TRANSLATION OF EMS: CLINICAL PRACTICE AND SYSTEM OVERSIGHT FROM CORE CONTENT STUDY GUIDE TO BEST PRACTICES IMPLEMENTATION IN AN URBAN EMS SYSTEM

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ABSTRACT

Since 2009, the seminal text in emergency medical services (EMS) medicine has been used to guide the academic development of the new subspecialty but direct application of the material into EMS oversight has not been previously described. The EMS/Disaster Medicine fellowship program at our institution scheduled a monthly meeting to systematically review the text and develop a study guide to assist the fellow and affiliated faculty in preparation for the board examination. In addition to the summary of chapter content, the review included an assessment of areas from each chapter subject where our EMS system did not exhibit recommended characteristics. A matrix was developed in the form of a gap analysis to include specific recommendations based on each perceived gap. Initial review and completion dates for each identified gap enable tracking and a responsible party. This matrix assisted the fellow with development of projects for EMS system improvement in addition to focusing and prioritizing the work of other interested physicians working in the system. By discussing expert recommendations in the setting of an actual EMS system, the faculty can teach the fellow how to approach system improvements based on prior experiences and current stakeholders. This collaborative environment facilitates system-based practice and practice-based learning, aligning with ACGME core competencies. Our educational model has demonstrated the success of translating the text into action items for EMS systems. This model may be useful in other systems and could contribute to the development of EMS system standards nationwide. Key words: emergency medical services; ACGME; fellow education; translation; system improvement

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INTRODUCTION

“When you’ve seen one EMS system, you’ve seen one EMS system” is a frequently used adage in the emergency medical services (EMS) community. This stems from the heterogeneity between EMS systems and whether they are urban or rural, public or private, advanced life support (ALS) or basic life support (BLS), or a number of other defining characteristics. Each system has certain advantages and disadvantages, leading to a unique set of challenges to overcome. Protocols vary widely based on local resources, transport times, and level of provider training. Often the EMS medical director is responsible for standardization and updating the protocols and policies.

In September 2010, EMS medicine became an approved subspecialty by the American Board of Medical Specialties. This recognized EMS medicine as an important and distinct area of medical practice and required fellowship programs to become standardized in their training of core content knowledge and curriculum.1 Fellowships that provided educational opportunities to meet the requirements of the Accreditation Council for Graduate Medical Education (ACGME) were approved as ACGME certified programs. In the development of an ACGME fellowship, curriculum topics must address the core competencies of medical knowledge, interpersonal and communication skills, patient care, professionalism, practice-based learning and improvement, and systems-based practice.1 Given the new nature of the subspecialty, there is little prior educational research on different curriculum approaches. Standardizing the training of future EMS physicians is the first step toward consistency among EMS systems.

The core textbook used among many EMS fellowships is the four-volume set Emergency Medical Services: Clinical Practice and Systems Oversight,2 which is distributed through the National Association of EMS Physicians (NAEMSP) organization. The textbook provides an evidence-based background and recommendations for “EMS System Best Practices.” Applying the learned medical knowledge into systems-based practice provides the basis for an
The University of California San Francisco (UCSF) sponsors a 1- to 2-year EMS/disaster medicine fellowship, which is the primary educational site in our model. UCSF is an approved ACGME site for the one-year EMS medicine fellowship and fellows may choose to remain for a second year to obtain more focused training and an advanced degree. Graduating fellows are eligible for the EMS medicine board exam through the “EMS fellowship training pathway” after completion of the ACGME year. There are different tracks toward eligibility for the EMS medicine board exam, but successful completion of this test is needed for an EMS physician to become subspecialty board certified. Currently, the “practice pathway” for non-fellowship-trained EMS physicians is available until 2019; after this the only pathway to EMS board certification is through EMS fellowship training.

The fellowship program has a Program Letter of Agreement, or Memorandum of Understanding, with the Department of Public Health, which has oversight of the EMS system via the local EMS agency. The EMS system is a public–private partnership, with the majority of 9-1-1 responses provided by a municipal fire department, backed up by two private ambulance companies. The system is two-tiered (basic life support first response followed by advanced life support transport units) and is dispatched from a single Primary Service Answering Point using Advanced Medical Priority Dispatch System (MPDS) protocols. Our system answers approximately 66,000 annual calls for service from a population that varies from 1.3 million workday to 800,000 night and weekend population.

The EMS fellowship faculty and fellows convened monthly at a central location for scheduled curriculum sessions. Prior to the meeting, each participant was assigned 2–4 textbook chapters to read and review for the group. The assignment was based on total combined page length and certain chapter topics could be chosen by a group member’s personal interest or related scholarship. Prior to the session, individuals updated an online “live” master Google drive document of chapter review material. A complete chapter review consisted of the topic overview, suggestions for content additions or recent research publications, and potential improvements that could be made in the local EMS system. During the session each chapter was summarized and discussed. The review included an assessment of areas from each chapter subject where our EMS system did not exhibit the recommended characteristics.

