospital- and community-based clinical rotations of four weeks each, structured didactic activities, and longitudinal care of a panel of continuity patients at a family health center.

We based our selection of target learners on the program structure and the developmental process of residency training. The early part of our residency program includes many intensive inpatient rotations; overnight call duties decrease in subsequent years. We believed that the clinical demands of the first year would present obstacles to residents' engaging in goal setting and reflection. We therefore targeted the SDL program to second-year residents, anticipating that they would be developmentally ready to engage in these activities and could benefit from using the skills during the remainder of their training. The first class to participate was an unusually heterogeneous group of residents—half were international medical graduates, and several were struggling learners. Although some project team members expressed concerned that this was a risky group with which to pilot a new intervention, others viewed the increased heterogeneity as an ideal context for SDL, as these learners might benefit more from an individualized strategy than would a more homogeneous group.

Evolution of Program Goals

The original proposal, which the project team submitted for a federal Primary Care Training Grant, outlined two goals: to enhance residents' self-assessment skills and to develop residents' SDL skills. In accordance with Knowles' model, we planned to achieve the first goal, improving resident self-assessment skills, by administering both self-assessment tools and objective assessments in key content areas (e.g., pediatrics, geriatrics, and maternity care), and by facilitating residents' reflection on similarities and differences between the results of their self-assessment and results of their objective performance assessments. Faculty advisors would then encourage and guide residents to practice cycles of SDL, beginning with identifying learning needs and setting goals, using data from the baseline assessments. A part-time family physician with a background in residency education would serve as an SDL facilitator, providing faculty training and support.

The announcement of funding for the project coincided with major personnel changes in the department. Opportunity arose as a new project team came together. The team comprised the associate residency director (a family physician, MN), a faculty psychologist, and a senior family physician educator on sabbatical in the department who served as interim team leader in the first year (SR). Both family physicians had completed master's degrees in medical education, and along with the psychologist, they revised the project design and introduced additional curricular elements. In addition to this team, a cultural anthropologist in the department (RG) brought qualitative research expertise to inform the evaluation process; two department education

coordinators worked to integrate the initiatives into the existing curriculum; and a research assistant managed the evaluation data. Also, an educationalist from a nearby medical school with expertise in SDL and development of physician expertise (MQ) met quarterly with the project team to ensure that the intervention and evaluation would be feasible, effective, and evidence-based. Over the next year the team reviewed and iteratively revised the project design based on theoretical and practical deliberations—as well as on serendipitous events.

After reading recent developments in the medical education literature, the project team eliminated the discrete project goal of improving resident self-assessment skills. Medical education researchers had previously viewed self-assessment as a discrete and stable skill. However, Eva and Regehr highlight fundamental flaws in this concept of self-assessment; they reject the use of "personally-generated summative judgments" and stress the importance of seeking out and reflecting on feedback from reliable and valid *external* sources as the most important route to self-improvement.[11] Therefore, the team simplified the project goal to developing residents' SDL skills. Quirk's work on the development of expertise in medical education added updated support to this decision.[5] Quirk argues that the emphasis of medical education must shift from imparting knowledge and skills, which become obsolete all too soon, to teaching metacognitive skills, which involve actively regulating or monitoring one's thinking or learning processes. Knowles' model of SDL encompasses key metacognitive competencies, such as those Quirk describes, that should help physicians to learn optimally from their experiences both during their training and throughout their careers.

Comment [esk4]: Again, the authors follow Dr. Kanter's advice in "Toward Better Descriptions of Innovations." Here, they explain why some past solutions have not worked well.

In light of the identified need to prepare physicians to manage rapidly expanding scientific knowledge, the project team also expanded the scope of the SDL goal to include evidence-based medicine (EBM) skills. The steps involved in EBM naturally parallel those of Knowles' SDL model (see Table 1); one begins the process by identifying a clinically relevant knowledge gap, then formulating an answerable question about the clinical problem, identifying the best sources of evidence for the particular question, critically appraising the information gathered, and finally integrating this information into clinical practice in light of patient characteristics and preferences.[12] Thus, we viewed the practice of EBM as an SDL activity, a measurable skill, and a part of lifelong learning.[13]

Choice of Instructional Strategies

Comment [esk5]: This heading reflects the 4th step of the Kern's model the authors cited at the beginning. In this section, the authors have helpful subheadings and describe components of their curricular innovation (again following the August 2008 editorial).

Learning coach

Recognizing the individualized nature of SDL and the heterogeneous needs of our learners, the project team determined that one-to-one meetings with a mentor might be the best strategy to promote the development of SDL skills. Second-year residents currently meet two to four times a year with their academic advisors to review formative and summative evaluations, to plan electives and projects, and to discuss career plans. More frequent meetings would be necessary to promote goal-setting for each monthly rotation, but a large increase in advisor meetings did not seem feasible. Furthermore, faculty members vary widely in their mentoring styles and familiarity with SDL. For these reasons, the team created the role of a "learning coach," an idea inspired by Collins' cognitive apprenticeship model.[14] Rather than focusing on the knowledge and practical skills taught in traditional apprenticeships, the cognitive apprenticeship model aims to teach, through coaching and modeling, processes that experts use to handle complex tasks.

This model requires expert teachers to externalize their tacit knowledge and their internal cognitive and affective processes, making the knowledge and processes accessible for students. Students can then practice these internal processes, developing strategies to enhance their own learning, with gradually fading support or "scaffolding" from the expert. Thus, in our model the learning coach acts as the facilitator for SDL, helping learners to reflect on their learning and develop metacognitive skills such as setting learning goals, developing and implementing plans to meet their learning needs, and evaluating their SDL process.

Evidence-based medicine

After considering several instructional options for EBM including an on-line self-study curriculum, we determined that a combination of didactics and one-on-one coaching stood the best chance of success in our residency's educational culture; Web-based self-study curricula have proven difficult to implement due to the already heavy demands on residents' time. Furthermore, an individualized approach would address the wide variability in residents' prior EBM experience.

Educational portfolio

As the emphasis on reflection and goal setting emerged in the project goals, one team member (S.R.) suggested using educational portfolios to promote these skills. Now prevalent in medical education, portfolios "report on work done, feedback received, progress made, and plans for improving competence."[15] When structured for these purposes, portfolios may facilitate residents' reflection on their performance and allow them to compare their self-assessments with external feedback, which, in turn, can help them monitor their development and plan their

learning.[15] A review of portfolio use in residency suggested that portfolios can also promote SDL, providing structure for learners to "construct goals and create learning plans."[16] However, other team members expressed reluctance to introduce portfolios, noting anecdotal reports of other residency programs' struggles to get their learners to participate in portfolio work. Given their potential value in development of SDL skills, the team decided to try portfolios, but agreed that they would make a conscious effort to address the culture and context of the residency program in determining how they would implement the portfolios.

The hidden curriculum

In contrast to a residency's formal curriculum, which consists of the stated educational goals and educational experiences, the hidden curriculum includes the unwritten, undocumented aspects of training, including norms and values transmitted through role modeling and day-to-day activities, which at times overshadow the formal or official curriculum.[17,18] Successful curricular and organizational change requires purposeful attention to the hidden curriculum.[19] The existing culture of our own residency included moderate resistance to change and a sense of overwork and excessive service burden among both the faculty and the residents. We anticipated that in a training program with heavy service demands, the introduction of new curricular elements would produce apprehension and resistance among learners and teachers. Without strategies to address it, the hidden curriculum could jeopardize the intervention.

We addressed the hidden curriculum through a combination of formal and informal methods. At the outset to address the anticipated central concern of participants, we developed a "vision statement," affirming that no one would be expected to work harder than he or she was already

working. When meeting with resident and faculty stakeholders and while making decisions about the program design, we tried to emphasize this core value of protecting residents' time. We considered sufficient time essential not only to increase acceptability of the program, but also to support reflection, a central element of the intervention. The team presented the project design at several meetings with residents and faculty during the planning process in order to introduce the project and elicit their concerns and suggestions. These meetings allowed us to address resistance to change as well as to generate strategies to successfully implement the intervention in our setting. The following are examples of aspects of the SDL program that emerged from these meetings: work on the portfolio outside of the meetings with the coach is optional; the reflection section of the portfolio is confidential; and new learning activities are built into the existing schedule.

We also created a formal structure to address the hidden curriculum in an ongoing way. We introduced a new curricular element, dubbed "The Family Medicine Forum," to facilitate patterns of meaning and inter-relating that would spread from individuals in the intervention group, to the entire group of learners, and perhaps to the faculty and department as a whole. We envisioned a space to share feelings and/or thoughts about professional identity formation, anchored in the context of the health care system. We hoped that The Forum would combine a macro-conversation about family medicine as a discipline and about the national and local health care system with a micro-conversation about the resident as a person and a family doctor now and in the future. We planned for residents and faculty mentors to meet every eight weeks for a two-hour workshop, which would be built into the residents' schedule. We planned to use a process that included a brief presentation to stimulate discussion, followed by a series of

exercises for discussion in pairs, small groups, and the large group. While we planned specific content (e.g., residents as teachers, long-term goal setting, time management, sustaining a commitment to public service) for The Forum during the intervention year, the first topic was use of mentoring relationships to learn to manage the demands of outpatient family medicine.

Implementation

The learning coach

As we defined the role of the learning coach, serendipity intervened and an ideal candidate for the job became available: a former chief resident, recently graduated from the program, with personal expertise in EBM and aspirations of a career in academic medicine. The department hired him to work one day per week to conduct one-on-one coaching meetings with residents as well as to supervise in the resident clinic. Thus, a model combining mentoring, reflection, EBM, and a portfolio emerged from the aforementioned theoretical deliberations (see List 1).

The learning coach meets with each second-year resident once a month for one hour. After they briefly chat about the resident's recent life and work events, they discuss his or her goals for the upcoming rotation. Next the coach encourages the resident to reflect on recent learning experiences, including interactions with patients, peers, and faculty, as well as on his or her progress toward goals set during the preceding months. During the second half of the meeting, the coach first presents a module of the EBM curriculum, tailored to the individual needs of the resident, and then supervises the resident practicing the steps of EBM using a clinical query, based on the resident's recent patient care experiences. List 2 describes the content of the EBM curriculum.

Comment [esk6]: The two lists (see pgs. 20-21) are exactly what lists should be:

(1) They are totally independent of the text. The reader does not need the text to understand the lists, and the reader does not need the lists to understand the text.
(2) The lists complement the text; they do not *repeat* any text.

The Portfolio

Cognizant of the literature, the ACGME endorsement, and the initial choices already described, we opted to implement a Web-based portfolio to support our SDL program. The portfolio serves as an intervention as well as a program evaluation tool. The software chosen (MyFolio, Advanced Informatics, LLC, Minneapolis, MN) had been piloted by a nearby residency program and had several attractive features: it automatically collates all assessment data on each resident in one central location; the data are accessible to the resident and to his/her advisor; and the software provides a platform for entering monthly and longitudinal learning goals as well as reflections on educational experiences. Portfolio entries from learning coach meetings are located in a section that is separate from summative assessments. Although the results of summative assessments such as test scores and rotation evaluations are available to the coach and learner, the coach does not participate in the assessment process, thereby creating a safe and confidential environment. While the learning coach focuses on SDL skills, faculty advisors will, for now, continue to address broader issues such as long-term career planning.

Faculty development

In the months leading up to the curriculum implementation, we conducted faculty development sessions designed to introduce the concept of SDL and to promote buy-in for the project. Medical education faculty from outside our department led three workshops using a combination of lectures, small-group discussions and role plays. They covered topics including learners from diverse backgrounds, e-learning, SDL, and the electronic portfolio as a mentoring tool. Planned goals for subsequent sessions during the implementation phase included providing regular

project updates as well as faculty development for teaching EBM, mentoring residents, and using the portfolio software.

A senior medical educator (SR) mentored the learning coach in his new role through regular reflection sessions, observations of coaching sessions, and provision of feedback.

Evaluation Strategy

The evaluation plan flowed from the hypothesis that the intervention as a whole will result in (1) improvements in residents' SDL skills, including use of EBM; (2) a positive impact on the program learning culture; and (3) favorable changes in resident attitudes regarding lifelong learning, especially as it pertains to transitioning to independent practice. We developed a mixed-methods evaluation plan to assess the program's impact on these outcomes. Due to a lack of validated tools to assess SDL,[20] we created a 7-item self-assessment form for residents and faculty to complete before and after the program (Supplemental Digital Content, Charts 1 and 2). The assessment includes ratings of SDL skills, such as goal-setting and reflection; familiarity with portfolios; and skills using EBM in practice. We modified an existing validated survey of EBM skills,[21] adding items measuring attitudes toward EBM and self-reported frequency of point-of-care use of EBM, to be administered before and after the intervention. We scheduled protected time for residents to complete the surveys. For a comparison group, we also administered the EBM survey to third-year residents who did not receive the intervention.

To this quantitative data we added qualitative measures, including faculty observations of participants, field notes from coaching meetings, field notes from the Family Medicine Forums,

analysis of the portfolios, and individual interviews with faculty and residents before and after implementation of the curriculum. Interviews of faculty and of the residents targeted for the intervention probed their understanding of SDL, their own SDL activities such as goal-setting and reflection, their perceptions of the residency learning culture, and their thoughts on activities in the residency that promote SDL. To get a sense of the baseline residency learning culture, we also interviewed third-year residents who did not receive the intervention. We designed the evaluation strategy to capture the construct of SDL with multiple measures and perspectives and used an iterative approach to allow for modification of the project design based on early data collection.

Looking Ahead

The challenges of 21st century practice must be matched by strategies that enable future practitioners to address complexity and change. As medical education embraces a competency-based paradigm, the focus of clinical teaching and learning expands from knowledge, skills, and attitudes to core competencies that support lifelong professional practice.

While a shift in U.S. medical schools towards valuing SDL was reported more than 15 years ago,[22] evidence for the effectiveness of SDL over traditional educational methods is still lacking.[3] The interest in and visibility of the construct of SDL among medical educators has markedly increased with dissemination of the ACGME competency framework, particularly around the "practice-based learning and improvement" competency. Medical educators believe SDL skills are teachable and that they require practice[4,23]; guidance for trainees during the

process of learning SDL skills is recommended, particularly in the clinical learning environment.[24] Although, at this moment, SDL remains more conceptual than practical, its place in the present discourse of medical education is robust, and interventions to amend its relative absence have been reported.[3,25] Some authors have suggested reorienting the study of SDL from assessing *perceived* self-directedness to measuring *actual* SDL behavior,[20] while others advocate using qualitative measures to assess SDL.[26] By collecting qualitative and quantitative data on SDL behaviors such as goal setting, reflection, and EBM use—both before and after the intervention—we should be able to evaluate its effectiveness in promoting SDL.

In choosing a portfolio, we attempted to follow the state-of-the-art portfolio use for residency education. The availability of an existing electronic portfolio designed for this setting facilitated the implementation. We are using the portfolio as a repository of experiences and formative assessments (replacing the existing cumbersome paper system) and as a tool to structure goal setting and reflection. Recent literature has emphasized the importance of guidance to promote effective reflection, supporting our choice of a coach to facilitate portfolio use. [15,24,27]

This project is unique in several ways. Innovative design features include the introduction of a reflective portfolio in the context of a continuous mentoring relationship, a mechanism to address the hidden curriculum, and the incorporation of training in EBM as a generic, measurable SDL activity. While there are reports of interventions addressing each of these features separately, we could not identify a similar composite. Existing complex interventions have addressed institutional change or the establishment of new structures.[28,29] We are not aware of analogous

Comment [esk7]: The authors explicitly explain why/how their innovation is different from other curricula.

complex interventions that have operated within an existing program, applying relatively modest resources and seeking the stated educational impact of the present study.

A limitation of our intervention as it currently stands is that we have bypassed our faculty advisors in favor of delivering the intervention through a single learning coach; in the next phase, we hope to facilitate a transition in which faculty advisors gradually assume this coaching role.

Comment [esk8]: The authors are trouble-shooting and looking ahead.

Our design and planning processes spanned the better part of two years, and were not a linear process, but rather a circular, complex journey. Educational theories proved useful in focusing and informing our approach. After we established an acceptable and feasible basic plan, the program design continued to evolve through both stakeholder input and serendipity (e.g., the availability of both a recent program graduate with skills that fit the learning coach job description and a senior medical educator who could mentor him into this new role).

As we enter year three of the intervention, our analyses of survey and interview data are encouraging; the SDL program is feasible and acceptable to residents and faculty, and the intervention appears to improve resident confidence and skills in SDL. We are optimistic that our results will help to document the effectiveness of SDL in graduate medical education.

Funding/Support: This project was supported by U.S. Department of Health and Human Services Primary Care Training Grant D58HP08298.

Other disclosures: None

Ethical approval: This study was approved by the institutional review board of Memorial Hospital of Rhode Island.

Previous Presentations: A description of this intervention was presented at the Society of Teachers of Family Medicine national meeting, April 2009, Denver, CO.

