

Chapter 4. Medical Team Training

The Case for Medical Team Training

Small groups of individuals work together throughout the health care community, in intensive care units (ICU), operating rooms, labor and delivery wards, and family-medicine practices. Physicians, nurses, pharmacists, technicians, and other health professionals must coordinate their activities, if safe and efficient patient care is to be a priority. Teams make fewer mistakes than do individuals, and this is especially true when every member of a team is as aware of their teammates' responsibilities as they are their own.

But the members of these teams are rarely trained together. Moreover, they often come from distinctly different disciplines and diverse educational backgrounds, even though the myriad conditions addressed by health care professionals require interdisciplinary teamwork. The varied nature of the work and the necessity for cooperation among those who perform it make team training an ideal tool in the drive to improve patient safety and reduce medical errors.

As the lead Federal agency supporting research into health care quality and patient safety improvements, the Agency for Healthcare Research and Quality (AHRQ) is advocating a shift in the health care community's attitude toward medical errors. The Agency is promoting a medical culture in which potentially life-threatening mistakes are acknowledged for their gravity and analyzed, after which interventions are put in place to prevent their future reoccurrence. In fact, AHRQ awarded grants totaling \$50 million in FY2003 to fund a portfolio of research projects aimed at reducing medical errors and improving patient safety practices in clinical settings.*

These funds support investigative research into such topics as adverse drug events, infection control, surgery and anesthesia, pain management, organizational/cultural issues, human factors, and information technology.¹⁰² Team training programs and CRM—which fall under the domain of human factors—are one means for bringing about this revised cultural mindset regarding medical errors.

Moreover, AHRQ is not the only group to acknowledge the value of teamwork in the professional medical environment. The Accreditation Council for Graduate Medical Education (ACGME) recently required surgical residents-in-training to demonstrate their mastery of several teamwork-related competencies. These competencies include effective communications with patients and their families, patient counseling and education, cooperative work-sharing with other health care professionals, and the ability to instruct students and other health care professionals.¹⁰³

Similarly, the Association of American Medical Colleges (AAMC) recently funded an investigation to identify successful and unsuccessful behaviors (e.g., critical incidents) that regularly emerge during medical school and residency. The results underscored the importance of teamwork-related competencies, such as interpersonal skills and professionalism, interacting with patients and family, fostering a team environment, and mentoring/teaching other students.¹⁰⁴

CRM-based medical team training programs began with the introduction of Anesthesia Crisis Resource Management (ACRM) training at the Stanford University School of Medicine and at

*More on the AHRQ patient safety portfolio and the associated grant awards is available at <http://www.ahrq.gov>.

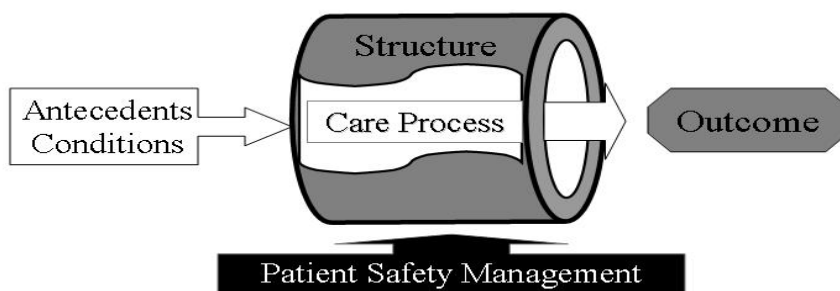
the Palo Alto Veteran Affairs Medical Center.¹⁰⁵ It should be noted that AHRQ's 2001 review of in-place patient safety practices included a critique of the ACRM model, commending the overall impact but, at the same time, noting a lack of evidence supporting its effectiveness.⁵ The Department of Defense (DoD) also has funded several other CRM-derived team training initiatives. The MedTeams™ program¹⁰⁶, in particular, has been implemented in a number of Army and Navy hospitals, while the Medical Team Management (MTM)¹⁰ program has been introduced in several Air Force facilities.

Although some preliminary research has addressed the effectiveness of the ACRM and MedTeams products, research into the competencies needed for effective teamwork in a health care setting and their evaluation remains in a formative stage. This chapter evaluates the state of the art in CRM-derived medical team training and associated best practices. We begin by presenting two theoretical models of patient safety to guide our overview of research issues.

