Can Cedars-Sinai's "M+M Matrix" save surgical education?

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Surgical journals are receiving an avalanche of editorials from frenzied educators who are wringing their hands over the current state of American surgical education. The authors claim that today's trainees receive an "extremely poor" educational experience.[1]

Similarly, some surgical educators crisscross the country on the grand rounds circuit, decrying the lack of a well-defined surgical curriculum. Recruitment is down, with some residency spots remaining empty. Symposia, think-tanks, focus groups, and break-out sessions to discuss and examine the issue are springing up across the surgical landscape.[2,3] "Mentor mania" has developed in an attempt to define the qualities of the elusive surgical role model for the new millennium.[4]

Against this backdrop, the Accreditation Council on Graduate Medical Education has imposed work-hour restrictions, just as the variety and complexity of surgical diseases have increased, and the technology designed to combat them has expanded.

Furthermore, a Dr. Phil-like focus on the lifestyle, self-esteem, and personal psychological fulfillment of the surgeon-to-be has taken center stage. A process that has long emphasized commitment, dedication, and continuous patient care now must offer opportunities for young professionals to share their feelings, to enjoy "quality time" with friends and family, and to develop their interpersonal skills. A sensitive and caring core curriculum has evolved, competing with standard and time-honored surgical teaching techniques. The burden on surgical educators has increased as these approaches vie for time, money, and attention.

When these trends are coupled with the Institute of Medicine (IOM) report on medical errors and a growing medical liability crisis, it is clear that rapidly implemented innovative change in surgical education is necessary. Some educators claim that the needed changes should be "Flexnerian" in character,[5] while others say we must discover the "Halsted reformer of today."[6]

In the evolution of the American surgical education system, the brightest flashes of innovation often follow the darkest hours of educational despair. So it was with Flexner. So it was with Halsted. So it will be with an entirely new approach to the traditional M&M conference developed at the Cedars-Sinai Medical Center in Los Angeles, CA. This approach is called the "M+M Matrix."

The M+M Matrix

The M+M Matrix is a concept that redefines and reconfigures the traditional surgical morbidity and mortality conference. This seminal surgical conference is the logical place to begin such Flexnerian and Halstedian change.

The M+M Matrix is a mechanism for reconfiguring the traditional surgical morbidity and mortality (M&M) conference, which, as currently conducted in many training programs, has failed in its educational mission. The great lessons voiced at most M&M conferences are dismissed at the exit door. It is as if a culture developed that failed to invent a written language and is restricted to the oral transmission of complication-reducing surgical principles. The reasons for the failure of the traditional M&M conference include the lack of continuity, the lack of educational accountability, and its lack of logic. It is an educational Roach Motel©: Great surgical ideas check in, but they don't check out!

The M+M Matrix implemented at Cedars-Sinai addresses these weaknesses through a process that involves a discussion of each surgical complication. That discussion is outlined and codified into a matrix—a framework on which residents and staff can build an approach to managing that complication as their education and careers progress.

The moderator of the forum serves as the chief and driving force behind this changing educational approach. The moderator's task is to supervise a one-week educational effort aimed at conference preparation. This individual formulates the weekly matrix outlines and works with the residents to arrive at unifying surgical principles.

The Matrix uses the inherent dynamic of a well-moderated, well-coordinated, and well-attended M&M conference. Using a weekly, monthly, and yearly cycle of e-mail, written examinations, and referenced discussions, the Matrix program codifies and sustains the great lessons of the traditional M&M conference while

purging it of the unfortunate legacy of shame and blame. It does so by changing the focus from rooting out problems to decreasing surgical complications and encouraging participants to recognize them earlier and to treat them more effectively.[7]

Using their well-documented views on medical education, it is likely that both Flexner and Halsted would focus on the surgical morbidity and mortality conference as the place to begin change in surgical education.

Reasons to implement

There are 10 reasons to bring about educational change through the surgical M&M conference. They are as follows:

1. The M&M conference is the only time of the week during which staff and residents assemble for a formal interactive session. The communal give-and-take of the surgical morbidity and mortality conference generates a passion for surgical education. The lively debates, the intellectual challenges, and the differing ways of managing surgical problems generate an educational spirit that can unify a surgical department.