The system improvements were compiled into matrix format as a to-do list for our EMS system. Each task was assigned a date entered and completed, as well as a person responsible for addressing the area of improvement. The sessions lasted over an approximately 2-year period during the fellow’s dedicated didactic time.

Protocol and policy revisions recommended from the process were submitted to the EMS Agency (EMSA) staff for inclusion into the development process. The EMS Agency is a staff composed of nurses, paramedics, and physicians to supervise and regulate EMS in each California county. The typical protocol and policy improvement process involves staff review, work group evaluation and development, public comment, and final approval by an EMS Advisory Committee (EMSA). The EMSA is composed of system providers and consumers as delineated in agency policy. A graphic representation of this process and the study guide input is depicted in Figure 1. The policy and protocol development process is designed to include the largest number of system providers as practically possible. By obtaining their input, greater acceptance and successful implementation is more likely, as well as increased ease of training implementation. The process takes approximately 3–4 months to accomplish, which imposes logistical restrictions on the text to policy or protocol implementation process.

**Results**

Our 2-year complete review of the four-volume textbook condensed approximately 1,800 pages into a 69-page study guide and an 18-page EMS system improvement matrix. The first product was a comprehensive study guide of the core content of EMS medicine. The chapter review process and final document provided the EMS faculty and fellows with preparation and resources for the EMS medicine board certification exam. The final study guide is open access and can be viewed online. The second product was a matrix developed in the form of a gap analysis to include specific recommendations for our EMS system based on each perceived gap. An example of the matrix can be found in Table 1. Each identified gap has an entered and completed date to enable tracking and a responsible party. This matrix was used as a resource for the fellow to develop EMS system improvement projects. It also focused and prioritized the work of other interested physicians (such as rotating residents) and EMS administrative personnel working in the system. Specifically in our system, these identified gaps were addressed through protocol/policy revision sessions and EMS Advisory Committee work groups.

After completion of the matrix, we compiled a summary listing of the recommendations to the EMS
FIGURE 1. Policy and protocol development process.
system. There were 178 total recommendations from the text review and the study group evaluated 67 topics as actionable. Nonactionable items included recommendations that had been implemented prior to the study guide review (example: priority of keeping the hands on the chest/minimizing CPR interruptions, which was implemented with the 2010 American Heart Association guideline revisions), recommendations for dealing with system components that are not found in our system (example: air medical transport), or general recommendations that the authors did not find specific actionable items to implement from their text review (example: robust dispatch protocols and QI are needed for EMS systems with tiered responses).

We divided these recommendations into seven categories to facilitate tracking and completion by specific work groups, as shown in Table 2. Protocol revisions (22) and policy revisions (16) were the most common, followed by quality improvement process changes (12), training program changes for prehospital (7) and physician (6) providers, base hospital process improvement (2), and state/national process improvement (2). Also listed in Table 2 is an example of each recommendation category with a corresponding action and the total recommendations in each category. As noted in Figure 1, after the protocol and policy work groups send recommended changes out for public comment, the final product is presented to the EMS Advisory Committee for review. The other categories, such as training program revisions and QI process improvement, were easier to implement. While the majority of system improvements were approved, several of the protocol revisions were rejected by the EMSAC due to conflicting new publication evidence, strong local expert resistance, or logistical/cost considerations. Since the recommendations are still in progress, are not standardized as quality improvement measures, and were designed to inform decision makers about the emerging standardization of many aspects of EMS medicine, we hesitate to report a success/failure rate. This might be more appropriate if and when standards of care emerge more clearly from the maturati
dation of EMS medicine, leading to an effort such as the “Get with the Guidelines” approach utilized by some