References

1. Dall'Alba G. Learning to be Professionals. Dordrecht: Springer; 2009.
2. Knowles MS. Self-Directed Learning: A Guide for Learners and Teachers. New York: Association Press; 1975.
3. Murad MH, Varkey P. Self-directed learning in health professions education. Ann Acad Med Singapore. 2008;37:580-590.
4. White CB, Gruppen LD. Self-regulated learning in medical education. Association for the Study of Medical Education: Understanding Medical Education Series. Edinburgh: Association for the Study of Medical Education; 2007.
5. Quirk ME. Intuition and Metacognition in Medical Education: Keys to Developing Expertise. New York: Springer Publishing Company, Inc; 2006.
6. Kern DE, Thomas PA, Howard DM, Bass EB. Curriculum Development for Medical Education: A Six-Step Approach. Baltimore: Johns Hopkins University Press; 1998.
7. Westberg J, Jason H. Fostering learners' reflection and self-assessment. Fam Med. 1994;26:278-282.
8. Aukes LC, Geertsma J, Cohen-Schotanus J, Zwierstra RP, Slaets JPJ. The development of a scale to measure personal reflection in medical practice and education. Med Teacher. 2007; 29:177-182.
9. Pugno PA, McGaha AL, Schmittling GT, DeVilbiss AD, Ostergaard DJ. Results of the 2009 National Resident Matching Program: Family medicine. Fam Med. 2009;41:567-577.
10. Accreditation Council for Graduate Medical Education. Program Requirements for Graduate Medical Education in Family Medicine. Updated July 2007. Available at: http://www.acgme.org/acWebsite/RRC_120/120_prIndex.asp. Accessed August 18, 2010.

11. Eva KW, Regehr G. Self-assessment in the health professions: A reformulation and research agenda. Acad Med. 2005;80:S46-S54.
12. Strause SE, Richardson WS, Glasziou P, Haynes RB. Evidence Based Medicine: How to Practice and Teach EBM (3rd Edition). New York: Elsevier/Churchill Livingstone; 2005.
13. Shuval K, Berkovits E, Netzer D, et al. Evaluating the impact of an evidence-based medicine educational intervention on primary care doctors' attitudes, knowledge and clinical behaviour: A controlled trial and before and after study. J Eval Clin Pract. 2007;13:581-598.
14. Collins A. Cognitive apprenticeship. In Sawyer RK, ed. Cambridge Handbook of the Learning Sciences. Cambridge: Cambridge University Press; 2006: 47-60.
15. Driessen E, van Tartwijk J, van der Vleuten C, Wass V. Portfolios in medical education: Why do they meet with mixed success? A systematic review. Med Educ. 2007;41:1224-1233.
16. Colbert CY, Ownby AR, Butler PM. A review of portfolio use in residency programs and considerations before implementation. Teach Learn Med. 2008;20:340-345.
17. Posner GJ. Analyzing the Curriculum, 3rd Edition. New York: McGraw Hill; 2004.
18. Hafferty FW. Beyond curriculum reform: Confronting medicine's hidden curriculum. Acad Med. 1998;73:403-407.
19. Braddock CH 3rd, Eckstrom E, Haidet P. The "new revolution" in medical education: Fostering professionalism and patient-centered communication in the contemporary environment. J Gen Intern Med. 2004;19:610-611.
20. Hoban JD, Lawson SR, Mazmanian PE, Best AM, Seibel HR. The Self-Directed Learning Readiness Scale: A factor analysis study. Med Educ. 2005;39:370-379.

21. Ramos KD, Schafer S, Tracz SM. Validation of the Fresno test of competence in evidence-based medicine. BMJ. 2003;326:319-321.
22. Gunzburger LK. U.S. medical schools' valuing of curriculum time: Self-directed learning versus lectures. Acad Med. 1993;68:700-702.
23. Pintrich PR. Understanding self-regulated learning. In Menges RJ, ed. New Directions for Teaching and Learning, no. 63. San Francisco: Jossey-Bass; 1995.
24. Dornan T, Hadfield J, Brown M, Boshuizen H, Scherpbier A. How can medical students learn in a self-directed way in the clinical environment? Design-based research. Med Educ. 2005;39:356-364.
25. Goldman S. The educational Kanban: Promoting effective self-directed adult learning in medical education. Acad Med. 2009;84:927-934.
26. Jennings SF. Personal development plans and self-directed learning for healthcare professionals: Are they evidence based? Postgrad Med J. 2007;83:518-524.
27. Sandars J. The use of reflection in medical education: AMEE guide no 44. Med Teach. 2009;31:685-695.
28. Suchman AL, Williamson PR, Litzelman DK, et al. Toward an informal curriculum that teaches professionalism. Transforming the social environment of a medical school. J Gen Intern Med. 2004;19:501-504.
29. Cottingham AH, Suchman AL, Litzelman DK, et al. Enhancing the informal curriculum of a medical school: A case study in organizational culture change. J Gen Intern Med. 2008;23:715-722.

Comment [esk9]: 29 references—thorough, but not exhaustive. Most are recent (from 2003 or later).

List 1

Components of Self-directed Learning Curriculum

1. E-portfolio (Continuous):
    - Is accessible to resident, faculty advisor, and learning coach
    - Contains goals, reflections, formative assessments, projects
    - Documents coaching meetings
2. Learning coach meetings (1 hour per month):
    - Are one-on-one meetings involving second-year residents and the learning coach
    - Deliver the evidence-based medicine training curriculum (30 minutes)
    - Provide the resident with mentored reflection and goal-setting (using e-portfolio) (30 minutes)
3. Family Medicine Forums (8 sessions per year, 2 hours each):
    - Involve all second-year residents and faculty advisors
    - Facilitate group reflections on professional challenges and development

List 2

Content of Evidence-Based Medicine Curriculum

1. Introduction to Evidence-Based Medicine
    - Background vs. foreground questions
    - Formulating clinical questions using the PICO mnemonic (Population, Intervention, Comparison, Outcomes) and searching for evidence
2. On-line resources available via university library
3. Use of Medline/Pubmed
4. Basic epidemiology/biostatistics
    - Prevention: primary, secondary, tertiary, and quaternary
    - Screening tests, sensitivity, and specificity
    - Lead time and length time biases
    - Incidence and prevalence
5. Locating and applying clinical guidelines
6. Clinical epidemiology: Study design and quality of evidence
7. Hierarchical approach to searching for evidence

Humanism or Professionalism? The White Coat Ceremony and Medical Education

Judah L. Goldberg, M.D., M.A.

Dr. Goldberg is a second-year resident, Department of Emergency Medicine, New York Hospital Queens, New York, NY.

Correspondence should be addressed to Dr. Goldberg, Department of Emergency Medicine, New York Hospital Queens, 56-45 Main Street, Flushing, NY, 11355; telephone: (718) 661-7305; fax (718) 661-7976; e-mail: (judahg@alumni.upenn.edu).

Comment [esk1]: Excellent, compelling title. Professionalism is – and was especially at the time – a hot topic.
The White Coat Ceremony is a beloved, well-established, unique-to-medicine tradition, so readers may be particularly interested in what the author has to say about this ceremony in relation to humanism/professionalism.

Abstract

In this article, the author challenges the widely held assumption that humanism and professionalism are necessarily complementary themes in medical education. He argues that humanism and professionalism are two very different value systems with different rationales, different goals, and different agendas. While humanism is a universal, egalitarian ideology, professionalism represents the parochial, culturally determined practices of a particular professional group that may or may not conform to lay expectations.

Distinguishing professionalism from humanism is crucial to understanding the divergent attitudes of providers and lay persons with regard to health care delivery and physician behavior. Moreover, it highlights the tension that medical students experience as they are tacitly asked to leave behind their lay, humanistic values and embrace a new professional identity, a transition that the common blurring of humanism and professionalism fails to recognize. In this context, the Arnold P. Gold Foundation's widely acclaimed White Coat Ceremony for entering medical students may actually be inhibiting, rather than encouraging, the genuine growth of humanism in medicine.

Comment [esk2]: Great 1st sentence for the abstract: summarizes the entire article well and establishes the reason for the article, an argument against the establishment…

The abstract uses 3rd person ("the author") – not 1st person ("I").

Even the graduate student should not lose sight of general cultivation and fall into stark professionalism.

--B.A. Hinsdale, *Studies in Education: Science, Art, History*, Chicago, Werner School Book Co., 1896

The purpose of this article is to highlight some of the tensions inherent in the messages that the medical community sends to its students, not only through the White Coat Ceremony but also throughout their training experiences. Specifically, the medical community regularly lectures its students about the dual values of humanism and professionalism without regard for either the distinctions between them or the tensions that can arise between them, both in training and in practice. Worse, there is a growing trend to assume that professionalism itself fully encompasses humanistic values and that professionalism alone can therefore represent the entire aspiration for virtue in medicine. I argue that this tendency towards professional reductionism impoverishes, rather than enriches, our moral base and could ultimately leave medicine bereft of a true humanistic moral compass.

Comment [esk3]: Great first paragraph—establishes the need for the argument: medical education conflates and therefore confuses humanism and professionalism, possibly resulting in less humanism

While this is concerning for medical practice generally, I believe it is most poignant, and perhaps most harmful, in the context of medical education, as medical students first encounter the profession of medicine and seek to develop their own identities as physicians. In promoting the dual values of "humanism and professionalism,"[1] or actually enveloping the former within the latter, as in "humanism is . . . central to professionalism,"[2] the medical community confuses more than it clarifies and hampers, rather than encourages, deep moral development in medical students. I will examine these issues as they pertain to the White Coat Ceremony, primarily because of its visible role as the harbinger of a new wave of professionalism education and because it serves as the actual

initiation point for many medical schools.[3-4] However, the issues that the White Coat Ceremony raises for medical students do not end with it, but persist throughout medical education and beyond.[5] Ultimately, the more clarity we can present to our students about the multiple, and sometimes competing, dimensions of medical practice, the better we will empower these fledgling physicians to balance them with grace and with insight.

Humanism Versus Professionalism

Comment [esk4]: Great heading. Clearly sets up the tension between humanism and professionalism

"Humanism and professionalism," it seems, has become somewhat of a catch-phrase for medical education. Compelled by a sense of dissatisfaction with the training for the non-medical aspects of physician practice, medical educators have increasingly sought both to teach and to measure a set of values and behaviors that are broadly labeled as "humanism and professionalism." The highly respected Dr. Arnold P. Gold has described how he felt that "students were undervaluing humanism and professionalism,"[6] motivating him and his wife, Dr. Sandra Gold, to launch the pioneering Gold Foundation, the sponsoring organization for the White Coat Ceremony.[7] Similarly, the Gold Foundation's most recent initiative, The Gold Humanism Honor Society, has been "organized to elevate the values of humanism and professionalism within the field of medicine and its constituent institutions."[7] Describing the White Coat Ceremony, a recent review of teaching professionalism explains it as a process by which students "learn the meaning of responsibility that comes with wearing the white coat, the expectations for humanism and professionalism."[1] Another commentary on the White Coat Ceremony reflects this language: "the white coat emerges from the ritual as a symbol of professionalism and humanism, and remains a tacit reminder throughout medical school."[8] Finally, I note that my own medical education included a curricular module termed

"Humanism and Professionalism,"[9] overseen by the Associate Dean for Professionalism and Humanism.

Some have gone even further, not just pairing humanism and professionalism but subsuming humanism within professionalism. Thus "Project Professionalism," a publication of the American Board of Internal Medicine, states that "humanism is . . . central to professionalism."[2] This language is almost exactly duplicated by Dr. Gold, who has written, "Humanism is the central aspect of professionalism."[10] From this perspective, discussion of "humanism and professionalism" is almost redundant, as medical professionalism has seemingly embraced the spirit and the values of humanism without reservation or exception.

More recently, Cohen has argued for independent definitions of humanism and professionalism and the indispensability of each for medical education. Still, for Cohen, too, humanism and professionalism are fully complementary, with humanism providing "the passion that animates authentic professionalism."[11] Together, they represent two halves of a unified, coherent vision for physician virtue, devoid of any internal tensions or contradictions.

The tendency to combine humanism and professionalism probably stems from a considerable overlap in their constituent elements. Empathy, compassion, respect, and integrity, for instance, could easily be described as components of both humanism and professionalism. However, I question both the conceptual validity as well as the ultimate wisdom of conflating these two terms. Humanism and professionalism, in my understanding, identify two very different ethos of physician practice and emerge from divergent visions for the physician-patient relationship. While they may often make overlapping and complementary demands of a physician, they can also split, run counter

to each other, and collide. Furthermore, blurring the distinctions between the two undermines both, as students and physicians alike are drawn towards the homogenized commonalities between them and are led away from critical reflection on the subtleties of either.

It is not clear who first stitched together the terms medicine and humanism, nor exactly what was intended at the time. For my purposes, I will adopt a fairly broad understanding of humanism, as articulated by one of my own mentors: the accordance of deep respect to humans individually, and to humanity collectively, and concern for their general welfare and flourishing.[12] While it is not at all difficult to imagine how this tradition intersects with clinical medicine, it is also crucial to understand exactly what it lends to the profession of healing. The hallmarks of humanism are its universality, its egalitarianism, and its scope. Its concerns, on the one hand, and obligations, on the other, apply to all humans equally; its training ground, for the most part, is experience—as a human and with humanity; and its ultimate vision is for human welfare, as broadly conceived as possible. It requires neither professional expertise nor special knowledge, only reflective and thoughtful human beings who are ready to engage each other across multiple dimensions. Furthermore, it is in no way bounded by clinical medicine but transcends it. Rather than embody the totality of humanism, the sensitive physician at most humbly participates in its venture, making his or her small contribution to the grander project of human wellbeing.

Professionalism, in contrast, is a socially constructed, local phenomenon. It is rooted in a sociological understanding of a profession, for which I rely on the late Eliot Freidson's classic definition in his landmark *Profession of Medicine*: a group of specialized workers whose expert knowledge earns them the right to function independently as a semi-autonomous mini-society.[13] The strength of a profession as a social unit lies in its members' assertion of a distinct and

Comment [esk5]: Over and over again, the author uses extremely pictorial, descriptive, vivid language helping readers "see" the differences between professionalism and humanism.

Comment [esk6]: The author clearly defines, for his purposes (i.e., the content/context of this author) a term (humanism) that could mean a lot of different things to a lot of different readers.

Comment [esk7]: The author again defines a term that may have many different meanings

consolidated collective identity, whether through participation in professional organizations; the nurturing of a rich, internal professional culture; or censure of those who deviate from the profession's standards of conduct. Professionalism raises expectations for professional behavior to the level of ideology, encouraging all members to embrace the traditions of the profession and be as "professional" as they can.

But what, exactly, does it mean to be professional? Though professional traditions do contain moral commitments, they also include a diverse range of other cultural components. Empathy, respect, and compassion, for instance, are certainly part of medicine's self-image, but so are certain standards of the appropriate dress, demeanor, language, and habits of a physician; a level of comfort in trespassing usual social taboos of exposing and touching strangers; a readiness to blend patient care with student mentoring in clinical contexts; a tacit understanding of the limits of physician responsibility; and a vision of medicine as an essentially scientific field. None of these elements by themselves are outright objectionable, but several of them are unquestionably value-laden and could be subject to discussion, yet they are usually justified by little more than the traditions of medicine themselves. An ideology of professionalism simply promotes all of them indiscriminately without offering any basis for introspection.

Several other features distinguish professionalism as a guide for physician behavior from humanism (see Table 1 for a summary). While humanism appeals to universal values, professionalism is rooted in the local traditions of a group whose self-identity lies primarily in its distinction from the surrounding lay community. Anyone with a good head and sharpened sensitivities may comment on humanism, while the normative understanding of professionalism belongs to the professional group, who manages how much of a voice outsiders are granted.[13] The content of professionalism,

too, is narrower than that of humanism, since the professional group defines what the content and issues for professionalism will be. Values such as courage, loyalty, patience, and humility, for instance, receive little attention in discussions of medical professionalism, whereas their relevance to everyday human interactions makes them central to humanism.

Motivation is also a dividing point for humanism and professionalism. Humanism emanates from a primary duty towards humanity. Professionalism, on the other hand, relates only indirectly to society. Enhancement of the profession's service to society might be a result, but professionalism itself is aimed primarily towards protecting the autonomy and integrity of the profession for its own sake.[14] Medicine, in fact, is a case in point. Speculation about the reasons for the current resurgence in medical professionalism abounds, but one undeniable component is the medical profession's need to reenergize itself as a strong and self-governing independent entity at a time of public doubt and encroachment.[1,15]

Finally, and perhaps most critically, humanism and professionalism differ in the way that individuals discover, negotiate, integrate, and apply them. Humanism, at its heart, is a philosophy. While social processes may contribute to humanistic moral development, the doctrine is an essentially cognitive one and therefore always subject to rational discourse. As a way of life for the individual, humanism is fashioned out of reflective experience, a dialectical process of calibrating theory to practice and vice versa, ever further refining both character and behavior. The professions, and medical professionalism, by contrast, are social phenomena. The primary mode of initiation is not through rational learning, but rather through an intense and well-studied socialization process through which newcomers absorb the social traditions of the group.[16-19]

To borrow terms from the field of moral psychology, professionalism typifies "conventional thinking," whereas humanism is an example of "postconventional thinking."[20] Conventional thinking judges behavior through the narrow lens of social convention. Postconventional thinking, on the other hand, seeks to transcend mere accepted practice and construct fair, universal guidelines for human interaction. While conventional thinking flows from an undue fascination with established social roles and norms, postconventional thinking thrives best when we break out of sectarian outlook and social rank, indulging instead in our common human identity. Postconventional thinking is a deliberative process through which we consider multiple perspectives and identify common core values. Conventional thinking, on the other hand, relies completely on comparison to an isolated group's conventions and offers no language through which to actually analyze the judgments it passes.

What follows is that humanism and professionalism for the physician are fundamentally different ways of operating. Regarding humanism, lessons learned from the medical context may be instructive, but humanism actually flows most naturally from a lay, rather than a professional, identity. Professionalism, in contrast, both represents and feeds a preoccupation with professional identity and contributes to isolating the physician from the lay public.