2. The M&M conference puts the departmental clinical knowledge on display. This knowledge can debunk the "promulgation of surgical folklore."[5] Errors in surgical thought are analyzed and debated. Only through such open debate can the principles of proper surgical practice be voiced and inculcated.

Much is made of the transmission of faulty surgical knowledge from an overburdened staff or an inexperienced cadre of residents. This conference sets the record straight and memorializes current surgical practice.

3. The M&M conference develops organization and presentation skills. The first goal of any training program is to produce knowledgeable surgeons. The second goal is to ensure that these young surgeons can articulate that knowledge to colleagues and to patients.

The Matrix develops preparation, presentation, and organizational skills. The resident prepares to answer pointed questions and to defend his surgical actions. These essential skills are needed throughout any surgical career.

4. The M&M conference is a forum for ongoing educational change. Once it is clear to a department of surgery that the M&M conference is an educational hub, it becomes a forum for change. New educational techniques are introduced. New ideas are tested, refined, and ultimately implemented through the department's educational program.

5. The M&M conference addresses the pressing issue of error and complication reduction in surgery. There is a growing national interest in errors and complications in medicine. The Matrix sensitizes residents to errors and complications early in their careers in an educationally meaningful manner.

Such sensitized surgeons will commit fewer errors. When complications arise, those surgeons will detect them sooner and will treat them more effectively.

Other specialties are beginning to recognize the value of the surgical M&M conference; hence, they are looking to surgery to provide an effective template for educational change.[8] Surgery has the opportunity to take the national lead in this critical area.

6. The M&M conference is the ideal vehicle for implementing a "small team" approach to patient care.[5] Hand-offs, sign-outs, and porous cross-coverage schemes are inimical to the seamless patient care required by the surgical patient. Having small teams work together in preparation of the M&M conference enhances a similar approach to clinical care. Each member of the clinical team has a role in conference preparation, and the most cohesive groups tend to develop presentations that stimulate audience interest and participation.

7. The M&M conference is an existing mechanism, currently free of the need for high-level funding. Because the M&M conference is part of the surgical training heritage, implementing educational change via the Matrix concept is relatively inexpensive. In today's cost-conscious surgical environment, reconfiguring an existing mechanism rather than building a new one is economically appealing.

8. The well-moderated, well-attended, and well-planned M&M conference serves as a medical student recruitment tool. There is inherent medical student appeal generated by a well-at-

tended and well-coordinated Matrix conference. Once this conference becomes an educational engine, rather than a burdensome shame-and-blame witch trial, it will attract the best students to the surgical programs that use it.

9. The surgical M&M conference generates a year-long curriculum for the entire department. The Matrix program generates a curriculum from the cases discussed. The distribution and memorialization of that curriculum provides a department of surgery with an ongoing error and complication-oriented course of study. The Matrix creates a unifying cross-specialty study plan for the entire department.

10. The increasing educational value realized by redesigning this conference will counteract the deleterious educational effects of mandated work-hour restrictions. With the advent of work-hour restrictions, every conference is being scrutinized for its educational value. As many conferences are deleted, the value of the surgical M&M conference will increase. This increased value can be augmented through the Matrix concept. Conversion of the surgical M&M conference into a Matrix conference reflects a dominant theme of both Flexner and Halsted—patient safety through education. Both of these educators would agree that the Matrix answers another more recent report on American health care, the IOM's report, *To Err Is Human: Building a Safer Health System*.

Response to IOM recommendations

To Err Is Human made five recommendations for the effective analysis of medical errors.[9] The following is a list of those suggestions, with explanations of how the Matrix responds to them.

1. *Report events to create a "story" of what occurred.* The presentations offered in the Matrix program involve stories about the team members' experiences in managing surgical complications. Refined organization and presentation skills enhance the impact of the story.

2. *Report events in a manner that seeks the meaning of the story.* The M+M Matrix uses the unique dynamic of the surgical morbidity and mortality conference to explain an event and to analyze the factors leading to it. It also demonstrates the educational meaning of the complication.

3. *Develop recommendations for improvement.* A Matrix conference not only analyzes the complication and suggests methods of improving medical care, but it goes one step further: it imprints those recommendations on the mind of the evolving physician. The Matrix memorializes those surgical lessons, constantly reviews them, and regularly administers examinations based on the surgical principles involved.