<table>
<thead>
<tr>
<th>Type of recommendation</th>
<th>Example of recommendation</th>
<th>Example of action</th>
<th>Total number of recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol revision</td>
<td>Literature review of tranexamic acid (TXA) benefit in trauma patients and potential for use in our system</td>
<td>Reviewed by protocol work group and submitted to EMS Advisory Committee (EMSAC)</td>
<td>22</td>
</tr>
<tr>
<td>Policy revision</td>
<td>Add a destination policy for patients with sexual assault as San Francisco General Hospital is the city designated facility</td>
<td>Reviewed by EMS agency staff and submitted to EMSAC</td>
<td>16</td>
</tr>
<tr>
<td>Training program revision</td>
<td>EMS providers Emphasize resources available for grief training during paramedic training and continuing education</td>
<td>Memo sent with training materials to EMS providers</td>
<td>7</td>
</tr>
<tr>
<td>Training program revision</td>
<td>EM residency/EMS fellowship Work with nearby programs (UC Fresno and Stanford) to incorporate wilderness EMS principles into UCSF program</td>
<td>Curriculum developed and inserted into residency training program and fellow education</td>
<td>6</td>
</tr>
<tr>
<td>Quality improvement process revision</td>
<td>Utilize customer satisfaction surveys as a means for evaluating EMS services</td>
<td>Review recommendation with EMS System QI Committee and implement approved changes</td>
<td>12</td>
</tr>
<tr>
<td>Base hospital process improvement</td>
<td>Integration of base hospital physician function in the field using EMS fellow and senior emergency medicine resident ride-alongs; e.g., consultation for Against Medical Advice dispositions and deviation from ambulance destination policies</td>
<td>Memo sent to base hospital for Process Improvement review and tracking of field use of this function (vs. standard recorded radio line)</td>
<td>2</td>
</tr>
<tr>
<td>State/national process improvement</td>
<td>Support standardization of EMS standards of care, e.g., standardized protocols at a state level and funding at a national level</td>
<td>Advocate at NAEMSP and California EMS Medical Directors Association for recommended changes</td>
<td>2</td>
</tr>
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jurisdictions to evaluate the implementation of American Heart Association guidelines for stroke.

DISCUSSION

Scholarly review of the NAEMSP textbook can be used for EMS curriculum development by addressing fellowship core content, facilitating board examination preparation, and formulating a gap analysis of system improvements for local EMS systems. With the recent recognition of EMS medicine as an ACGME subspecialty, fellowship programs will be focusing on core content to build curriculum structure and to provide fellows the opportunity for system-based application of this knowledge. The text is an excellent resource for curriculum development as the four volumes mirror the four categories of core content of EMS medicine. These main subject areas — clinical aspects of EMS medicine, medical oversight of EMS, quality management and research, and special operations — are the basis of an ACGME fellowship education and are the components of a well-functioning real-world EMS system. Group discussion in the context of the local EMS system provides a framework for the faculty to teach fellows how to approach system improvements based on prior experiences and current stakeholders. This collaborative environment facilitates system-based practice and practice-based learning and improvement, which align with ACGME core competency guidelines. It allows the EMS fellow to be an active participant in multiple protocol and policy workgroups as well as system projects and quality improvement.

Our results identified gaps in our EMS system that we were able to address in the form of policy and protocol workgroups. We recognize that our review of the text and the recommendations we generated from this review are not a “one size fits all” (other reviewers may develop different recommendations from the same material when applied to a different system), but rather a standardized approach. What we advocate is not the specific findings from our text review, but the academic process of review that our fellowship program was able to contribute. While some system improvements were approved by the EMSAC immediately, others required specialist (such as trauma or pediatrics) input and additional revision. An example area of continued multidisciplinary discussion is the implementation of spinal motion restriction in place of traditional cervical spine immobilization. Throughout this process we also encountered recommendations to advance our local quality improvement (QI) process, base hospital functions, as well as changes at the state and national level. The process of continually evaluating an EMS system is important and should be recognized by EMS fellows in training as well as by practicing EMS medical directors.

Change processes are slow and we intend to continue to track group recommendations as they are evaluated by EMS system providers and interested stakeholders. Our hope is that our suggested curriculum method is a building block toward standardizing the training of EMS fellows in their pursuit of becoming EMS physicians and EMS medical directors in different communities, which will maintain high standards of prehospital care and create unity among the many different systems that exist.

LIMITATIONS

Our findings are limited to one urban EMS system with a newly accredited ACGME fellowship, but we believe this methodology is easy to adapt to any program and should be able to be replicated in other systems. While other systems may not have an identical regulatory structure, the general concept of updating local policies or protocols through a workgroup for final system-wide approval and implementation may be similar. In our system, many of the EMS fellowship faculty members also hold leadership positions at the EMS agency, which may influence the protocol or policy implementation process.

Additionally, we used the most recent version of the textbook available at the time, which was published in 2009, and therefore some of the recommendations in the book were written without consideration of emerging research. The proposed methodology of text translation could be applied to the current edition or any future textbook revisions. Our review of the four-volume text was completed during monthly sessions over a 2-year period, this can easily be adjusted for a one-year fellowship by focusing on certain topics or meeting more frequently.

CONCLUSIONS

Our innovative educational model has demonstrated the success of translating the NAEMSP four-volume textbook into action items for EMS systems. This model may be useful in other fellowship programs and EMS systems and could contribute to the development of EMS system best practices standards nationwide.

References

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