The limits of professionalism also become apparent. As with all forms of conventional thinking, professionalism cannot distinguish between different types of transgressions on a rational basis. In contrast to humanism, which is logically constructed out of foundational principles and can therefore develop a sophisticated hierarchy of moral responsibilities, professionalism confronts a static field of arbitrary conventions without any analytical tool for assigning moral weights. Acting unprofessionally means little more than deviating from the conventions of medicine. By itself,

professionalism cannot explain why lying to a patient, for instance, is worse than wearing a T-shirt to work, other than to grade different professional traditions as more or less central to medicine. Such an undertaking, however, would be a sociological inquiry, not a philosophical one. No wonder that medical professionalism has fascinated sociologists,[21-23] while some philosophically inclined clinicians have regarded it as conceptually thin.[24-25] Humanism, on the other hand, can offer a coherent argument for why deception more gravely disrespects a patient's essential humanity than does dressing down in the clinic .

None of this means that medical professionalism is self-serving, disingenuous, farcical, or even dispensable. To the contrary, medical professionalism is for the most part aligned with noble, humanistic ends, and the force of its total vector has generally pointed in the same direction as society's interests. Moreover, even Eliot Freidson, famous for his critique of the medical profession, defended the absolute necessity of an autonomous profession with its own professional ethic.[14] What does mark professionalism, however, is its socially constructed nature, and therefore its essential arbitrariness; its heterogeneous tangle of overlapping, intersecting, and contradictory goals and interests (e.g., the conflict between improving access to care[26] and preserving a long tradition of high compensation for physicians); and its conventional, rather than deliberated, character. Just realizing how differently various medical circles have interpreted professionalism over time ought to chasten those who currently swear by it. If professionalism in the twenty-first century emphasizes the art of medicine over its scientific component, for instance, the exact opposite was true at the beginning of the twentieth century, when professionalism in medicine meant emotional distance and scientific stoicism above all else.[27]

Even today, after so many organizations have taken steps to articulate the expectations of professionalism, gaps, doubts, and inconsistencies persist. For example, authors have noted how supposed professionalism, both in theory and in practice, has been surprisingly tolerant of an increasingly aggressive commercialism among physicians[23] as well as of ever closer financial ties to the pharmaceutical industry.[28] If the professional societies responsible for the professionalism agenda are themselves complicit,[29] from whence can come a critique? And if lay humanism has indeed become central to medical professionalism, how do we explain the disparity between public outrage and professional smugness with regard to these practices?

At The "Rough Edge" of Medical Education

Comment [esk8]: Another excellent heading, compelling and also summative. This entire section is about third-year students who are entering the clinic more or less for the first time. They are on the edge of being just lay humans and medical professionals

To document the tension between humanism and professionalism, one need only observe third-year medical clerks as they shift from passive absorbers of medical knowledge to active participants in the health care system. If this transition is stressful, one of the primary reasons is because these clerks must suddenly leave behind a purely lay identity and internalize an entirely different,[17] unreflective culture,[30] including a radically different cultural understanding of humanism. Here, deep ethnography gets replaced by curt social histories; human relationships must adapt to a tight and inflexible hierarchy; and humanism is rationed out in ways that don't interfere with the health care engine. Whereas students' college educations likely championed respect for persons and personal integrity above all else, their early clinical training now instructs them to enter, disturb, wake, undress, and examine at will in an environment that hardly offers the patient a chance to protest. Even their early, modest forays into the clinical setting as first- and second-year students, whether to observe or to shyly practice interviewing and examination skills, barely prepare the clerks for this new reality: "Often in the hospital setting I feel I intrude into people's lives, take

Comment [esk9]: Vivid language. Use of "whereas"—excellent contrasting.

what I want, and move on."[31] Whether this mode of practice is justifiable or not for the sake of health care delivery is not the question. Even if we assume, somewhat generously, that it is unavoidable, this doesn't change the fact that these behaviors inevitably betray, and quite possibly erode,[32] the lay sensitivities of medical students to a degree that the medical profession rarely acknowledges.

We can learn much about the rough edge of humanism and professionalism education from examining medical students' self-reported internal tensions and conflicts. Several studies, both qualitative and quantitative in nature, have documented the ethical lapses that medical students both observe and participate in during medical school, as well as a trend towards lower standards as medical education progresses.[31,33-44] In fact, these data sets have been instrumental in prodding the medical community to invest more heavily in humanism and professionalism education at the undergraduate level.

However, what is missing from many of these analyses is the recognition that value judgments such as unethical and unprofessional have a sociological component to them. Charles Bosk has emphasized a similar point with regard to medical error, arguing that the very definition of "error" is a "negotiated concept," subject to interpretation and influenced by one's role in the health care system.[45-46] The same holds true for judgments of conduct. What a patient considers rude might seem acceptable to a physician (e.g., immediate total body exposure of trauma patients in the emergency department), and what an ethics panel flags as troubling might seem unavoidable to the health care team. Straddling the great divide, of course, is the medical student, who lives on the ever-so-thin boundary between lay and professional. Depending on the day, or the mood of their superiors, medical students may either be granted entry into the hospital's work-group or be treated

as outsiders. Similarly, students themselves study their environment from both sides of the nurses' station, viewing it alternatively as insiders or through the eyes of the lay community from which they are still emerging.[40] What they call inappropriate may reflect the consensus of the professional community into which they are assimilating, or it may deviate sharply from the mindsets of their superiors and find more in common with a lay perspective.

The cases in which medical students voice a lay perspective, in particular, can provide a unique lens through which to view the struggles between lay and professional, between humanism and professionalism, as they unfold in the hearts and minds of tomorrow's doctors. While popular wisdom holds that these two value systems should peacefully coexist in the soul of a medical student, the data, I believe, suggest that this is not always the case. Of the total pool of ethical violations described in the above-mentioned studies, at least some of the judgments seem to be student-specific, meaning that the professionals involved, whether residents or attendings, did not apparently recognize that anything at all had been compromised. To be sure, not all of the physician behavior and attitudes described by the students conform to the various codes of professionalism that are bandied about today. However, if we take the social nature of professionalism seriously, then the norms of actual practice in the professional context should mean far more for our understanding of professionalism than any position statement. While the cases I draw from may not be exemplary, none are fringe, either, and that says the most of all.

Students' reported dismay about the seemingly normal functioning of the health care system around them falls along several different themes. By far the most common is student discomfort with the power and authority of the health care team over its ward. Whereas the students imagine a more even relationship between practitioner and client, the hospital setting in practice robs patients of

Comment [esk10]: This paragraph provides a superb introduction and explanation for the three quotes that follow.

much of their control over their illnesses, right down to their very diagnoses. For example, several students quoted in these studies are taken aback by how carefully the health care team regulates the sharing of diagnostic information:

> Pathology report came back for a patient with colon CA. I was instructed not to tell him—wait for the attending to tell him. The attending was on vacation for the week.[34]

> When I learned that the biopsy of a lung nodule showed an undifferentiated cancer, I was very upset but I wanted to be there when [the patient] was told. When I asked my resident *who* would inform the patient of the biopsy results, he instructed me that no one on our team was to say anything. Instead, the oncologists would tell him . . . For the next two days, the patient repeatedly asked me if I knew the results, and with many misgivings I told him "no." When he finally learned, he was very angry that I had kept the truth from him—and I couldn't blame him.[33]

> On my medical rotation, there was a patient on the floor who had lung cancer but [the physicians] weren't sure [of the type]. Nobody would tell the patient that he had cancer. . . It was very clear that the patient could have been told he had cancer but they just didn't know exactly what type it was and they didn't want to get into specifics until they knew that every test had been done. This patient was probably in the hospital close to a week and a half, and, every time I would go in the room, he would keep saying to me, "I don't have cancer do I?" And I was not at liberty to even tell him anything because the staff and the respirologist wouldn't tell him.[39]

In the modern health care system, medical results do not belong to the patient. Rather, they rest with the attending physician, who controls when, where, and how to share them with a patient. The students' superiors take this ownership for granted, even in extenuating circumstances. The students, in contrast, express deep misgivings about this form of authority, as they find themselves uncomfortably situated right at the gap between physicians' medical omniscience and patients' frustrating blindness.

Comment [esk11]: Likewise, this sentence and paragraph also explains how/why the three above quotes are important for the author's argument.

The author does not ever simply "dump" quotes in the article.

More directly demonstrative of the tug-of-war between humanism and professionalism is students' surprise with the boundaries of medicine. Whether in taking a history, presenting a case, developing a problem list, or coordinating management, the students are led to gloss over aspects

that are deemed non-medical (itself a value judgment) in favor of the quintessentially medical. Whereas the students approach the clinical context with an expansive, humanistic conception of health and flourishing that includes social concerns, they sometimes find that their superiors exclude primarily social problems from the medical realm and focus only on organic disease:

> A 72-year-old woman had been readmitted for another exacerbation of her chronic obstructive pulmonary disease, precipitated by her failure to take her medicine. Over the ensuing week I got to know her, and she confided in me that she was homeless but was "looking for a good place." She also made me promise that I would not tell this to anyone, since she did not want social work or psychiatry involved in her case. She responded well to treatment and as she approached discharge, my attending asked her where she would be going. She replied that she had an apartment lined up. While I felt that I couldn't violate her confidentiality, I did hint that she might not have any place to go. My intern replied that she was competent, had said that she had secured an apartment, and that he wanted her "off his service."[33]

The student, apparently, sees great irony in narrowly focusing on an acute respiratory problem while ignoring the larger threats to health and wellbeing in this chronically ill patient. Moreover, discharge under these conditions almost guarantees relapse, making the whole effort self-defeating. The intern, however, is uninterested. Whether out of cynicism, resignation, or both, he has learned to define his own professional role just that narrowly. The patient's next admission will belong to someone else.

Of all of the studies, Parsons et. al.'s "Between Two Worlds: Medical Student Perceptions of Humor and Slang in the Hospital Setting"[40] is most insightful in noting the unique sociological position of medical students. According to Parsons et. al., students may be alternatively "outsiders" or "insiders" to the medical culture, capable of identifying with either the patients' or the physicians' perspectives. Early on, students express shock at the slang and humor in the hospital, observing from the sidelines and questioning the appropriateness of the humor:

> [The residents were] talking about older patients as toads and frogs and gomes [a shortened form of GOMER]. I had never heard patients talked about in that way.

> And just going from the classroom to the clinics with all these ideals of what doctors were supposed to be like . . . It was 20 [physicians] sitting at breakfast together like a big football team and talking about patients in a way that was very disappointing.

Over time, however, the students learn to identify with their superiors, growing more accepting of the humor and even participating. The same student who described initial disappointment then explains the shift in attitudes that came with finishing a sub-internship:

> I was so shocked at the way doctors talked about people in the beginning. But having just finished a month of being that tired and sleep deprived, and being up all night for really stupid things, I can see where the frustration comes from. I still don't think it's right, but I can understand it a little. Now it's no longer inconceivable to me why people talk that way about patients and families.

Yet again, we encounter a form of behavior that by no means conforms to the party line on professionalism, yet is, for the students, part and parcel of belonging to the medical profession. Moreover, whereas at first the students align themselves with the ridiculed patients, they learn through their training to think and act more and more like the professionals they report to.

It would be easy to dismiss the behavior in all these cases as both non-humanistic and unprofessional. Rather than descend into a semantic squabble, I will highlight one simple point: *that's not how the students saw it*. For them, this was professional medicine at its most authentic. For the same reason, I have glossed over any distinction between resident and attending behavior in this context, as both, I believe, were representative of professional norms for the medical students. From their perspective, their collective, naïve conscience was hitting up against the conventions of professional practice and, in many cases, it succumbed. As the data suggest, the students evolve over time, willing, for instance, to speak about patients in ways that they themselves used to find disturbing.[34,38,40]

How, exactly, should we describe this transition? Specifically, is this indeed a phenomenon of losing values, or would we better describe it as a gaining of a new set of professional values? More broadly, when a medical student learns to ask an embarrassing question of a patient on morning rounds without blushing, or to mold a complex story into a slick but anonymous presentation, or to use ward humor as a pressure valve, is this a loss, a gain, or both? And the answer is crucial, because the storyline of ethical erosion is central to the current wave of professionalism in medical education. Educating for professionalism is a solution to a stated problem, a way to preserve the ethical standards that supposedly break down during the course of medical education. However, if we interpret the changes that medical students report as a process of trading lay, humanistic values for professional ones, then pushing professionalism even harder cannot be the response. To the contrary, all it does is further befuddle medical students about exactly what we seek from them.

The White Coat Ceremony

With this we come to the White Coat Ceremony, the almost universal opening bell for American medical education, where the confusion begins. The Gold Foundation, to its credit, has bucked the trend towards professionalism and continues to identify "humanism in medicine" as its primary mission.[7] The White Coat Ceremony remains its most visible achievement in trying to "build values and traditions through rituals and rewards that would elevate and expand humanism."[10] But what symbol does the Gold Foundation use for this purpose? The white coat, the supreme icon of medicine as a profession. In other words, we are teaching medical students that humanism is to be found within their professional identities and not outside of it, and that their white coats will provide all the encouragement they need to level with their patients as fellow humans. Through the White Coat Ceremony, the locus of humanism becomes an external uniform of exclusivity rather

than the naked, vulnerable, common human being who hides inside. Not only do students miss the point of humanism in the moment of the ceremony, they also learn that their professional socialization (i.e.; "putting on the coat") is a source of virtue, providing a full dose of the sensitivity, courage, and humility they will need as physicians.

Furthermore, whenever this faith falters in the future, the medical establishment repeats the message, responding to a self-reported sense of ethical erosion with a greater emphasis on competencies in professionalism. So begins a long journey for medical students of having their internal struggles between lay humanistic and professional values denied, their intuitive sense of friction unacknowledged, and their own silent transformations from humanists to professionals ever reinforced by an enshrined set of clichés and myths.

Amidst all the acclaim,[8,47] some of the problematic themes latent in the White Coat Ceremony have been recognized.[48-50] Robert Veatch[49] has been particularly sharp in his criticism of what the Gold Foundation positively describes as a "bonding process" between faculty and students.[7] Veatch charges that the White Coat Ceremony is better described as "a symbolic 'setting apart' of the student from the lay population." He concludes that

> it is doubtful that a "bonding process" is tolerable if its real function is symbolically to remove students from the culture from which they and their future patients come and to place them in a new culture bonded with medical practitioners from all manner of traditions but increasingly isolated from the people and cultures from which they have come.

What Veatch leaves out is that the ceremony is actually staged in the name of "humanism in medicine." Not only does it ritualize the conversion of medical students from lay people into professionals, but it claims that the students will be more connected with the universal values of humanism as a result.

Responding to Veatch, other authors[8,51] reject what Veatch sees as an inherent tension between personal values and professional ethics, between lay and professional culture. Thus Raanan Gillon, for instance, writes that the bonding process "is intended as an enhancement and expansion of a medical student's and a doctor's moral and cultural commitments, not a replacement of those they already have."[51] If only it were so simple. As any medical student or reflective physician can attest, the tensions are real, deep, and systematic. If we acknowledge them, we will at least have a chance to confront them openly. With enough humility, we might even seek the input of the lay community, who arguably ought to have a say in how easily its values should bend to the whims of self-righteous professionalism. If we deny the conflict, however, we will only continue to enwrap ourselves ever more tightly in this enchanted cloak of humanism and professionalism, waiting for the public to point out that we are thinly veiled indeed.

The Legacy of Dr. Arnold P. Gold

It is unfortunate that the Gold Foundation has accidentally stumbled into the politics of professionalism, for its mission is genuine to the core. If it has done so, it is only because the white coat for Dr. Gold, it seems, symbolizes the medical tradition of 1954, when, in his words,

> There were none of the competing values and messages that are prevalent today. Residents and students did what their attendings modeled. Altruism was the rule, and meeting the needs of the patients, whatever the personal cost, was the norm. In effect, both the formal and the hidden curriculum were one in the same, and expectations for success were clearly defined. [10]

Whether the messages of professionalism were indeed so straightforward fifty years ago is itself a question, but Dr. Gold first among us acknowledges the shortcomings today. The irony, however, is that to today's medical students, the white coat symbolizes not the medical profession of 1954, but the current medical culture that compelled Dr. Arnold and Dr. Sandra Gold to launch the Gold

Foundation in the first place. In other words, the Gold Foundation has gotten caught in the very gap between humanism and professionalism, tying timeless values to the whims and fancies of today's medical culture. Unwittingly, it is contributing to the socialization of students into the very professional conception that it claims has betrayed the spirit of humanism.

But there is a greater fallacy here, and perhaps Dr. Gold's model most of all can provide guidance in revealing it. If Dr. Gold became a caring physician, I suspect that it was not because he joined the professional ranks of physicians, but because he trained with humanistic doctors who brought humanism to their medicine. If they encouraged and rewarded his integrity and compassion in professional contexts, all the better, but I doubt his humanism was truly rooted in his professional practice. My own hunch is that Dr. Gold is an extraordinary human—and humanist—in every sense, and I read his secretary's words carefully when she comments, "It is rare when a patient leaves Dr. Gold's office to not mention what a sweet and kind *human being* he is." (emphasis added)[52] I would venture that the outstanding model of practice that the Gold Foundation honors draws more upon Dr. Gold's core person than any professional identity. This, ultimately, is the potent message of Dr. Gold's legacy that medical students so desperately need: your socialization into the medical system will hand you a mixed-bag; no one besides yourself can be responsible for your development of character; and this character, upon which your patients will rely, will ultimately grow out of what kind of person, not how much of a physician, you are.

