Chapter 5. Conclusions and Recommendations

This chapter outlines a number of important conclusions that can be drawn from the preceding review. We further provide specific recommendations for ensuring the design and delivery integrity of medical team training programs with respect to desirable patient safety outcomes.

Conclusion 1: The medical field lacks a theoretical model of team performance.

To date, research has not developed a comprehensive model of team training performance in medical settings. As a result, medical team training programs have not been grounded in a scientific understanding of those human factors that directly influence effective teamwork in medical treatment settings. Given this gap in knowledge, the first research effort we advocate is the development of a theoretical medical team performance model that hypothesizes (1) the interrelationships among predictors of performance, and (2) the interdependencies of predictors and outcome criteria. Despite the absence of a team-performance model uniquely suited to medical treatment scenarios, however, previous research has revealed a considerable volume of relevant knowledge. The availability of this knowledge underscores several of the remaining conclusions and recommendations.

Conclusion 2: The science of team performance and training can help the medical community to improve patient safety.

As discussed in Chapter 2, the generalized science of team performance and training has evolved and matured over the past 20 years. This evolution has produced a number of principles, learned lessons, tools, and guidelines conducive to the growing patient safety movement. Our recommendations are: (1) the medical community continue to disseminate findings with regard to the progress of this science, through the use of different instruments (e.g., professional journals, specialized workshops, books, etc.), and (2) the medical community should involve the team training experts, in attempts to apply to patient safety the principles, guidelines, and learning emerging from previous research.

Conclusion 3: Research has already identified many of the competencies necessary for effective teamwork in medical environments.

Previous investigations have identified the competencies essential to effective team performance in a number of complex settings. Many, if not most, of these competencies are applicable to the environment of clinical medicine. As noted in Chapter 2, however, Cannon-Bowers and colleagues have pronounced the team skills literature confusing, contradictory, and plagued with inconsistencies. For example, different labels are used, across various studies, to describe the same teamwork skills. Conversely, different teamwork skills are labeled identically in other studies.[21] Therefore, we recommend using a two-step process for developing a taxonomy with standard nomenclature. This taxonomy would name and define teamwork-related knowledge, teamwork-related skills, and teamwork-related attitudes that constitute the core competencies related to successful teamwork in the medical domain.

The first step in developing such a taxonomy is to determine an appropriate level of explanation; the included constructs must be sufficiently broad in concept to encompass the various medical specialties, yet specific enough to facilitate valid measurement. Furthermore, this list of core competencies should reflect all relevant aspects of team training performance, while at the same time demonstrating the concise description and power of expression necessary for use in research and organizational needs analyses.

The second step involves the determination of relevant core competencies. This involves the delineation of those competencies outlined in previous research that are relevant to all medical teams. A second—and, perhaps more demanding—task is to identify those core medical team competencies that have not emerged in previous team research related to other domains. Investigators might rely, to some extent, on medical experts, such as those convened in January 2003 by the American Institutes for Research, for guidance in this area. We believe job analysis techniques (e.g., survey questionnaires, structured interviews, and nonobtrusive observations), used in conjunction with the development of a medical team performance theory, will yield the most valid information. In addition, we are emphasizing the importance of large-scale, stratified data collections and the goal of identifying generic competency requirements consistent with the medical community at large.

Conclusion 4: A number of proven instructional strategies are available for promoting effective teamwork.

The science of team performance and training has led to the development and validation of numerous strategies that can be used by teams performing in complex environments to attain necessary competencies, as evidenced in Chapter 2. With a variety of formats and objectives, these strategies extend beyond mere CRM training. We recommend that (1) the medical community use these strategies wherever possible, given that some are relatively easy to design and deliver; and (2) the community explore team-based strategies other than CRM for improving patient safety.

Conclusion 5: Team training strategies must be further adapted to suit medical needs.

We are convinced that no one existing model of team training can be applied across all medical practices and contexts. We are defining a ***practice*** as a medical specialty or sub-specialty, (e.g., emergency medicine, family medicine, intensive care, surgical medicine, obstetrics, etc.) for purposes of this discussion. Medical practices differ dramatically across a variety of criteria: size, purpose, duration, redundancy of expertise, decision time, and consequence of error, to name but a few.

Moreover, a particular practice may operate in a number of diverse contexts. For example, emergency medicine specialists work in hospital emergency departments, in emergency-response mobile units, and in battlefield environments. Similarly, urban and rural general practitioners operate out of independent or multi-practitioner offices, as well as in community walk-in clinics. No one team training strategy—or the competencies that drive successful teamwork—can be used to its best advantage across all these contexts. This is due to circumstances unique to each practice, along with the fact that not all members of the same team needs the same knowledge, skills, and attitudes.

Therefore, we further recommend developing practice-specific taxonomies, in addition to the core-competency taxonomy proposed in Conclusion 3. These highly specialized taxonomies would not overlap the generic, core-competency taxonomy. Rather, a practice-specific taxonomy would identify the specific knowledge, skill, and attitude requirements that are central to teamwork in a given practice. The medical content and procedures that define this practice would be used to determine the relevant team competencies.

For example, a successful ER team with a frequently changing membership might need to know the various roles necessary to each patient encounter, but not the strengths and weaknesses of particular team members. In addition, while some team members would need finely honed decisionmaking skills, others would be more concerned with timely equipment set-up and operation; it is also possible that none would need the skills necessary to assess long-term treatment options for a chronic condition. Furthermore, nearly all emergency team members should be possessed of an emotional detachment that allows them to function in the face of appalling injuries.