4. *Implement the lessons learned.* A primary task of the surgical educator is to assure the public that the lessons imparted to the surgical resident are retained and reinforced. The M+M Matrix defines and facilitates that process through staff supervision and ongoing evaluation of Matrix-educated residents.

5. *Track the changes and gauge their effect.* Testing physicians and tracking cases measures the effect of the M+M Matrix on a division of surgery. Written tests evaluate the surgeons' knowledge. Computer analysis of medical records, operative logs, peer review recommendations, and complication lists track the effectiveness of the program in the area of complication reduction. Increasingly sophisticated computer tracking of patients, surgeons, and outcomes will finally allow us to do for our patients what FedEx© does for a fruit basket.

Conclusions

The Matrix concept is the mechanism by which all conference discussions are linked. It is the means by which seemingly unrelated complications are unified by examining their origins, anatomy, and pathophysiology. Only through such an integrated plan can a collective surgical memory become valuable. Surgical intuition, often discounted in today's hyper-analytical world, suggests that the Matrix will decrease the incidence of surgical complications through a complication-oriented introduction to the discipline of surgery.

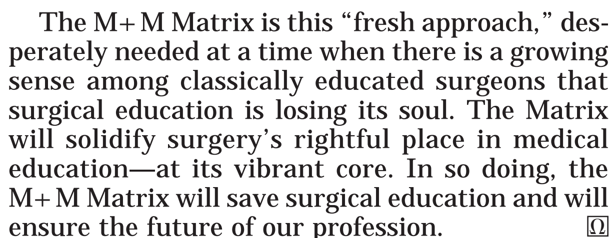
Point by point, the template for adopting the IOM's recommendations is the surgical M&M conference transformed by the M+M Matrix.

The time has come for surgical educators to reevaluate the M&M conference. It is the logi-

cal place to begin implementing significant educational change.

Commenting on the surgical M&M conference, Wachter and Shojania, in their phenomenally popular book *Internal Bleeding—The Truth Behind America's Epidemic of Medical Mistakes,* write:

> It's still too early to tell which of these methods—or perhaps something entirely different—will be the key to harnessing the full potential of the M&M as a problem solving, error-preventing forum. *For now, it's good to know that the forum exists, just waiting for fresh approaches.*[10]



The M+M Matrix is this "fresh approach," desperately needed at a time when there is a growing sense among classically educated surgeons that surgical education is losing its soul. The Matrix will solidify surgery's rightful place in medical education—at its vibrant core. In so doing, the M+M Matrix will save surgical education and will ensure the future of our profession. Ω

Acknowledgment

The author thanks Achilles Demetriou, MD, FACS, chairman, department of surgery, and Alan Lefor, MD, FACS, director of surgical education, Cedars-Sinai Medical Center, for their support of the Matrix program. The author is indebted to David Cossman, MD, FACS, and Alan Silberman, MD, FACS, for their assistance in developing the Matrix concept.

References

1. Silen W: Crisis in surgical education. *J Am Coll Surg*, 193:514-515, 2001.
2. Papers from the Symposium: Challenges in surgical education competencies, work hours, and workforce assessment and adaptation; Louisville, Kentucky May 8-9, 2002. *Am J Surg*, 184:185-253, 2002.
3. DaRosa D, Bell RH, Dunnington GL, et al: Residency program models, implications and evaluation: Results of a think tank consortium on resident work hours. *Surgery*, 133:13-23, 2003.
4. Sanfey H. Mentorship: A review. *Focus on Surg Ed,* 21(2):17-20.
5. Silen W: Surgical education: In need of a shift in paradigm. *Surgery*, 134:399–402, 2003.
6. Mayberry J: Residency reform Halsted style. *J Am Coll Surg*, 197:433-435, 2003.
7. "The M+M Matrix." Information available upon request from Leo.Gordon@cshs.org
8. Pierluissi E, Fischer M, Campbell A, et al: Discussion of medical errors in morbidity and mortality conferences. *JAMA,* 290(21):2838-2842, 2003.
9. Kohn LT, Corrigan JM, Donaldson MS (eds): *To Err Is Human: Building a Safer Health System*. Committee on Quality of Health Care in America, Institute of Medicine. Washington, DC: National Academy Press, 2000.
10. Wachter RM, Shojania KG: *Internal Bleeding—The Truth Behind America's Terrifying Epidemic of Medical Mistakes*. New York, NY: Rugged Land, 2004; 281.

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