We do not need to teach students how to put on their white coats, but how to take them off. If I could script an initiation ritual for medical students, it would be in the spirit of a comment by Dr. Sandra Gold, President and Chief Executive Officer of the Gold Foundation: "One thought is that every physician in training should spend a week as a patient."[10] Rather than cloak the students in the

coats of the elite, I would borrow a scene from the 1991 film "The Doctor" and dress the students in the common garb of human frailty: a hospital gown. Vulnerable and slightly exposed, they could stand in front of a crowd that only slightly outnumbers the daily census of an average hospital room and pledge never to forget how unforgiving medical care can be in stripping patients down to their bare humanity. Perhaps students would thus embark on their medical education with a reminder of what they share with their patients rather than what sets them apart.

Conclusion: Humanism *over* Professionalism in Medical Education

Comment [esk12]: This last section heading refers cleverly to both the title and a previous section heading.

I close with a pointed message for the medical profession overall. Humanism is too precious to medicine to be swallowed up by pretentious professionalism. To the contrary, humanism must remain the external standard by which we can occasionally critique our practice and re-center our professional values. If we persist with the notion that professionalism embodies humanism, we only rob ourselves of an important reality check that can keep us grounded in and connected to the lay population we serve.

But it is not enough just to protect the universal values of humanism from an encroaching professionalism. Rather, we ought to foster a practice of medicine in which an expansive spirit of humanism that transcends the specific realm of health and disease continually animates and elevates our perspectives. Perhaps a greater emphasis on the universal principles of humanism, rather than on parochial professionalism, is in order, at least at the level of undergraduate medical education. The social, political, and economic forces that fuel medical professionalism are not going away. Furthermore, the Accreditation Council for Graduate Medical Education (ACGME) has already canonized professionalism as one of the central criteria for resident competency,[53] guaranteeing that

medical trainees will soon enough encounter its themes. But undergraduate medical education can still choose to resist the fad if it so wishes. Rather than submit to the framework that the ACGME has chosen, medical educators should place the onus on professionalism to prove what it offers to their bright-eyed, fresh recruits that a sweeping and inspiring humanism does not.

Medical schools do not need the slogans of professionalism any more than kindergartens need political banners. Nor does medical education benefit from the jumbling of disparate terms. There is nothing terribly humanistic about protecting professional elitism, whether through uniforms or other means, and to pretend otherwise risks cheapening the very concept to the point of irrelevance.

What our students could use most is the intellectual and emotional space to reflect on their inexorable transition from lay to professional, as well as validation from their mentors about that process. We serve our students best by keeping their tensions alive rather than masking them, lest these future physicians lose total self-awareness of their conflicted social role. Let them learn to subordinate their medical, professional identity to their essential human character, for our goal is physicians who see their medicine as part of a commitment to humanism, not physicians who superficially incorporate values of humanism into their picture of medicine.

Comment [esk13]: The last sentence is a call to action. It answers the question, "So what?"

Acknowledgements

The author would like to thank Dr. Chris Feudtner and Dr. Charles Bosk for their insights.

References

1. Stern DT, Papadakis M. The developing physician—Becoming a professional. N Engl J Med. 2006;355:1794-1799.
2. Stobo JD (chair). Project Professionalism. American Board of Internal Medicine, Philadelphia, PA, 1995. Available at:(http://www.abim.org/pdf/publications/professionalism.pdf). Accessed April 28, 2008.
3. Cohn F, Lie D. Mediating the gap between the White Coat Ceremony and the ethics and professionalism curriculum. Acad Med. 2002;77:1168.
4. Rhodes R. Enriching the White Coat Ceremony with a module on professional responsibilities. Acad Med. 2001;76:504-505.
5. Ellsbury KE, Carline JD, Wenrich MD. Competing professionalism values among community-based physicians. Acad Med. 2006;81(10 Suppl):S25-S29.
6. Gold AP, Gold SO. An accelerating trend: more humanism in medicine. AAMC Reporter. Washington, DC: Association of American Medical Colleges, 2002. Available at:(http://www.aamc.org/newsroom/reporter/oct02/viewpoint.htm). Accessed April 28, 2008.
7. Arnold P. Gold Foundation website <http://www.humanism-in-medicine.org>. Accessed April 28, 2008.
8. Huber SJ. The white coat ceremony: A contemporary medical ritual. J Med Ethics. 2003;29:364-366.
9. Lewin LO, Lanken PN. Longitudinal small-group learning during the first clinical year. Fam Med. 2004;36(Jan suppl):S83-S88.
10. Gold A, Gold S. Humanism in medicine from the perspective of the Arnold Gold Foundation: Challenges to maintaining the care in health care. J of Child Neuro. 2006;21:546-549.

11. Cohen JJ. Linking Professionalism to humanism: What it means, why it matters. Acad Med. 2007;82:1029-1032.
12. Lichtenstein A. *"Mah enosh"*: Reflections on the relation between Judaism and humanism. Torah U-Madda J. 2007;14:1-61. Available at:(http://www.yutorah.org/_shiurim/1.%20Aharon%20Lichtenstein%20-%20%27Mah%20Enosh%27%20Reflections%20on%20the%20Relation%20between%20Judaism%20and%20Humanism.pdf). Accessed April 28, 2008.
13. Freidson E. Profession of Medicine: A Study of the Sociology of Applied Knowledge. New York: Dodd, Mead, 1970.
14. Freidson E. Professionalism, the Third Logic: On the Practice of Knowledge. Chicago: University of Chicago Press; 2001.
15. Siegler M. Training doctors for professionalism: Some lessons from teaching clinical medical ethics. Mt Sinai J Med. 2002;69:404-409.
16. Fox RC. The Sociology of Medicine: A Participant Observer's View. Englewood Cliffs, N.J.: Prentice Hall; 1989.
17. Hafferty FW. Into the Valley: Death and the Socialization of Medical Students. New Haven: Yale University Press; 1991.
18. Hafferty FW, Franks R. The hidden curriculum, ethics teaching, and the structure of medical education. Acad Med. 1994;69:861-871.
19. Apker J, Eggly S. Communicating professional identity in medical socialization: Considering the ideological discourse of morning report. Qual Health Res. 2004;14:411-429.
20. Rest J, Narvaez D, Bebeau MJ, Thoma SJ. Postconventional Moral Thinking: A Neo-Kohlbergian Approach. Mahwah, N.J.: Lawrence Erlbaum Associates; 1999.
21. Bloom SW. Professionalism in the practice of medicine. Mt Sinai J Med. 2002;69:398-403.

22. Hafferty FW. Professionalism—The next wave. N Engl J Med. 2006;355:2151-2152.
23. Hafferty F. The elephant in medical professionalism's kitchen. Acad Med. 2006; 81:906–914.
24. Kinghorn WA, McEvoy MD, Michel A, Balboni M. Professionalism in modern medicine: Does the emperor have any clothes? Acad Med. 2007;82:40–45.
25. Pellegrino ED. Professionalism, profession and the virtues of the good physician. Mt Sinai J Med. 2002;69:378-384.
26. ABIM Foundation; ACP-ASIM Foundation; European Federation of Internal Medicine. Medical professionalism in the new millennium: A physician charter. Available at: (http://www.abimfoundation.org/professionalism/pdf_charter/ABIM_Charter_Ins.pdf). Accessed April 28, 2008.
27. Warner JH, Rizzolo LJ. Anatomical instruction and training for professionalism from the 19th to the 21st centuries. Clin Anat. 2006;19:403-414.
28. Rothman DJ. Medical professionalism—focusing on the real issues. N Engl J Med. 2000;342:1284-1286.
29. Kassirer JP. Professional societies and industry support: What is the quid pro quo? Perspect Biol Med. 2007;50(1):7-17.
30. Taylor JS. Confronting "culture" in medicine's "culture of no culture." Acad Med. 2003;78:555-559.
31. Feudtner C, Christakis DA. Making the rounds: The ethical development of medical students in the context of clinical rotations. Hastings Center Report. 1994;24(1):6-12.
32. Newton BW, Barber L, Clardy J, Cleveland E, O'Sullivan P. Is there hardening of the heart during medical school? Acad Med. 2008; 83:244–249.
33. Christakis DA, Feudtner C. Ethics in a short white coat: The ethical dilemmas that medical students confront. Acad Med. 1993;68:249-54.

34. Feudtner C, Christakis DA, Christakis NA. Do clinical clerks suffer ethical erosion? Students' perceptions of their ethical environment and personal development. Acad Med. 1994;69:670-679.
35. Charon R, Fox R. Critiques and remedies: Medical students call for change in ethics teaching. JAMA. 1995;274:767-771.
36. Feudtner C, Christakis D, Schwartz P. Ethics and the art of confrontation: Lessons from the John Conley Essays. JAMA. 1996;276:755-756.
37. Satterwhite WM, Satterwhite RC, Enarson CE. Medical students' perceptions of unethical conduct at one medical school. Acad Med. 1998;73:529-531.
38. Satterwhite RC, Satterwhite WM, Enarson C. An ethical paradox: The effect of unethical conduct on medical students' values. J Med Ethics. 2000;26:462-465.
39. Hicks LK, Lin Y, Robertson DW, Robinson DL, Woodrow SI. Understanding the clinical dilemmas that shape medical students' ethical development: Questionnaire survey and focus group study. BMJ. 2001;322:709-710.
40. Parsons GN, Kinsman SB, Bosk CL, Sankar P, Ubel PA. Between two worlds: Medical student perceptions of humor and slang in the hospital setting. J Gen Intern Med. 2001;16:544-549.
41. Ginsburg S, Regehr G, Stern D, Lingard L. The anatomy of the professional lapse: Bridging the gap between traditional frameworks and students' perceptions. Acad Med. 2002;77:516-522.
42. Caldicott CV, Faber-Langendoen K. Deception, discrimination, and fear of reprisal: Lessons in ethics from third-year medical students. Acad Med. 2005;80:866-873.

43. Wear D, Aultman JM, Varley JD, Zarconi J. Making fun of patients: Medical students' perceptions and use of derogatory and cynical humor in clinical settings. Acad Med. 2006;81:454–462.

44. Fryer-Edwards K, Wilkins MD, Baernstein A, Braddock CH. Bringing ethics education to the clinical years: Ward ethics sessions at the University of Washington. Acad Med. 2006;81:626-631.

45. Bosk CL. Forgive and Remember: Managing Medical Failure (2nd ed). Chicago: University of Chicago Press; 2003.

46. Bosk CL. Continuity and change in the study of medical error: The culture of safety on the shop floor. 2005. Available at:(http://www.sss.ias.edu/publications/papers/paper20.pdf). Accessed April 28, 2008.

47. Gillon R. White coat ceremonies for new medical students. J Med Ethics. 2000;26:83-84.

48. Wear D. On white coats and professional development: The formal and the hidden curricula. Ann Intern Med. 1998;129:734-737.

49. Veatch RM. White coat ceremonies: A second opinion. J Med Ethics. 2002:28:5-6.

50. Russell PC. The white coat ceremony: Turning trust into entitlement. Teach and Learn Med. 2002;14(1):56-59.

51. Gillon R. Commentary. J Med Ethics. 2002;28:7-9.

52. Lipowsky J. The Gold standard. The New Jersey Jewish Standard. September 14, 2006. Available at:(http://www.jstandard.com/articles/1590/1/The-Gold-Standard). Accessed April 28, 2008.

53. Accreditation Council for Graduate Medical Education. Outcome Project Website. Available at:(http://www.acgme.org/outcome/). Accessed April 28, 2008.

Table 1

A Summary of the Differences Between Humanism and Professionalism

Characteristic	Humanism	Professionalism
Types of problems	Universal	Local
Sources of learning	Human experience	Socialization into profession
Motivation	Human welfare	Strengthening of professional identity
Primary duty	To other humans, to society	To the professional group
Cognitive basis	"Postconventional thinking" – judging behavior through deliberation about universal values	"Conventional thinking" – judging behavior by comparison to the accepted social norms of a specific group

Have First-Time Medical School Deans Been Serving Longer Than We Thought? A 50-Year Analysis

Comment [t1]: The title is interesting and gives the main idea of the report, instead of simply stating the research method and topic. This title is about as informal as a research report title should be; many are more formal.

Joseph A. Keyes, JD, Hershel Alexander, PhD, Hani Jarawan, William T. Mallon, EdD, and Darrell G. Kirch, MD

Mr. Keyes is chief legal officer, Association of American Medical Colleges, Washington, D.C.

Dr. Alexander is director, medical school and faculty studies, Association of American Medical Colleges, Washington, D.C.

Mr. Jarawan is research analyst to the president and CEO, Association of American Medical Colleges, Washington, D.C.

Dr. Mallon is senior director, organizational learning and research, Association of American Medical Colleges, Washington, D.C.

Dr. Kirch is president and CEO, Association of American Medical Colleges, Washington, D.C.

Correspondence should be addressed to Mr. Keyes, Association of American Medical Colleges, 2450 N St. NW, Washington DC 20037. Phone: 202-828-0555, fax: 202-828-1125, e-mail: jakeyes@aamc.org.

Abstract

Purpose

To describe the length of service of deans at accredited U.S. MD-granting medical schools from academic years 1959-2008 and to determine whether the median length of service of deans changed over time.

Method

The authors used the database of the Council of Deans of the Association of American Medical Colleges to seek data, from July 1,1959 to June 30, 2009, on lengths of service of 842 deans and interim deans at all 125 accredited U.S. MD-granting medical schools existing in 2007. All but eight schools verified their data, which included the date of the beginning of service, the date of the end of service, and whether the individual served in a permanent or interim capacity.

Results

Across five-year cohorts of the first-time deans and interim deans studied, the median length of service was 4.4 years. When the authors excluded individuals who were interim deans exclusively and focused the analysis on the 639 persons who were "permanent" deans, the median length of service was 6.0 years across five-year cohorts. Analysis of one-year cohorts of deans showed similar results (median = 6.1 years), although the medians for 6 of the 7 most recent one-year cohorts ranged from 5.0 to 5.7 years.

Conclusions

Through cohort analysis, the median length of service of permanent medical school deans was longer than that found in previous studies, and has remained relatively stable.

Comment [t2]: The abstract is structured, since this is a research report.
Remember: the abstract is NOT an introduction to the report. It is, instead, a summary of the report, separate from it. That means that anything said in the abstract must be said all over again in the report.

Comment [t3]: The abstract has little background information but, instead, focuses on the substance of the report. Abstracts should be as substantive as the 250-word limit allows (i.e., more than just an outline). But if an outline format seems best, give one or more specific examples of a few of the general topics of the outline.

Comment [t4]: The year (in this case, years) of the study are included—omitting the study's time period is a frequent mistake.

Comment [t5]: The abstract is written in the third person, even though the report (or article) should be written in the first person (I, we, our, us).

Comment [t6]: The data for this study were comprehensive, which is why the conclusion could be stated in such a definite way. But if the data had been from a limited sample and only one or a few institutions, the conclusion would need to be stated in a more cautious way, with a sentence that begins something like "The study findings SUGGEST that…," etc. In short: Don't overgeneralize findings.

At the nexus of education, research, and health care delivery, the deans of medical schools in the United States are critically important leaders with complex, demanding roles. Their ever-growing breadth of responsibility includes leading hundreds or even thousands of faculty members in the pursuit of the teaching, research, clinical, and service missions of academic medicine; articulating a compelling vision of the future; and, in some cases, heading the faculty practice plan. Deans are accountable to numerous stakeholders, particularly if they also oversee other health professions schools or serve as the chief executive of the teaching hospital and health network.[1] Given the level of responsibility and pressure that comes with leading medical schools and their related academic health centers, there is a great deal of interest in the lengths of service of medical school deans. An unsettled deanship has the potential for creating troubling consequences for faculty and staff of medical schools, stakeholders of academic health centers, and within the community at large, and can impinge upon the organization's ability to meet its missions. Thus, deans' lengths of service deserve scrutiny.

As far back as 1969, researchers have reported a decrease in the retention rates of medical school deans.[2] This finding has not faced many dissenting opinions over the years; subsequent analyses have come to the same conclusion that the retention of U.S. medical school deans has declined over time.[3-5] As a result, the belief about decanal tenure lengths, even among medical school deans, has been accepted as fact. This belief may have inhibited top-level talent from seeking deanships, curbed the boldness of sitting deans to make improvements to their organizations, and created concern throughout the institution and larger community that deans are in an unstable, precarious position.

The information available to and the methodologies used by past studies, however, seem sufficiently limited to warrant reconsidering conclusions about medical school deans' tenure. Therefore, the purpose of this study was to re-examine the length of service of U.S. medical school

Comment [t7]: The first three paragraphs build the case for why the research was done. The research problem/goal is clearly stated.

deans using a 50-year time span and a cohort analysis. We had two primary questions: What is the median tenure for first-time U.S. medical school deans, and has the median tenure changed over time?

Previous Literature

Comment [t8]: The literature review is composed mainly of primary sources relevant to the study. The literature is analyzed and critically appraised.

Four studies have contributed to the knowledge base on the tenure of medical school deans. Published in 1969, Robert Glaser's article details his fear that the position of medical school dean is becoming less attractive.[2] He analyzed the turnover of medical school deans in 1949 – 1959 compared to 1959 – 1969, as well as the median and mean tenure lengths of deans who left office in 1962 compared to 1969. He found that turnover increased in the 1960s compared to the 1950s, and that average and median tenure lengths dropped from 7 and 5 years, respectively, in 1962 to 4 and 3 years in 1969. Glaser concluded that the longevity of medical school deans is shortening. Glaser's study, however, has several limitations. It does not differentiate between interim deans and permanent deans, it does not specify whether the median tenure is calculated on current deans or on departing deans, it does not provide a year-by-year analysis, and it does not describe the character of the data sufficiently for the data to be assessed.