Conversely, a family-medicine practice composed of two nurses, a physician, and a receptionist may need very different competencies—knowledge of one another's strengths and weaknesses, the skill to promote and evaluate long-tem care, and an expression of empathy that signals a unified concern for each patient's welfare. In addition, the physician likely would need to articulate his or her treatment protocol to the patient, to the nurse, and/or a consulting physician. The receptionist, on the other hand, likely would need first-rate office management skills and far less medical knowledge. As a final example, the specific competencies and their relative importance may differ greatly for a hospital emergency department and a mobile responder, such as firefighter/paramedic unit or an emergency medical technician (EMT)/ambulance team.

Previous research has not addressed the differences within and between various medical care-delivery environments, and the manifestations of these differences in the treatment competencies

specific to each environment. Yet we find this issue sufficiently compelling to suggest further investigation. Because these taxonomies are derived from the medical characteristics of various care-delivery settings, experts representing each type of setting might be invaluable in identifying practice-specific team competencies that do not overlap the generic core-competency taxonomy. We further suggest that researchers avail themselves of survey questionnaires, structured interviews, as well as nonobtrusive observation means to collect such information.

Conclusion 6: The medical community has made considerable progress in designing and implementing team training across a number of settings.

Our review clearly demonstrates the efforts being made in the medical community to implement CRM team training across a variety of medical domains. We recommend the support and continuance of this trend. Less clear is the extent to which these programs are being implemented, despite recent advances in learning science, team performance, and training methodologies. We are, therefore, recommending further studies into the science of medical team training, as well as continued and advancing exploration into its practical applications. Furthermore, the medical community should additionally investigate other learning techniques that might be used to enhance the effectiveness of medical team training. Specifically, we first recommend that medical team training be developed in such a way as to reflect established, foundation principles for team training research. Second, we recommend a full evaluation of the programs' quality measures, using verifiable scientific criteria (e.g., assessing the degree to which training transfers to the actual work environment).

Conclusion 7: The impact of medical CRM training on patient safety outcomes has not been determined.

Although data from other domains are encouraging and common sense would appear to support a conceptual link between CRM training and enhanced patient safety, this relation has yet to be empirically validated. Furthermore, and as mentioned in Chapter 3, data with a direct relation to the efficacy of CRM (or any other team training strategy now in use) is often difficult to obtain. This is due to the relatively low base rate at which serious errors occur in some industries. Nevertheless, supportive evidence is essential if the field is to advance. The future research outlined in the next chapter speaks to this need.

Conclusion 8: The institutionalization of medical team training across different medical settings has not been addressed.

Our final conclusion focuses on what we consider the imperative need to make team training an embedded part of professional medical education. By *embedded*, we mean implementing and regulating team training throughout each health care provider's career. As noted in Chapter 4, the Accreditation Council for Graduate Medical Education (ACGME) has identified several teamwork-related competencies that all surgical training residents now are required to master.[103] Similarly, the Association of American Medical Colleges (AAMC) has funded a "critical incident" analysis to investigate the behaviors that result in successful and unsuccessful performance during medical school and residency.[104] Although not originally targeted towards team performance, the results of these mandates have underscored the importance of several specific teamwork-related competencies.

Simply stated, medical team training must be instilled and reiterated at every stage of a care provider's career, if it is to fully exert its potential positive impact on patient safety. Certain medical school assignments, for example, might require students to prepare projects involving the use of teamwork skills. Similarly, interns and residents might observe, participate in, and evaluate practicing teams in teaching hospitals. The larger challenge, however, occurs after physicians, nurses and technicians have completed their formal training.

The delivery of recurrent team training across all segments of the health care community is, at present, haphazard. Few structural or procedural mechanisms exist to ensure that it continues at regular intervals. Similarly, few systemwide procedures exist for reporting errors, and few organizational policies allow and encourage health care providers to report near misses, without fear of sanctions. As a result—and lip service to the contrary notwithstanding—the U.S. health care community often fails to regard medical teamwork as an important facet of medical performance. One means of correcting this systemic indifference is the implementation of a formal, mandatory error-reporting system. A second possible strategy would require all care delivery providers to take part in newly developed team training programs, or in refresher training, at specified intervals. This initiative would be similar in concept to the professional licensing requirement that obliges nurses, teachers, and other skilled workers to earn a certain number of continuing education credits, every two or three years.

The structure of health care, in its present form, offers numerous junctures for the evaluation of teamwork skills, were recurrent training to be instituted as a mandatory and ongoing process. For example, it might ultimately be useful to develop a board certification test for teamwork, similar to the board exams mandated for medical specialties. Such an exam might combine a written test of knowledge and situational judgment with performance in a simulation scenario. And since the board examinations are designed to assess the requisite body of knowledge for each medical specialty, the teamwork component also could be configured to assess teamwork competencies inherent to each specialty. In addition, the Joint Commission on Accreditation for Healthcare Organizations (JCAHO) currently evaluates hospitals on criteria ranging from medical practices and managerial systems to facilities maintenance. Folding generic team training competency criteria into the JCAHO evaluations, at some future point, might focus the

attention of all health care providers on the importance of teamwork in medical settings, while at the same time yielding valuable research data.