The Donabedian Model of Patient Safety

Donabedian's structure–process–outcome model has long served as a unifying framework for examining health services and assessing patient outcomes.¹⁰⁷ Donabedian defines *structure* as the physical and organizational properties of the settings in which care is provided, while *process* is the treatment or service being provided to the patient, and *outcomes* are the results of the treatment. From the standpoint of patient safety, Donabedian's model (shown in Figure 2) provides a patient safety framework, and permits an examination of how risks and hazards embedded within the structure of care have the potential to cause injury or harm to patients. For example, individual or team failures in a health care delivery setting are consistently identified as a leading cause of negative patient outcomes.

Figure 2. The Donabedian Model of Patient Safety†



Adjust structure and process to eliminate or minimize risks of health care associated injury before they have an adverse event impacts on the outcomes of care

† Adapted from Donabedian, 1980.¹⁰⁷

Coyle and Battles modified the Donabedian model in 1980 to include important antecedent conditions that can affect patient outcomes.¹⁰⁸ Specifically, they suggest that patient and environmental factors are critical to understanding the effectiveness of any new strategies or modifications introduced into the care process. They further emphasize the idea that improved patient outcomes are the “ultimate criterion”; that is, a change in process must lead to a corresponding positive change in patient outcomes before a strategy can be deemed successful. Under the heading of patient factors, Coyle and Battles include genetics, socio-demographics, health habits, beliefs and attitudes, and preferences. Environmental factors include the patients' cultural, social, political, personal, and physical characteristics, along with factors related to the health profession itself.

These patient safety models, both of which call for processes to be evaluated in accordance with the outcomes they generate, have considerable support within the health care community. Moreover, we believe that the perspective they offer is as vital to the effect of teamwork and team training as it is to the assessment of any other treatment process. As we review the primary medical team training programs currently in use, these two patient safety models will continue to underscore our focus on improved patient outcomes as a measure of effectiveness.

Structure of Review

A number of medical team training programs have been developed in recent years. Some of these programs have been used in military settings, while others were developed more for commercial medicine. Certain programs are domain-specific (e.g., anesthesia), whereas others are multidisciplinary. Some rely heavily on state-of-the-art simulators, while others rely primarily on classroom instruction. Despite their differences, however, each of these programs was inspired by CRM concepts and all share the common goal of reducing the number and severity of medical errors.

The following discussion will compare the purpose, strategy, and effectiveness in three of the best-known medical team training programs: Anesthesia Crisis Resource Management (ACRM), MedTeams, and Medical Team Management (MTM). Since purpose and strategy are closely linked, we will examine both issues simultaneously. We will also describe the extent to which each program incorporates the three defining CRM elements: informational instruction, practice and feedback, and recurrent training opportunities.

Finally, we will also review three lesser-known training programs—Team-Oriented Medical Simulation (TOMS), Dynamic Outcomes Management (DOM), and Geriatric Interdisciplinary Team Training (GITT)—to further highlight the involvement of CRM-derived team training in health care.

Anesthesia Crisis Resource Management (ACRM) Program

ACRM Purpose and Training Strategy

The Anesthesia Crisis Resource Management (ACRM) program is derived from CRM principles, as are the MedTeams and Medical Team Management (MTM) programs. Unlike MedTeams and MTM, however, ACRM encompasses a family of training programs and bears a greater resemblance to CRM aviation training models than do the other two programs.

Developed by David Gaba and his colleagues at Stanford University and the Palo Alto Veteran Affairs (VA) Medical Center, ACRM is designed to help anesthesiologists better manage crises by working in multidisciplinary teams that include physicians, nurses, technicians, and other medical professionals.^{58, 105, 109} ACRM training provides trainees with precompiled responses to a vast array of critical incidents and, in turn, the trainees refer to these responses as needed.¹¹⁰ Training in 10 teamwork skills better enables trainees to learn from adverse occurrences in the clinical environment, and to work effectively with different personality types.¹¹¹ The teamwork skills on which the ACRM program focuses are development of a thorough case orientation, proper inquiries and assertions, communications and constructive feedback, leadership, appropriate group climate, anticipation and planning, workload management and distribution, vigilance, and reevaluation actions.