Glaser's findings were re-evaluated in 1984 when Wilson and McLaughlin published *Leadership and Management in Academic Medicine.*[3] The authors examined the year-by-year longevity of departing deans from 1960 – 1980. In the process, Wilson and McLaughlin calculated higher average tenures than Glaser had calculated (9 years rather than 7 years for 1962 and 5.5 years rather than 4 years for 1969). Wilson and McLaughlin provided no data or methodological explanation for these discrepancies with Glaser. However, the authors noted that their analysis is consistent with Glaser's finding of a decrease in tenure length. Indeed, Wilson and McLaughlin observed steady declines in tenure to an average of 4.1 years of service in 1976. But how the distinction between deans and interim deans was handled (if at all) remains as unclear as in the Glaser analysis.

In 1994, Banaszak-Holl and Greer readdressed the issue of dean longevity. [4] An important contribution of their piece is to specify a methodology for differentiating deans and interim deans. For example, an interim dean who became dean at an institution has his or her length of service calculated from the start date of the interim deanship. The authors grouped deans into three cohorts based on start year of appointment: 1940-1959, 1960-1979, and 1980-1992. In each of these respective cohorts, the average tenure of deans was 7.6 years, 6.6 years, and 4.1 years. When Banaszak-Holl and Greer included into the mix individuals who had been interim deans only, the corresponding averages fall to 6.7 years, 5.8 years, and 3.5 years. Based on their analysis, the authors agreed with previous research that deans' tenures are decreasing. Nevertheless, we suspect three limitations with the Banaszak-Holl and Greer study. First, the data are drawn from a source that is too infrequently updated to capture all appointments or to provide exact start dates and end dates for those appointments, i.e., the annual education issue of the *Journal of the American Medical Association*. Second, the study aggregates at too high a level (20-year increments), thereby obscuring potentially meaningful variability across the years. In the 1980-1992 cohort, for example, the authors show that the average tenure of 4.1 years was associated with a standard deviation of 2.7 years. Third, the methodology is unclear about how the authors calculated the length of service for the 126 deans who had not left office by the end of the study. These individuals fall almost exclusively into the most recent cohort. Our suspicion is that the authors set the length of service for the 126 deans to be equal to their time in office to date, thereby artificially deflating the average length of service for the 1980-1992 cohort.

Finally, a 1998 study by Levin et al. focuses on the organizational, financial, and environmental factors affecting length of tenure among U.S. medical school deans.[6] For deans at medical schools founded before 1970 or after 1970, the average tenure was the same (6.0 years). However, the authors presented the average tenure over a ten-year period (1985-1994)—they did not show any year-by-year fluctuations. Another issue is that the study used the data set from Banaszak-Holl and Greer, as updated

with information from the *Directory of American Medical Education*, an annual publication of the Association of American Medical Colleges (AAMC), and from AAMC staff. Levin et al. found an average tenure during 1985-1994 that is higher than the average tenure that Banaszak-Holl and Greer found over 1980-1992 (an average of 6.0 years versus an average of 4.1 years), but Levin et al. do not discuss what data or methodological considerations might explain this increase.

Method

Data

We addressed data limitations in previous research by using the AAMC Council of Deans database, the official roster of deans and interims deans at AAMC-member medical schools. AAMC staff regularly update and check this database to ensure that information on current and past deans or interim deans is accurate. In 2007, the dean's offices at 117 of the 125 AAMC-member medical schools at that time verified and (as appropriate) edited the start date and end date for each appointment from July 1959 through March 2007. The remaining eight schools did not respond to repeated requests to verify past data. This study is based on the data we have for all 125 schools, in the belief that our data for those schools as a group is sufficiently precise for our purpose and that the potential error introduced by the small number of unverified schools is less than would be introduced by excluding these schools. In short, our study data represent all U.S. MD-granting medical schools accredited by the Liaison Committee on Medical Education that were in existence in 1959 plus all schools that were subsequently established up through 2007 (minus one that closed). The data are from 842 deans.

Research design

The period we studied ran from July 1, 1959 through June 30, 2009. We examined two groups of individuals. The first group consisted of first-time deans and first-time interim deans. The second

Comment [t9]: The Method section describes only those actions that yielded the reported results. Other material and extra details, if needed, should be in the Introduction or Discussion. NOTE: The subheadings (e.g., "Data") in the Method section (and other sections of this report) might not be needed in some other reports—subheadings should fit the nature of the study. Sometimes, the entire Method can be described with no subheadings, if it is short enough or there are reasons where subheadings would be artificial. But the main headings Method, Results, Discussion, and Conclusion (sometimes "Discussion and Conclusion" as one heading) are required in all research reports.

Comment [t10]: The sources of the data are clearly described. For other studies that have a study LOCATION (such as the study of two curricula at a medical school), the location (e.g., Harvard Medical School) should be clearly stated.

Comment [t11]: The number of possible respondents and the number of actual respondents are stated (in this case, they were schools).

Comment [t12]: The research design is clear, appropriate to the research question, and plausible. It is described in enough detail to permit the study to be replicated. The time period of the study and (if relevant) the location of the study are stated (authors often forget to state the time period). The statistical methods used are appropriate and clearly explained. The design has both internal and external validity and allows for unexpected outcomes or events to occur/be revealed.

group consisted only of the first-time deans, including individuals who had contiguous interim dean appointments at the same medical school. For the purposes of this study, if an individual moved into a deanship from a contiguous interim deanship at the same medical school, we calculated the length of service from the start of the interim deanship. In both groups, we included only first-time appointees to control for the possible influence of prior experience.

Comment [t13]: Make sure that all terminology used in the Method section is the same or very similar to the terminology used in the abstract and the other sections of the report and in any tables or figures.

To track changes in length of service over time, we adopted a cohort analysis. Furthermore, we analyzed length of service descriptively instead of inferentially in recognition of having data more akin to population values than to random samples. Since selecting the number of years to include in a cohort is subjective, we explored one-year, three-year, and five-year cohorts. These different approaches did not result in a meaningfully different story about the general trends. Since that was the case, in this analysis, we primarily focused on a cohort length of five years so that survival curve graphics are readable while providing an adequate number of cohorts to illustrate changes in the median years of service. Therefore, we ended up with nine five-year cohorts. For example, all first-time deans from academic year 1959 through 1963 formed one cohort. Each academic year ran from July 1 through June 30 (e.g., July 1, 1959 through June 30, 1960 for academic year 1959). To ensure that only first-time deans and first-time interim deans were included in the earliest cohorts (and not deans with prior decanal experience), we triangulated our database with information listed in the medical education issues of the *Journal of the American Medical Association* from 1940 to 1964.

Why did we show median years of tenure and not average years of tenure? One can calculate a median tenure so long as at least half the members of a cohort have left office, while one can calculate an average tenure only after all members of a cohort have left. We took this approach to avoid the truncation of years of service that happens when average years of tenure are calculated on currently active deans or interim deans. In our analysis, we had active individuals with start dates as far back as 1989.

How we calculated the median years of tenure depended on the cohort analysis. For the five-year cohorts, we displayed each survival curve for as many academic years out as the most recent appointee in the cohort could be retained logically. For example, someone from the 1989-1993 cohort appointed in 1993 could be in office 15 years (2008 – 1993 = 15 years), someone from the 1994-1998 cohort appointed in 1998 could be in office 10 years (2008 – 1998 = 10 years), and someone from the 1999-2003 cohort appointed in 2003 could be in office 5 years (2008 – 2003 = 5 years). Given this methodology, we could not show a survival curve for the 2004-2008 cohort because the most recent appointees, that is, those assuming office in 2008, could not have a tenure of more than one year. Another consideration in a five-year cohort analysis (or any cohort analysis) is that the number of years of service is calculated based on the individual start date of each person in the cohort. In the 1989-1993 cohort, for instance, two years of retention for a person starting in 1989 would mean being retained to 1991, while two years of retention for a person starting in 1993 would mean being retained to 1995.

Results

Comment [t14]: The study finding are reported in the Results section only. All methodology outlined in the Method section should have corresponding results in the Results section. Results are presented without commentary or analysis—such interpretations are for the Discussion section. The data are accurate and appropriate. Make sure that the data (e.g., 457 students responded) are the same throughout the abstract, article, and any tables or figures. In studies where there are respondents, the number of respondents and the response rate are given in this section. In studies where percentages are used, usually the NUMBERS that the percentages are based on should also be used, as in "457 (68%) of the students took the exam."

Figure 1 illustrates a median tenure of 4.4 years across the nine five-year cohorts of first-time deans and first-time interim deans (N = 842). But when we excluded individuals who were interim deans exclusively and focused the analysis on the 639 persons who were permanent deans (Figure 2), we find a median tenure of 6.0 years across the five–year cohorts. As Figure 2 suggests, the median tenure across all five-year cohorts of first-time deans is narrowly distributed.

To test whether the period of the study, the duration of the cohort, or the inclusion of prior decanal experience might change our basic findings, we examine three questions: (1) What if we selected a start year other than 1959? (2) What if we created cohorts shorter than five years? (3) What if we included individuals who had previously been deans at other institutions (i.e., non-first-time

deans)? For different combinations of long-term study periods, years per cohort, and decanal experience, we discovered a strong consistency of findings.

Figure 3 illustrates one of these alternate analyses: the median years retained for one-year cohorts of first-time deans beginning in academic year 1959. One-year cohorts of first-time deans and first-time interim deans combined had a median length of service of 4.5 years, while first-time deans only had a median tenure of 6.1 years. There is variability in the median lengths of service across cohorts, but the variability is arguably small in the context of the entire 50-year study period (standard deviation = 1.4 years for both groups). Moreover, a linear regression shows little correlation between median lengths of service and cohorts (r=-.14 for first-time deans plus first-time interim deans compared to r=0.07 for first-time deans).

Comment [t15]: Figures, tables, lists, and charts (FTLC) should be used only if their information cannot easily be reported in the report itself. FTLC should have enough information in them (e.g., explanatory titles, footnotes, and column headings) so that the sources of their data and their purpose can be understood even when read separate from the report. FTLC should be two-dimensional and use black, white, or gray (no color). Tables must be created in Word software. Tables and figures must be "active" files (e.g., no pdfs). See published reports in the journal for examples of FTLC.

Discussion

Comment [t16]: In this section, the findings are interpreted and analyzed. Interpretations are appropriate (i.e., flow from the study) and should not be overgeneralized. No new findings or new methodology may be mentioned in the Discussion. Practical significance or theoretical implications and guidance for future studies are discussed. The authors' personal views about their findings are appropriate in this section, which can be more informal than the other sections. Limitations of the study are stated and evaluated.
Sometimes, the Discussion and Conclusion are ONE section when it is easier and clearer to do that.

Because we were able to control for some factors that previous studies did not, our analysis results in two important findings. First, by removing the effects of individuals who were only interim deans, we find a median tenure of 6.0 years across five-year cohorts of first-time deans, a healthy finding relative to the conclusions of previous researchers. This median tenure of U.S. medical school deans is comparable to that of other major leadership positions in U.S. higher education. For example, the average tenure of presidents of four-year colleges has varied from 6.3 years to 8.5 years in studies conducted from 1986 to 2006.[7] A 2009 study of chief academic officers (i.e., provosts) in U.S. higher education finds a median tenure of 4.7 years.[8]

Second, contrary to several studies and years of conventional wisdom, there is no ongoing shortening of tenure in any kind of dramatic way. After controlling for limitations in earlier studies, the tenure of medical school deans has remained in a fairly narrow range over many decades.

Figure 3 reveals a possible caveat. Of the 7 most recent one-year cohorts of first-time deans (1996-2002), six have median length of service between 5.0 and 5.7 years (the 2000 cohort's median was 6.5 years). These medians are below the long-term median of 6.1 years. One might question if these figures are indicative of a trend in the most recent cohorts of deans leaving office sooner than their historical counterparts. We would be cautious about such an interpretation. As Figure 3 illustrates, there have been fluctuations in the median length of service among the one-year cohorts in any two arbitrary periods of time. The 2003 cohort, for which a median could not be computed because more than 50% of the cohort remained in office as of June 30, 2009, could show a median length of service higher than, equal to, or lower than the long-term median. If the median for the 2003 cohort were to be equal to or higher than 6.1 years, a possible pattern in the 1996-2002 data would be harder to discern. We err on the side of caution and conclude that the available data do not yet allow us to comment on whether a trend is emerging.

Despite the overall robustness of our findings, this study has several limitations. First, we do not analyze length of service by demographic, academic, or other variables. Second, as discussed, our analysis cannot fully examine the trends of recent cohorts.

Conclusion

Comment [t17]: Information in the Conclusion should be clearly stated. Conclusions follow from the design, method, and results; justification of conclusions is clearly articulated (often in the Discussion section instead of the Conclusions section). The importance and implications of the findings are discussed here or in the Discussion section. The Conclusion section should NOT be a summary of the article—that's the job of the abstract.

With this new perspective of the tenure of medical school deans, we hope to blunt the view that there is an accelerating rate of turnover among U.S. medical school deans. Nationwide, deans' length of service has not varied considerably over the last few decades, although any period of general decline should rightly concern the medical school community, and a period of rapid turnover at a single school is indeed challenging for the institution and dean affected. In addition, it is noteworthy that the tenure of medical school deans is comparable to that of leaders in other sectors of higher education. We hope this analysis encourages medical schools and the academic medicine community in general to be as

concerned with the *quality* of service as with the duration of service. The most important outcome for any leader in medical education is not how long the leader remains in the role but how much impact the leader achieves—for patients, students, residents, faculty, and the community at large.

Acknowledgments: The authors wish to thank Rae Anne Sloane for her data collection and analysis, R. Kevin Grigsby, DSW, for his critical revisions on an early draft of this manuscript, and David J. Vernon for his background literature search.

Funding/Support: None

Other disclosures: Ms. Sloane, Dr. Grigsby, and Mr. Vernon contributed in their capacity as employees of the Association of American Medical Colleges and did not receive any compensation for their assistance.

Ethical approval: This study was given expedited reviewed by the institutional review board of the American Institutes for Research and determined to be exempt from further review because the project used existing data that are free of identifiers.

References

1. Rich EC, Magrane D, Kirch DG. Qualities of the medical school dean: Insights from the literature. Academic Medicine. 2008;83:483-487.
2. Glaser RJ. The medical deanship: Its half-life and hard times. Journal of Medical Education. 1969;44:1115-1126.
3. Wilson MP, McLaughlin, CP. Leadership and Management in Academic Medicine. San Francisco: Jossey-Bass Publishers; 1984.
4. Banaszak-Holl J, Greer DS. Turnover of deans of medicine during the last five decades. Academic Medicine. 1994;69:1-7.
5. Banaszak-Holl J, Greer DS. Changing career patterns of deans of medicine, 1940-1992. Academic Medicine. 1995;70:7-13.
6. Levin R, Bhak K, Moy E, Valente E, Griner PF. Organizational, financial, and environmental factors influencing deans' tenure. Academic Medicine. 1998;73:640-644.
7. American Council on Education. The American College President: 2007 Edition. 6th ed. Washington, DC: American Council on Education; 2007.
8. Eckel PD, Cook BJ, King JE. The CAO Census: A National Profile of Chief Academic Officers. 1st ed. Washington, DC: American Council on Education; 2009.

Comment [t18]: Except in a literature review, the references should be illustrative, not exhaustive. This study required exhaustive references of the key previous studies of deans, but not of other related topics. Some older references were required in this study, and there are sometimes "classic" older references. But whenever appropriate, the author should use the most recent studies to back up a statement when information in older references would be out of date.

FIGURE LEGENDS

Figure 1 Survival curves of first-time deans and first-time interim deans of 117 U.S. medical schools showing median years of service: Nine mutually exclusive five-year cohorts, academic years 1959 through 2003, *N* = 842. Source of data: database of the Council of Deans of the Association of American Medical Colleges.

Figure 2 Survival curves of first-time deans of 117 U.S. medical schools showing median years of service: Nine mutually exclusive five-year cohorts, academic years 1959 through 2003, *N* = 639. Source of data: database of the Council of Deans of the Association of American Medical Colleges.

Figure 3 Median years of service of first-time deans at 117 U.S. medical schools: 46 mutually exclusive one-year cohorts, academic years 1959 through 2004, *N* = 639. Source of data: database of the Council of Deans of the Association of American Medical Colleges.

Comment [t19]: These legends (i.e., descriptions of the figures that appear below the published figures), along with the information in the figures themselves, will allow the readers to get a sense of where the figure's data came from and what the figure is about even if they have not read the report. Sometimes, a legend must be much longer if that is needed to explain the figure. It is often necessary for legends of different figures to repeat some of the same information, as appropriate, since each figure's information must be complete on its own.

Slowing Down to Stay Out of Trouble in the Operating Room: Remaining Attentive in Automaticity

Comment [JC1]: The interesting title catches readers' attention and describes the content of the research report without disclosing the findings.

Carol-anne Moulton, MD, MEd, PhD, Glenn Regehr, PhD, Lorelei Lingard, PhD, Catherine Merritt, MSc, and Helen MacRae, MD

Dr. Moulton is assistant professor, Department of Surgery, University of Toronto Faculty of Medicine, staff surgeon specializing in hepatobiliary and pancreatic surgical oncology, University Health Network, and scientist, Wilson Centre, University of Toronto, Toronto, Ontario, Canada.

Dr. Regehr is professor and associate director, Centre for Education Scholarship, Department of Surgery, University of British Columbia Faculty of Medicine, Vancouver, British Columbia, Canada.

Dr. Lingard is professor and director, Centre for Education Research and Innovation, the Schulich School of Medicine & Dentistry, University of Western Ontario, London, Ontario, Canada.

Ms. Merritt is a PhD student, Department of Anthropology, University of Toronto, Toronto, Ontario, Canada.

Dr. MacRae is staff general surgeon, Mount Sinai Hospital, Toronto, and director, Surgical Skills Laboratory, University of Toronto Medical Faculty, Toronto, Ontario, Canada.

Correspondence should be addressed to Dr. Moulton, The Wilson Centre, Toronto General Hospital, 200 Elizabeth St., Eaton Sth 1-565, Toronto ON, M5G2C4, Canada; telephone: (416) 340-4800, ext. 8819; fax: (416) 340-3792; e-mail: Carol-Anne.Moulton@uhn.on.ca.

Abstract

Purpose

Automaticity is integral to expert performance, but experts must be able to transition from an automatic mode into a more effortful state when required. In this study, the authors indentified and characterized the manifestations of the phenomenon of "slowing down when you should" to stay out of trouble in operative practice.

Method

The authors interviewed 28 surgeons (60-minute, semistructured format) from various specialties at four academic medical centers and observed 5 hepato-pancreato-biliary surgeons in the operating room (29 cases, 147 hours) during 2007–2009. Using a grounded theory qualitative methodology, they conducted a thematic analysis of transcripts and field notes in an iterative manner. Data collection continued until saturation. They adopted a reflexive approach throughout.

Results

Surgeons described and the authors observed four phenomenological manifestations of the transition from an automatic mode to a more effortful state. In the most extreme manifestation, "stopping," surgeons actually stopped the procedure, whereas in the most subtle manifestation, "fine-tuning," surgeons were able to continue the procedure and focus on minor events simultaneously. A separate phenomenon of "drifting" represented surgeons' failure to transition out of the automatic mode when appropriate, resulting in surgical errors or near-misses.

Comment [JC2]: This is a research report, so the abstract is structured and includes the four required headings: Purpose, Method, Results, Conclusions.

Comment [JC3]: The abstract's Method provides a concise summary of the setting, participants, time period, and methodology, and identifies this as a qualitative study.

Comment [JC4]: The Results section identifies the four manifestations the authors observed as well as a fifth related phenomenon.

Conclusions

The manifestations of the slowing down phenomenon represent acts of cognitive refocusing during the potentially more-critical moments of operative practice. Further, the authors challenge the conception of automaticity as effortless, arguing that automatic behavior can be attentive (fine-tuning) as well as inattentive (drifting).

Automaticity is an important component of expert performance.[1] As experts acquire experience and knowledge, they accumulate many automatic resources (such as pattern recognition) that provide them with the ability to "just know the right answer" or "just know what to do"—in other words, the ability to think and act in a predominantly intuitive manner. However, experts cannot stay in automatic mode all the time; they must transition into a more effortful state as the situation requires.[2-4] Schön[5] observed experts from various domains in the context of their daily practices, and he found that they engaged not only in "automatic" modes of thinking (which he termed "knowing-in-action") but also in more "effortful" modes of thinking (or "reflection-in-action"). Thus, he highlighted the ability to think on one's feet during times of uncertainty as a central component in his model of expertise.

In previous work, we have argued that component of expert judgment in clinical practice is captured by the effective and appropriate transitioning from the automatic mode to the effortful mode when the situation requires it; we refer to this phenomenon as "slowing down when you should."[6] "Slowing down" represents the surgeon's cognitive refocusing or increased attention directed toward a particular task and describes the surgeon's experience during the critical moments of surgery. The term is not meant to describe the speed of the surgeon's hand movements nor does it imply that the surgeon in any way slows down temporally, although both may occur. Rather, it describes the surgeon's experience of the transition from the routine to the effortful when additional cognitive resources are recruited to focus on the task at hand.

Comment [JC5]: The first five paragraphs define the terms the authors will use throughout the study (e.g., "automatic," "effortful," "slowing down") and place them in the context of the literature on expert performance, automaticity, their prior work on the "slowing down" phenomenon, and this study.

In an earlier qualitative study, we interviewed surgeons from a range of specialties about their experiences with this phenomenon and determined that slowing down moments may be *situationally responsive* or *proactively planned.*[7] For example, if an expert surgeon is faced with unusual anatomy when removing the gall bladder, she slows down in response to the situation and focuses on the abnormality, rather than "plowing through" by remaining in automatic mode. Similarly, when an expert surgeon recognizes preoperatively that a colonic tumor might be invading the duodenum, he plans for a moment during the dissection in which he will slow down to approach the tumor using alternate anatomic planes. This transition to the more effortful state marks moments of increased attention during critical or unexpected events and is a means by which the surgeon "stays out of trouble" in the operating room. To be responsive to unexpected events, the surgeon must vigilantly monitor relevant environmental cues and appropriately interpret the cues as signals that he or she needs to transition into a more effortful state.

Comment [JC6]: In this paragraph and the two that follow, the authors also provide examples of behaviors they observed in previous studies that set the stage for this study.

During that study, surgeons acknowledged the presence of slowing down moments in their operative practice that are marked at times by observable behaviors, like asking others in the room to stop a conversation or to turn the music off. They suggested that other operating team personnel (i.e., nursing staff, surgical trainees) may detect their slowing down moments and respond appropriately by cutting out distractions on their behalf. The surgeons also described various "telling signs," such as whistling or humming, that marked this transition in other surgeons with whom they worked.

From the initial study, it appeared to us that surgeons' redirection or focusing of attention was an observable or, at least, a noticeable phenomenon that we could explore further using observational methods. From a cognitive perspective, transitioning from a relatively automatic mode to a more effortful mode requires an individual to recruit an increased level of cognitive resources or attention from a limited pool of resources.[8] It is by engaging in monitoring activities that surgeons recognize the need for increased attention. The reallocation of attention that occurs with the slowing down moments may help mark these more-critical junctures during surgical procedures.

The purpose of this study was to identify and describe the manifestations of the slowing down phenomenon in surgical operative practice by supplementing surgeons' descriptions of these events with observations of the phenomenon in intraoperative contexts. By identifying the transitions in practice, we may be able to help individual surgeons pinpoint potentially critical moments that require more effort and lead them to a greater understanding of why they feel increasingly distracted or annoyed by concurrent activities.

Comment [JC7]: The authors state the purpose of this study and indicate what they hoped to accomplish by undertaking it.

Method

We designed this study using grounded theory, a qualitative methodology intended to explore a social phenomenon for the purpose of generating a descriptive or explanatory theory that is "grounded in" (i.e., derived from) naturalistic data.[9-11] In this study, which was part of a larger study exploring the role of slowing down when you should in the area of intraoperative surgical judgment, we explored one theme: the manifestations of the

slowing down phenomenon in the operating room. We have described elsewhere the methodology of the larger study and two other themes—the initiators and influences of the phenomenon and the control dynamics associated with the display of the phenomenon in the educational context of the operating room.[7, 12] In this article, we will describe the pertinent methodological points as they relate to the exploration of this theme.

Four tertiary-care academic medical centers (Toronto General Hospital, Toronto Western Hospital, Princess Margaret Hospital, and Mount Sinai Hospital) affiliated with the University of Toronto provided the setting for this study, which took place in two phases over a 16-month period (phase 1: November 2007 to April 2008; phase 2: May 2008 to February 2009). We obtained approval from the institutional review boards at the involved hospitals.

Comment [JC8]: The authors describe the setting (including the names of the institutions) and indicate the period over which the study took place. They also indicate that they received ethical approval for the study from each institution.

Phase 1 of this study involved 60-minute, semistructured interviews with 28 surgeons who were selected on the basis of their reputations for having excellent surgical judgment. They represented a variety of specialties (general n = 9, neurosurgery n = 4, orthopedics n = 3, cardiac n = 3, vascular n = 3, head and neck n = 2, plastics n = 2, thoracics n = 1, trauma n = 1). The principal investigator for this study (C.A.M.), who is a hepato-pancreato-biliary (HPB) surgeon, and a research assistant (C.M.) with a master's degree in anthropology jointly interviewed all of the surgeons about their perceptions of and experiences with the "slowing down" phenomenon.[7] Consistent with the iterative design of grounded theory, they conducted further interviews with 8 surgeons from the original group of 28 to probe an emergent theme: These participants had denied quite

Comment [JC9]: This study involved two phases. Here, the authors describe the surgeons they interviewed during the first phase and the method they used to interview the surgeons and analyze emergent themes.

vehemently in their original interview that they were ever in the automatic mode when operating. The 8 surgeons were further questioned on their perceptions of "automaticity" and their ideas about their "routine" mode of functioning in their operative experience. Each interview in phase 1 was audio-recorded and transcribed.

The manifestations of the slowing down phenomenon that emerged as dominant themes from phase 1 were explored iteratively in the second phase of the study. In phase 2 the lead investigator and research assistant conducted observations in the operating rooms of five HPB surgeons, over a 10-month period (29 cases, 147 hours) to expand, confirm, and refine the preliminary framework developed from phase 1.[7, 12] The two researchers observed the surgeons together until the research assistant was trained in observation methods. They then observed the surgeons independently but occasionally worked together to explore similarities and differences in their observations.

Comment [JC10]: The author indicates how the phases are linked, then describe the participants and method used in the second phase, in which they observed surgeons in the operating room.

The phase 2 surgeons were purposefully selected[13] from the same specialty as the principal investigator to enhance her ability to detect subtle nuances of the slowing down phenomenon and to understand the intricate technical and cognitive operative details.[10,14] During and after surgery, the observing researcher discussed with the operating surgeon his or her interpretations of operative events and asked the surgeon to comment specifically on the researcher's interpretations of the slowing down moments. All pre- and postoperative interviews were audiotaped and many of length were transcribed.

In all cases, it was the staff surgeon who was observed performing the procedure or maintaining either "direct" or "overall control" of the procedure through the hands of the trainee.[12] The HPB cases were advanced cases that required the staff surgeon to be an integral component of the procedure. The researchers did not observe or interview the trainees as this study explored the phenomenon of slowing down in the context of expert performance.

Surgeons involved in phase 2 were not participants in phase 1. This was an intentional decision: We did not want the HPB surgeons being observed to have previously reflected on or explicitly considered the slowing down phenomenon.

The lead investigator and research assistant conducted thematic analysis of the transcripts and field notes from phase 2. They compared the preliminary categories they had identified and discussed discrepant categories; periodically and when discrepancies persisted, they brought the relevant excerpts from the transcripts or field notes to the larger research team.

Comment [JC11]: The thematic analysis of phase 2 qualitative data is described, as is the role of the larger research team.

The larger research team consisted of the principal investigator, the research assistant, a cognitive psychologist (G.R.), a surgeon (H.M.), and a qualitative researcher (L.L.). We met regularly to elaborate and refine the evolving framework as data collection progressed.[10] Also, a key informant (an HPB surgeon who became interested in the phenomenon and was able to be reflective about the emergent ideas and themes) provided

us with opportunities for additional discussions and interviews that helped us refine the various categories.[15]

Data collection continued until further interviews and observations ceased to inform our emergent thematic framework[16]. We ensured confirmability by maintaining an audit trail of all analytical memos, minutes of the meetings, and revisions to the coding structure. We applied the final coding structure to the complete data set using NVivo 7 software (QSR International Pty Ltd., Cambridge, Massachusetts) to facilitate cross-referencing.[17] We adopted a reflexive approach at all stages of the research process.

Results

As surgeons were observed in the operating room transitioning from a routine mode to a more effortful mode, the range of phenomenological manifestations of slowing down expressed during the phase 1 interviews became apparent, and we were able to elaborate on and refine them. We detail below the various transitions that surgeons described and we observed, from the most extreme manifestation of "stopping" to the most subtle of "fine-tuning."

Comment [JC12]: In the Results, the authors describe and analyze the manifestations of "slowing down" that the surgeons described and they observed. They use examples to illustrate each phase and tie the manifestations to transitions from routine to effortful modes.

Stopping

The most extreme manifestation of slowing down occurred when surgeons actually stopped the progression of the operation (refer to the example from a reflective field note in Table 1). Often, surgeons described stopping in relation to critical intraoperative moments when they knew they required more information. Researchers observed this in

the operating room as a stop in the procedure while the surgeon sought further information: The surgeon might ask a colleague for assistance, look up reports from the patient's file, or review imaging. Surgeons interviewed in both phases frequently used words such as "regroup" and "reassess" to describe these situations, reflecting the uncertainty that was so often linked to this critical transition**.**

Stops were sometimes prearranged for the purpose of setting up the surgeon's environment to prepare for these more-critical *proactively planned* slowing down moments. Surgeons would stop the procedure and ensure all necessary team members were ready and had the required resources available. Some surgeons described engaging in a mental rehearsal to focus themselves and their team on the task at hand. Surgeons appreciated the critical nature of these moments; they understood that once the first step was initiated, the subsequent steps would necessarily follow in what might be a time-pressured situation or a difficult-to-control cascade. Many study participants described stopping or were observed stopping in this study, including orthopedic surgeons getting ready to divide the pelvis, vascular surgeons preparing to open an aneurysm, and HPB surgeons preparing to clamp the portal vein.

Stopping, whether it occurred as a function of an emergent issue or was proactively planned, was clearly a strategy that provided cognitive space for surgeons to consider the situation or gather new information.

Removing distractions

Sometimes, the surgeon, upon encountering a slowing down moment, became irritated or distracted by various stimuli and told others in the operating room to remove them so that he or she could focus on the task at hand. Removing distractions made available the additional cognitive resources that the surgeon required to transition into the effortful state and focus on the critical event. One surgeon described this manifestation as he discussed his slowing down moments:

> I think I notice the noise level. When things are going smoothly, you hardly notice it and when things get a little rough in there, you notice it much more … [T]he anesthetist doesn't realize what's going on and they're still nattering away about what the Raptors did last night, so I usually have to just tell them, hold it a minute here until I see what we're doing with this.
>
> —Surgeon A05, phase 1 interview

In phase 2, surgeons were observed removing distractions during the potentially critical slowing down moments. The operative team, however, did not always recognize the need for this, as illustrated by the example in Table 1 of a resident's continuing her "chatter." Many members of the team did notice, however, and took steps to remove distractions themselves, without the surgeon's prompting. Nurses and surgical trainees, at such moments, were observed turning music down or off, turning away visitors to the operating room, and requesting conversations be taken outside. Even when scrubbed, surgeons and staff could relay the same messages with eye contact and head motioning. Many surgeons recognized that experienced members of their surgical team eliminate distractions on their behalf. One phase 1 surgeon (A04) proclaimed, "Good nurses get it and residents may not." During a phase 2 observational session, a clinical fellow was

overheard telling a junior resident after an operative case that "you take cues from the surgeon when to talk and not talk," demonstrating that the reverence or respect for these moments is not necessarily an intuitive skill but rather one residents may acquire over time with training.

Focusing more intently

A somewhat more subtle manifestation of the slowing down phenomenon in the operating room was demonstrated when the surgeon allowed external distractions to continue but ceased to participate in such activities and focused his or her attention on the procedure exclusively. During the observational sessions, surgeons who were focusing more intently did not appear to be distracted by conversations and noise around them as long as it was not directed at them. They simply appeared to be "dropping out" of conversations or teaching interactions as they focused on the operative field (Table 1).

One phase 1 surgeon (B02) described the transition this way: "If you ask me to talk about my vacation or where I go take my car for repair, of course I can't anymore. It becomes distracting to what am I doing." Many surgeons recognized that the level of attention required during the critical slowing down moments made them unable to split their attention with another task (i.e., teaching or talking). One surgeon (A10) explained in a phase 1 interview, "If it is a real critical part I'll be the one that does that part and chances are there will be less teaching at that point in time, less talking at that point in time."

Some surgeons described particular "telling signs," either their own or their colleagues', which indicate to the outside observer that the surgeon is in the midst of a slowing down

moment. One phase 1 surgeon (A14) shared his own sign: “And you’d also see me, maybe I’m starting to sweat a little bit, I’m just not as happy as I was, I’m not enjoying it as much as I was”. Another described a colleague’s:

> I get to work with everybody so I’ve seen everybody in that situation ... Dr [name withheld] has an interesting one … he’ll start singing or humming “La Vie En Rose.” It’s, like, he sings a particular song, he hums a song and it’s always the same one, when he’s stressed.
>
> —Surgeon A13, phase 1 interview

Fine-tuning

During phase 1 interviews, surgeons offered examples of what appeared to be very minor transitions from the routine to the effortful state that would occur numerous times throughout any given procedure. These transitions appeared to be responsive, but on a much smaller scale than those described above, and to fit best as a separate category of “fine-tuning.” As one surgeon explained,

> I mean there are junction points during an operation during which you have to make a judgment, you have to make a decision but more than that there are multiple small nodal points where you have to go this way or that way, probably thousands.
>
> —Surgeon B04, phase 1 interview

Surgeons described engaging in this fine-tuning activity on a moment-to-moment basis, responding to emergent cues (e.g., readjusting angles, approaches, technique) to stay out of trouble. According to one surgeon,

> Even performing a relatively routine part of the whipple, like dissecting out, or dividing the small bowel mesentery, each time we tie the end that is staying in, I pay a little more attention. Others would not necessarily notice this.
>
> —Surgeon OR05, phase 2 interview

During the observational sessions, fine-tuning appeared to manifest as momentary increases in attention or focus that occurred throughout the procedure. The surgeon appeared to be responding to or focusing on a technical issue (e.g., finding the correct dissection plane, tying off an important vessel) to safely deal with the issue at hand. During these minor transitions, surgeons were able to continue with other activities (e.g. talking, teaching, listening to music) with few, if any, interruptions (Table 1).

The fine-tuning events were not obvious transitions from the routine mode to the effortful mode and went largely unnoticed by others in the operating room. In fact, many fine-tuning transitions were so subtle that they were not noticed by the research assistant (who is not a surgeon). The lead investigator, an HPB surgeon with knowledge of the procedures, detected many fine-tuning events, though likely not all of them. It was in discussions with the key informant that this category was refined in conjunction with re-reading the transcripts from the interviews in phase 1 and ongoing observations from the operating room in phase 2.

Fine-tuning appeared to represent the interplay between the finer aspects of the cognitive and technical components of surgery and, therefore, to require detailed, content-specific

procedural knowledge of the surgery to be detected by an observer. The purpose of engaging in this fine-tuning activity appeared to be to keep the operation on course and avoid injury (e.g., putting a hole in a vessel, compromising a tumor margin). By responding appropriately to emergent cues through fine-tuning transitions, surgeons avoided "incidents" that would have required more effort and could have jeopardized the safety of the patient.

Failure to slow down: The state of "drifting"

Comment [JC13]: The authors describe another phenomenon related to automaticity, "drifting," which they observed as they studied the phenomenon of "slowing down."

During the phase 1 interviews, many surgeons provided examples of times when they may drift dangerously into an inattentive state while operating. In fact, when surgeons considered the word *automatic*, drifting seemed to be what they were thinking about, which may explain why a subset of surgeons vehemently objected to ever being in the automatic mode. Surgeons recognized drifting as a consequence of complacency during the more routine, mundane, or "boring" parts of the procedure. Referring to a recent mishap in the operating room, one surgeon explained:

> It's the routine cases … it's like the … bile duct injuries always happened in easy gall bladders, right? That's what happened here. It was an easy case. We were chatting and obviously not being as diligent as we should have been.
>
> —Surgeon B03, phase 1 interview

This was a common admission: When surgeons allow themselves to drift, they fail to engage in the essential monitoring activities that allow them to detect the cues that will

initiate a slowing down event. Drifting was observed in the operating room, as the lead investigator noted:

> The senior surgeon was removing the head of a pancreas on a patient with an aberrant artery. He carefully dissected out this artery as it was crucial to the procedure that it be preserved. Having completed this step, he continued to the usual next step, dividing the small bowel mesentery. While the surgeon assisted the fellow in this more mundane and routine part of the procedure, the surgeon and trainee engaged in extraneous conversation. Returning to the porta hepatis, the surgeon placed the right angle around the bile duct, forgetting, for that moment, the aberrant artery that had been delicately dissected out thirty minutes before. Unknowingly the artery was tied off with the bile duct. In the postoperative interview, the surgeon explained that it was normally such a routine part of the procedure and admitted to being distracted by conversation. He appeared to have drifted in a mode of "just tying off the bile duct," forgetting the variation in this patient.
>
> —Surgeon OR05, phase 2 field notes

Many surgeons described the state of drifting in relation to an adverse event that occurred and that appeared to be the negative consequence of inadequate fine-tuning or monitoring. The surgeon's failure to monitor appropriately led to a lack of fine-tuning, which caused a mishap to occur.

Discussion

We have proposed the phenomenon of "slowing down when you should" as an important marker for the display of intraoperative surgical judgment.[6,7] As noted above, it is not the surgeons' hands or movements that necessarily become slower but rather the focus of

Comment [JC14]: In the discussion, the authors interpret the results and discuss the implications for future research, practice, and trainees. They also discuss limitation, such as the fact that the research assistant was not a surgeon and yet observed surgeons in the operating room.

their attention that changes. While the surgeons in this study sometimes described a simultaneous decision to actively slow their movements down or make them more deliberate, their doing so seemed to be a consequence of their desire to regain or retain control during these critical moments. This important distinction is consistent with the widely accepted "capacity model" of attention, which suggests that humans work within a limited capacity of attention.[8] When the threshold is reached, an individual cannot give further attention to a stimulus without taking attention away from other stimuli.

Using this model, we can begin to interpret the various manifestations of the slowing down phenomenon seen in our study as representative of behaviors found along a spectrum of investment in cognitive effort. As the surgeon requires more cognitive resources to carry out the physical and mental processes involved with a particular surgical task, the surgeon takes more attention away from other activities. As the surgeon transitions from a routine state to a more effortful state, various levels of recruitment are necessary to meet the demands of the task, which manifest in different ways. In general, the larger the amount of cognitive resource recruited for the task, the more dramatic the manifestation (i.e., stopping) that accompanies it. This may not always be the case in situations where a life-threatening event forces a surgeon to continue operating. The surgeon might like to stop and regroup but time does not allow it; therefore, the transition might be observed as a less intense manifestation of removing distractions or focusing more intently.

This overlay of manifestations onto a framework of cognitive recruitment may not be a perfect match, but it is nonetheless useful for understanding the various manifestations that accompany the slowing down phenomenon. While it is useful to conceptualize the manifestations as occurring along a spectrum, we do not intended to imply that recruitment in cognitive activity occurs through stages and proceeds from one level to the next in a linear fashion. Rather, it is more appropriate to consider the various manifestations as fluctuations in discrete amounts of cognitive investment. A surgeon engaging in fine-tuning activities, for example, might recognize an abnormality and suddenly stop the procedure, traversing no other "levels" along the way.

Choosing to observe HPB surgeons was an intentional sampling strategy based on the fact that the principal investigator (C.A.M.) is a HPB surgeon. She would be able to detect subtle nuances of the slowing down phenomenon as well as have the ability to understand and make informed attributions for what was going on surgically—weaving together a story of slowing down events and their surgical relevance. We believe this strategy enabled us to expand and refine the manifestations of this phenomenon in a way that otherwise would have been impossible.

The subtleties of the phenomenon, however, pose significant implications for future research It would be difficult, if not impossible, to place "naïve" observers in the operating room and train them enough to detect the more subtle manifestations of fine-tuning and focusing more intently. Although the research assistant (C.M.), with training, was able to detect the range of manifestations (including some instances of these more

subtle manifestations), she also missed many instances as well as the surgical details that were essential for adding meaning to the story. It is unclear whether even a trained surgeon in one specialty could detect the subtleties of a surgeon in another specialty. Further, a potential limitation of having a surgeon observe in their own environment is the issue of familiarity—of not noticing events and practices that might otherwise inform the phenomenon. The principal investigator broadened her perspective by engaging in the process of reflexivity—examining and exploring her own assumptions and presuppositions of what she might find—and involving a second observer (the research assistant) outside the field of surgery.

Importantly, the subtleties of the slowing down phenomenon also have implications for both the smooth functioning of the operating room and the training of novice staff and residents. That is, surgeons recognized that not all members of their team detected their slowing down moments. Knowledge of the cognitive fluctuations in members of the surgical team, particularly during the slowing down moments, might provide sensitivity to this dynamic nature of the surgical environment and improve the performance of the surgical and operating room team.[18] Also, it is probable that trainees (medical or nursing) reach their "attentional threshold"[8] before surgeons do, so extraneous conversations, music, or noise may be distracting for the trainee but not the surgeon. If trainees lack the "right" or ability to remove distractions, they may be unable to dual-task effectively and their performance may suffer.[19]

Further, if trainees do not detect the staff surgeon's more subtle transitions or slowing down moments—manifested as fine-tuning or focusing more intently—they are less likely to appreciate the subtle nuances that require cognitive effort and minor readjustments in technique. This has obvious implications for teaching and training and may be one reason why some trainees appear to plow through procedures, failing to slow down appropriately.[7] It is not always obvious to the trainee why the staff surgeon slows down as the trainee may not appreciate fully the cues that have alerted the surgeon. Similarly, the trainee may not appreciate the surgeon's fine-tuning maneuvering and therefore may miss the surgeon's focus directed at simply "staying out of trouble"—a key component of surgical judgment.

It is important to note that some surgeons, while appreciating the phenomenon of the transition, felt less personal resonance with the construct of automatic activity. As Surgeon OR01 commented during a phase 2 interview, "I don't think we're automatic. I don't think we can be … but I guess there are levels, right?" Consistent with this position, during the observational sessions, the principal investigator began to notice that the surgeons being studied rarely looked as if they were in a truly effortless mode, even during routine aspects of the procedures. Reading the expertise literatures, though, one might develop an image of surgeons' movements in the operating room as unconscious, quick, fluid, and effortless, becoming effortful when the occasional situation requires it.[1, 20] This image of expert automaticity, as a sense of detachment from the activity, was not regularly demonstrated in this study; to the extent that it was, it manifested as sufficiently different from the usual surgical practice of fine-tuning that it was recognized as the

separate phenomenon of drifting. More often, it appeared that even though surgeons' hand movements demonstrated an economy of motion, lacking the clumsiness of novices for instance, some part of their cognitive processes were constantly engaged in and attentive to their environment. Surgeons described this background monitoring activity as a "heightened sense of surveillance". We believe that it is from this heightened baseline awareness that surgeons momentarily dip into their cognitive resource pool and slow down to make minor adjustments and technical maneuvers to stay on course—the subtle manifestation of the slowing down phenomenon we refer to as "fine-tuning."

By contrast to this state of monitoring and heightened surveillance, surgeons in this study described the state of drifting as a negative by-product of automaticity, a state of inattention that could lead to error. This view might explain why they were reluctant to consider automaticity as their baseline level of functioning. The "cost of automaticity" is discussed in the broader attention literature concerning procedures that are highly routinized but, at the same time, require close attention.[21, 22] Errors in such systems, like those described by surgeons in this study, occur because routinization leads to automatic behaviors that are not accompanied by close attention.[21] Often the only evidence of drifting in these situations is when errors occur. Drifting has been suggested by some to be beyond the control of the individual working in such routine or automatic conditions. Toft and Gooderham[22] refer to drifting as "involuntary automaticity" and go so far as to suggest it as a potential legal defense against allegations of clinical negligence in situations where organizations have not taken measures to counteract or consider the influence of automaticity on their workers' performance.

On the basis of what we observed in the operating room, we propose that being in an automatic mode is not an "all or none" phenomenon; rather, it can be further characterized by how much attention is being reinvested into monitoring activities during the case.

Automaticity might best be divided into two states, described as "attentive automaticity" and "inattentive automaticity." Working in a dynamic environment, surgeons are required to maintain some degree of situational awareness, with the ability to redirect attention to the important cues when necessary. This requires cognitive effort to be directed toward metacognitive monitoring to "remain aware of the whole situation, to monitor events as they occur, to reflect on alternative possibilities should a decision need to be made,"[23] and to monitor processes that are happening automatically.[23] When this monitoring activity fails, drifting occurs.

The important role of metacognitive monitoring for health care professionals has been the recent focus of research programs in medical education[24-27] that have expanded researchers' view of expertise beyond the "expertise as automaticity" model. It is possible to consider that a true expert is someone who reinvests freed up cognitive resources (a benefit of being automatic) into the moment-by-moment monitoring of his or her clinical activities—a process that requires purposeful attention and effort. The "cost" of automaticity and the potential for drifting into an inattentive automatic state have important implications for patient safety and may help educators instill in the next

generation of health care professionals the importance of remaining purposefully attentive, of reinvesting their cognitive resources back into the case to function as a metacognitive self-monitoring and self-corrective feedback tool.[24,28]

Funding/Support: This study was funded by the Physician Services Inc.

Comment [JC15]: In the mandatory structured disclosure section, the authors disclose their funding source and provide information related to ethical approval.

Other disclosures: None.

Ethical approval: This study was approved by the University Health Network Research Ethics Board and University of Toronto Office of Research Ethics.

References

1. Dreyfus HL, Dreyfus SE. Mind Over Machine. New York: The Free Press; 1986.

2. Bereiter C, Scardamalia M. The Need to Understand Expertise. Surpassing Ourselves: An enquiry into the nature and implications of expertise. Chicago and La Salle, Illinois: Open Court; 1993.

3. DeNeys W., Glumicic T. Conflict monitoring in dual process theories of thinking. Cognition. 2008;106:1248-1299.

4. Schön DA. The Reflective Practitioner : How Professionals Think in Action. New York: Basic Books; 1983.

5. Schön DA. Educating the Reflective Practitioner : Toward a New Design for Teaching and Learning in the Professions. San Francisco, Calif: Jossey-Bass; 1987.

6. Moulton CA, Regehr G, Mylopoulos M, MacRae HM. Slowing down when you should: a new model of expert judgment. Acad Med. 2007;82(10 Suppl):S109-S116.

7. Moulton C, Regehr G, Lingard L, Merritt C, MacRae H. "Slowing down when you should": initiators of the transition from the routine to the effortful. J Gastrointest Surg. 2010;14:1019-1026.

8. Kahneman D. Attention and Effort. Englewood Cliffs, NJ: Prentice-Hall Inc; 1973.

9. Charmaz K. Grounded theory: Objectivist and constructivist methods. In: N.Denzin, Y.Lincoln, eds. Handbook of Qualitative Research. 2nd ed. Thousand Oaks, Calif: Sage; 2000.

10. Glaser B, Strauss A. The Discovery of Grounded Theory: Strategies for Qualitative Research. Chicago, Ill: Aldine Publishing Co.; 1967.

11. Kennedy TJ, Lingard LA. Making sense of grounded theory in medical education. Med Educ. 2006;40(2):101-108.

12. Moulton C, Regehr G, Lingard L, Merritt C, MacRae H. Operating from the other side of the table: Control dynamics and the surgeon educator. J Am Coll Surg. 2010;210:79-86.

13. Emerson RM, Fretz RI, Shaw LL. Participant observation and fieldnotes. In: Atkinson P, Coffey A, Delamont S, Lofland J, Lofland L, eds. Handbook of Ethnography. London, UK: Sage; 2001.

14. Strauss A, Corbin J. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. 2nd ed. Thousand Oaks, Calif: Sage; 1998.

15. Gilchrist V, Williams R. Key informant interviews. In: Crabtree B, Miller W, eds. Doing Qualitative Research. 2nd ed. Thousand Oaks, Calif: Sage; 1999.

16. Morse J. The significance of saturation. Qual Health Research. 1995;5:147-9.

17. Kelle U. Computer-Aided Qualitative Data Analysis: Theory, Methods and Practice. Thousand Oaks, Calif: Sage; 2002.

18. Sevdalis N, Lyons M, Healey AN, Undre S, Darzi A, Vincent CA. Observational teamwork assessment for surgery: Construct validation with expert versus novice raters. Ann Surg. 2009;249:1047-1051.

19. Hsu, K, Man F et al. Experienced surgeons can do more than one thing at a time: Effect of distraction on performance of a simple laparoscopic and cognitive task by experienced and novice surgeons. Surg Endosc. 2008;*22*:196-201.

20. Ericsson KA. Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. Acad Med. 2004;10:S1-S12.

21. Barshi I, Healy AF. Checklist procedures and the cost of automaticity. Memory & Cognition. 1993;21(4):496-505.

22. Toft B, Gooderham P. Involuntary automaticity: A potential legal defence against an allegation of clinical negligence? Quality & Safety in Health Care. 2009;18(1):69-73.

23. Dunphy B, Williamson S. In pursuit of expertise—Toward an educational model for expertise development. Advances in Health Sciences Education. 2004;9:107-27.

24. Epstein RM, Siegel DJ, Silberman J. Self-monitoring in clinical practice: A challenge for medical educators. J Contin Educ Health Prof. 2008;28(1):5-13.

25. Eva KW, Regehr G. Self-assessment in the health professions: a reformulation and research agenda. Acad Med. 2005;80(10 Suppl):S46-S54.

26. Regehr G, Eva K. Self-assessment, self-direction, and the self-regulating professional. Clin Orthop Relat Res. 2006;449:34-8.

27. Regehr G, Mylopoulos M. Maintaining competence in the field: learning about practice, through practice, in practice. J Contin Educ Health Prof. 2008;28(Suppl 1):S19-S23.

28. Epstein RM. Mindful practice. JAMA. 1999;282(9):833-9.

Table 1

Manifestations of the "Slowing Down" Phenomenon in the Operating Room: Transitions From the Routine to the More Effortful*

Manifestation	Definition	Representative reflective field note excerpts
Stopping	The surgeon stops the operative procedure.	As the fellow was transecting the liver parenchyma, the surgeon, recognizing unusual anatomy said, "What the hell is that? Let's just stop and see how we're doing here". The surgeon then placed his hand in the field to prevent the fellow from operating and looked up at the ceiling for a few seconds with his eyes closed. When the researcher asked what he was thinking, he (half) joked, "I am looking at the textbook on the ceiling". (*Observing Surgeon OR05)*
Removing distractions	The surgeon removes distractions from the environment.	The surgeon was assisting the fellow as the liver parenchyma was transected. The situation was relaxed and proceeding uneventfully. The resident, holding a retractor, was telling an unrelated story to the surgical team with the surgeon laughing in response to her story and joining in the discussion. In the operative field, a large hepatic vein was opened suddenly causing a moderate and steady flow of blood loss. Oblivious to this, the resident continued talking. The surgeon said, "Wait one minute [resident name]. Let's just see where we are" as the surgeon and fellow continued operating. Without the situation fully under control, the resident resumed talking. The surgeon said (with some agitation), "Wait one minute [name], a bit too much bleeding here". (*Observing Surgeon OR05)*
Focusing more intently	The surgeon withdraws from extraneous conversation or distraction but proceeds without removing or controlling the environmental distractions.	The surgical fellow had just divided the bile duct during a standard Whipple procedure and was engaged in an extraneous conversation with U2 playing in the background. The surgeon noticed some bleeding and dropped out of the conversation, focusing intently on what they had just divided. While he was

Comment [JC16]: The table title and accompanying footnote are written so that the table could be understood independent of the research report. The table defines and provides a representative example of each of the four manifestations of the "slowing down" phenomenon.

		inspecting the ligated bundle of tissue, feeling for pulses in the hilum, and tracing the pulse of the hepatic artery along its length, the fellow continued talking and the resident and medical student were literally nodding their heads to the music. Once the surgeon was happy he had not ligated a replaced right hepatic artery he rejoined the conversation. The researcher asked the surgeon whether he had heard what the fellow had said just seconds before. He had not. (*Observing Surgeon OR02)*
Fine-tuning	The surgeon continues to engage in extraneous conversation or pauses momentarily to focus on the operative procedure.	The surgeon was encircling the portal vein at the hilum of the liver. He recognized the vein was bigger than anticipated and pulled the dissecting instrument out to then encircle the much larger vein. He was conversing throughout this maneuver with the fellow about the prognosis of the case and 'paused' momentarily as he corrected the angle of the right-angled instrument. (*Observing Surgeon OR03)*

* Manifestations are listed from the most extreme to the most subtle. All excerpts are taken from the principal investigator's (C.A.M.) field notes on her phase 2 observations of five hepatopancreatobiliary surgeons in the operating room, May 2008–February 2009.

Guidelines to Help Authors Write Effective, Interesting Letters to the Editor

Introduction

Below I have listed guidelines for writing letters to the editor that I have learned by editing letters for the last few years. I have also learned that most of these guidelines, in rare cases, will not apply—a letter will come along that requires a different approach. However, if you do your best to follow these guidelines, your letter will almost always be one that others will want to read.

After the list of guidelines, I have presented two actual letters in their "before" and "after" forms, to illustrate how some of the guidelines work.

Guidelines

1. *Your message should be of interest.* A letter to the editor is one way to tell others in the academic medicine community something of interest to them. That may not always be the same "something" that is of interest to you. Ask yourself, "Even though this topic is interesting and important to me, will it be interesting and important to the community?"

2. *Your letter should be focused, direct, and short.* A great advantage of a letter is that it states its case and finishes soon after. If your message can be presented well in this condensed style, start writing your letter. On the other hand, if your message

   - requires a lot of explaining or data,
   - is primarily the basis of a research report or a program description,
   - has a long chain of ideas, or
   - cannot easily fit into 400-500 words,

   you should write a scholarly article or a research report instead.

3. *State the message of your letter in its first sentence or, at most, in its first paragraph.* Unlike scholarly articles, letters do not require long introductory explanations and information. Letters must "get down to business" immediately. Your readers should understand right away what you are trying to tell them.

4. *Letters should have titles that give the sense of the letter's message, not just its topic.* A title such as "Reflections on Problem-Based Learning" is not nearly as effective for a letter as "Why Problem-Based Learning Sometimes Fails Our Students." Once your letter is accepted, the journal's editor will help you create an effective title if you have not already done so.

5. *Your letter should focus on ideas and opinions.* Letters are not reports of research or descriptions of programs, although research findings and program descriptions can be used to illustrate the letter's ideas and views. Ask yourself, "What ideas and views

underlie—and perhaps motivated— the research or program I want to write about?" and then emphasize those ideas and views in your letter.

6. *In a letter, you can speak more directly than is sometimes the case in a scholarly article.* Why spend the time writing a scholarly article if you can say what is on your mind in a letter, and say it more directly? Often a scholarly article is a better venue because it gives more scope to presenting data and arguments. But not always.

7. *In a letter, you can speak more informally than is sometimes the case in a scholarly article.* Along with speaking directly in a letter, you can also speak more informally and plainly. Think of a scholarly article as an essay you would deliver in a formal session of a conference. Think of a letter to the editor as a comment you would make to friends over drinks after the conference was over. For example, whereas in the scholarly article, you might say "An essential requirement for the success of junior faculty is that they be assigned mentors," in a letter you could say, "We must assign mentors to our junior faculty if we want them to succeed." This being said, it is not a requirement that letters have an informal tone. But usually such a tone is more persuasive.

8. *Your letter can be on a controversial topic.* Letters offer a format to air difficult, controversial topics in a direct way. Do not be afraid to speak plainly about a touchy topic as long as your words are civil and your tone constructive.

9. *Your letter should usually have only one message.* More than one message usually will not fit into the short space of a letter. Also, more than one message can weaken the impact of the letter—there is not enough space to put each message in context. Finally, readers will more easily remember—and perhaps think about—a letter with one well-stated message.

10. *Your letter should contain only the information that is needed to explain and support your message.* As fascinating as your topic may be, don't discuss any aspects of it that do not directly relate to your message. If you need to have such extra information, you should probably write an article instead.

11. *Your letter should not contain tables, figures, or headings, and should have one or two footnotes only when truly necessary (as in the first letter presented below).* Remember, a letter is not a scholarly article—which gives it certain advantages (like directness) and certain disadvantages (like those stated above).

12. *Your letter should contain only those reference citations that are truly necessary.* One reason that the words that constitute references are part of the total word count of the letter is to discourage authors from having unnecessary references. In unusual cases where several references are needed (for example, to defend the position you take in your letter), explain this to the editor of the letter to see if there is a way to accommodate the extra references.

Two Before-and-After Letters That Illustrate Some of the Guidelines Discussed Above. (Authors' names and references were deleted from these examples—they were not needed to illustrate the guidelines, although they are needed in actual letters.)

First letter—BEFORE

Creating a K-Community of Investigators

To the Editor: In 2006 the NIH initiated the CTSA Program (1). This program is suppose to "break down institutional barriers and foster team science, partnerships, collaboration and connectivity…".(1) Education and training is a key component and includes KL2 stipends for young investigators. In 2008, Boston University School of Medicine was awarded a CTSA grant. At that time we had an institutional K30, but no NCRR sponsored K12. Since then under the auspices of our CTSA we have tried to create a K community of investigators that includes trainees from our initial K30, two institutional K12 programs, our own KL2 awards, and individual K awardees. We envision a continuum of training from K30 to K12/KL2 to individual K awards.

We surveyed our individual K awardees in 2009. Sixteen of 36 responded. They told us what their funding priorities would be in the $3-5000 range. They also indicated that the CTSA could help them succeed in three areas: (1) help with issues related IRB; (2) statistical support; and (3) some resources for travel and supplies.

In response to the survey and consistent with the goals of our CTSA, we have created the following resource package that is now available for all of the BUSM K investigators:

- Assistance with IRB applications through a formal consultative service sponsored by our Regulatory Knowledge and Ethics Function;
- Statistical support through the biostatistical core function;
- Internet access and vouchers for CORE laboratory facilities through our translational technology function; and
- Small grants for supplies, travel or other needs not covered by the individual K or K12 grants.

In 2010 we announced our first small grant program specifically for our current individual K awardees. The application was one-page with notification in 2 weeks. We funded 5 of 15 applications. The majority of requests were for laboratory supplies, advanced statistical support, and travel.

We have tried to leverage the funds from the CTSI to create a K-community of investigators that spans the continuum of training from fellowship through the KL2/K12 programs to individual K awards. Our initial efforts have focused on ensuring that additional resources are available in areas highlighted by our awardees. We believe this approach is more effective than simply concentrating our resources on KL2 awardees. As our program matures, we will again survey our K community of investigators in order to ensure that we are continuing to meet their needs.

Some Problems That Needed Solving in the First Letter:

- The letter does not get to the point early enough—readers wonder for too long "What is this author trying to tell me?"
- The letter is full of information that clutters the letter and impedes the flow of ideas—yet, in some cases, is needed.
- The letter focuses unduly on the authors' program and not enough on the ideas and issues that underlie the program.

The edited version below solves these and other problems. This letter was unusual in that the final version required footnotes to explain some terms, so that that information would not clutter the letter.

First letter—AFTER

Creating a K-Community of Investigators

To the Editor: How can a medical school maximize the benefits of an NIH Clinical and Translation Science Award (CTSA)? * We advocate the creation of a "K-community of investigators" to span the continuum of training from fellowship through the KL2/K12 programs to individual K awards. † A first step toward this goal would be to survey the K awardees about their needs. For example, do they need help with issues related to IRBs? Do they need statistical support? Do they need funds for travel and supplies? Once the survey results are in, it would be important to ensure that the resources that awardees highlighted are available to them, perhaps through a small-grants program and other services.

We believe such an approach would be more effective than simply concentrating a school's resources on CTSA K awardees only. First, the amount of resources that individual KL2 awardees need is extensive and the types of resources are similar. Second, the idea behind a community of investigators is to create a supportive environment for all the young investigators at a school, not just those who receive KL2 support. Third, another aspect of the community approach is the recognition that trainees often learn from each other, both in hearing about each others' projects, reviewing them, and being aware of each others' errors and successes.

We have put the above ideas into practice at Boston University of Medicine since 2009, when we surveyed our K awardees about their research needs. Our experience to date shows that this approach, which continues to evolve, is working. We urge other schools with CTSA Program awards to consider creating their own communities of K investigators.

[FOOTNOTES]

* Clinical and Translational Science Awards: Translating Discoveries to Medical Practice. Available at: http://www.ctsaweb.org/. Accessed August 25, 2010.

† KL2 awards provide "protected-time" for faculty members to conduct research and are provided under the auspices of CTSA. K12 awards provide "protected time" for faculty members to conduct research and are available at various institutions, in specific areas,

like women's health or child health. Individual K-awards provide "protected-time" for faculty members to conduct research and are available from virtually all NIH institutes. KL2 and K12 support is available for two to three years, and individual K-award support is available for three to five years.

Second letter—BEFORE

Becoming a Pediatric Physician-Scientist: A Woman's Perspective

Introduction

Among the specialty areas in medicine, Pediatricians consists among the highest numbers of women compared to other specialties. In 1982, approximately 50% of Pediatric residents were women and the numbers are increasing to now 70% (1). Although there have been some advances and examples of women achieving a successful academic career, in many ways, very little has changed (2). Many of the challenges that exist today were reported by Nancy Andrews in 2002 (3). A recent review from the Association of Medical School Pediatric Department Chairs (AMSPDC) summarizing important barriers to the success of women faculty addressing work/life balance and family issues mentioned the same issues that existed 6 years ago (4). Women are underrepresented in leadership positions in academic institutions (5). In addition, the numbers of physician-scientists, especially women, in the U.S. are decreasing (6). Even more rare are women who are of ethnic minority. Perhaps it is because women have the reputation of being more nurturing, therefore tending to care for patients rather than a bench or translational researcher doing experiments or writing grants. Another reason may be the length of commitment and the other responsibilities in their personal lives.

Life-long learning

As we look back on our careers, one thing is clear; we have always been involved in some type of research and life-long learning. In high school, it was genetics course looking at the color of drosophila eyes. In college, it was an honors thesis project, which resulted in a co-authored paper or a summer internship in a research laboratory. During residency, it was using elective time to start a new research project or during fellowship, a two-year research fellowship turned into a 4 and a half-year fellowship under the mentorship of a successful female Ph.D. scientist and translational researcher.

Throughout all of these experiences, the pursuit of knowledge was the motivation. Medicine was a two-edged sword during our training. Unlike my PhD colleagues, who didn't have other options, physicians could do research without the pressure of their livelihood depending on it. Research was the current focus, but medicine was always our vocation in case the research part "didn't work out." In one sense, it provided security; but on the other hand, another alternative that could lead to one giving up the tough life of academics. These experiences are not particular to women, but to all physician-scientists, especially those who decide later in their careers, i.e. during fellowship, to pursue a bench or translational research pathway.

Being a woman physician-scientist

Perhaps being on the West Coast has made the experience of being women easier. Although there appears to be a glass ceiling, the ceiling seems to be lower compared to our colleagues elsewhere, where traditions are strong and the numbers of role models are fewer. Having a female mentor or male mentors who truly support women has been critical to the

success of our careers. In fact, seeing other Division Chiefs successfully promoted, who are also accomplished researchers and clinicians at large institutions, is very encouraging to junior faculty.

Getting over the hump

There are so many obstacles for women physician-scientists at academic institutions. In addition to limited NIH funding, competition with Ph.D. scientists, high standards required for publications, there are personal challenges. Delaying marriage or starting a family due to lack of time or finances is one reason. The average medical student has over $150,000 in loans to pay (7). This factor, in addition to starting a new family and buying a home (which can be expensive especially in Los Angeles), is prohibitive to extending the fellowship training to build a successful academic career. Women can be successful in becoming a physician-scientist if they either have financial support from a spouse, no loans to pay, or can support themselves through their research fellowship by moonlighting occasionally. The NIH loan repayment program helps, but they are competitive and only 30% are funded each year (7). Women with children have been successful if they have help at home, e.g. nanny or babysitter (which can require significant resources) or a spouse or family member to take care of the children. Of importance is the need to remain focused and protected (less than 20% clinical work). The likelihood of this happening is greater if the mentor is a female or is someone who is very supportive of women in academics. Once the person has their first R01 grant and achieves promotion to Associate Professor, they should be "over the hump" thereby allowing us to help other women physician-scientists.

Conclusions

Despite the challenges and hurdles necessary to be a successful physician scientist, this career has been the most satisfying and interesting career we could have imagined. It is critical for successful women physician-scientists to emphasize the positive aspects of our career as in the long-term benefits and maintaining the "big picture," i.e. a satisfying career, intellectual satisfaction, preventing burnout from patient care, prestige, and recognition. Without this type of encouragement and support of women physician-scientists in research, we will become an endangered species and have no opportunity to train future role models in academic medicine.

<u>Some Problems That Needed Solving in the Second Letter:</u>

- The letter was written as a scholarly article, with an introductory section, headings, and much more information than was needed.
- The tone of the letter was fairly formal.
- The main point of the letter was not clear enough early enough.
- The writing was too detached, not direct enough.
- Even without the references the author included, the letter went well beyond the word limit.

The edited version below solves these and other problems.

Second letter—AFTER

Becoming a Woman Physician Scientist

To the Editor: We wrote this letter to share what we think has helped us succeed as women physician scientists.

First, as we look back on our careers, we see that we have always been involved in some type of research and lifelong learning. In high school, it was a genetics course looking at the color of drosophila eyes. In college, it was an honors thesis project, which resulted in a coauthored paper or a summer internship in a research laboratory. During residency, it was using elective time to start a new research project. Throughout all of these experiences, the pursuit of knowledge was the motivation.

Second, each of us had supportive mentors. Perhaps being on the West Coast made the experience of being women in academia easier. Although there appears to be a glass ceiling, the ceiling seems to be higher compared with that experienced by our colleagues elsewhere, where traditions are strong and the numbers of role models are fewer. Having a mentor who supports women in academics has been critical to the success of our careers. Also, seeing other women faculty successfully promoted is very encouraging, and those women can become excellent mentors.

Third, we have learned that there are ways to overcome many of the obstacles that women physician scientists face at academic institutions. In addition to limited NIH funding, competition with PhD scientists, and the difficulties of having one's work published, there are personal challenges—for example, delaying marriage or starting a family because of lack of time or finances. The NIH loan repayment program helps. Women with children have been successful if they have help at home, such as a nanny or babysitter (which can require significant resources) or a spouse or family member to help care for the children. Of importance is the need to remain focused and have protected time (less than 20% clinical work).

Despite the challenges to becoming a successful physician scientist, we cannot imagine a more satisfying and interesting career. It is critical for us as successful women physician scientists to emphasize to ourselves and to those we advise the positive aspects of our professional lives: a satisfying career, intellectual satisfaction, avoidance of burnout from patient care, prestige, and recognition. Without this attitude and the other factors we have mentioned above, women physician scientists will become an endangered species and have fewer opportunities to train future role models in academic medicine.

###

Additional Resources

- *Academic Medicine's* For Authors Page
  http://journals.lww.com/academicmedicine/Pages/InformationforAuthors.aspx

This page on *Academic Medicine's* Web site includes the complete instructions for authors, tutorials on how to write articles and research reports, and a variety of other useful resources for authors interested in submitting to *Academic Medicine*.

- International Committee of Medical Journal Editors
  http://www.icmje.org/

This Web site includes the Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publications, which are truly the industry standard (*Academic Medicine* is a signatory—here's the full list of journals that follow the Uniform Requirements: http://www.icmje.org/journals.html). Guidance on ethical considerations such authorship or conflict-of-interest as well as practical issues centering on preparing and submitting manuscripts can be found here.

- AMA Manual of Style
  www.amamanualofstyle.com/

Journals may subscribe to unique style requirements, but many in the medical field are influenced by the AMA Manual Style. This is a good resource to help answer style questions— from formatting references to understanding when it is appropriate to abbreviate an acronym. A subscription is required to access the online version of this style guide. A book version is available for purchase, too.

- PubMed
  www.pubmed.gov

PubMed is a free database to over 19 million MEDLINE citations, abstracts and some full text articles on life sciences and biomedical topics. The United States National Library of Medicine at the National Institutes of Health maintains PubMed.