ACRM training takes place in a simulated operating room (OR) environment, apart from the reading assignments that precede each module. The OR simulator includes actual monitoring equipment, a full-body patient simulator, a video station for recording team performances, and a debriefing room equipped with a variety of audiovisual equipment. The full-body patient simulator incorporates a series of complex mathematical models and pneumatic devices to simulate the patient's breathing, pulses, heart and lung sounds, as well as exhaled CO₂, thumb twitches, and other physiological reactions.^{58, 112}

The ACRM curriculum is comprised of 3 full days of simulation training. Day One serves as an introduction to ACRM principles and basic skills. Day Two begins with a skills refresher, after which trainees learn to analyze clinical events from the technical and teamwork perspectives, as well as the systemic viewpoint. Day Three emphasizes leadership training, debriefing skills, and procedural adherence in the face of adverse clinical events. Training topics are organized into modules consisting of assigned preparatory readings, introductory material reviews, simulator familiarizations, case study analyses and videotape reviews. Six hours of different simulator scenarios are followed by instructor-led debriefing and a post-course data collection session. Each simulator training scenario is approximately 45 minutes long and each debriefing session lasts about 40 minutes.⁵⁸

Several instructors are needed to properly facilitate the ACRM training scenarios. They may include an active or retired operating room nurse playing the role of a circulating nurse, and an anesthesiologist instructor who plays the role of an operating surgeon. In addition, a simulation director monitors and videotapes the simulation from another room, communicating with the role-playing instructors via two-way radios. The trainees rotate through various roles during the simulator scenarios, including "first responder," "scrub technician," and "observer."⁵⁸

ACRM training—including an annual refresher training component—is used currently at several major teaching institutions, including Harvard University. Some institutions offer ACRM

training for experienced practitioners and for trainees. Moreover, it is sufficiently well respected that some malpractice insurers have lowered their premium structure for ACRM-trained anesthesiologists. The three centers that codeveloped ACRM training also have established the Working Group on Crisis Management Training in Health Care, which provides additional guidance and establishes training standards.⁵⁸

ACRM training was structured around the best practices from CRM training in commercial aviation, including an adaptation of crew performance functions such as the Line/LOS checklist.^{109, 113} It should be noted, however, that ACRM focuses solely on the second phase of CRM advocated by the FAA—skills practice and feedback—while the awareness and recurrent training phases have yet to be incorporated.

ACRM has a number of desirable qualities. First, it provides trainees with 3 days of hands-on skills practice in a simulated operating room environment. Second, each scripted training event is followed by a detailed instructor-led debriefing that identifies lessons learned and recommends tactics for further improvement. Because it takes place in a simulator, ACRM training allows trainees to experience situations—including the “death scenario”—that are impossible to replicate in an actual OR. Finally, ACRM uses cross-training to allow each participant to experience the learning process from different perspectives.⁵⁸

Nevertheless, ACRM training evinces certain program limitations that future iterations would do well to address. First, the training is not multidisciplinary in the truest sense. Instructors, not fellow trainees, play the roles of nurses and physicians; in other words, trainee teams do not practice teamwork in ACRM simulations.¹¹⁰ Given the importance of teamwork skills, we believe that ACRM would benefit from a training strategy that embodies genuine interdisciplinary team training.

On a related note, to the extent that ACRM focuses on the role of teamwork skills in the OR, it emphasizes their application in emergency situations and devotes substantially less attention to the role teamwork plays in nonemergency situations.¹¹⁰ Thus, ACRM developers might enhance the program's purpose and efficacy with a more even distribution of emergency and nonemergency training scenarios.

Furthermore, the ACRM focus on full-fidelity simulation ignores other forms of learning (e.g., videotaped examples, classroom instruction, case studies, part-task trainers, etc.). Simulation has been shown to be most effective when used to reinforce a previously acquired knowledge base of facts and theories, motor skills, and attitudinal competencies.¹¹² Accordingly, ACRM might put trainees in the awkward position of participating in the simulator scenarios before they have a complete grasp of the necessary factual background information. Therefore, a greater emphasis on the advance transfer of concepts and information needed to perform effectively in the simulator environment might prove advantageous.

The final limitation surrounding ACRM is one of cost. The training focuses exclusively on the role of the anesthesiologist in the OR—a somewhat limited application, given the initial cost of purchasing a commercial simulator (not to mention the operational costs) can exceed \$200,000.¹¹² The magnitude of such an investment puts an ACRM training program out of the reach of many institutions.

ACRM Effectiveness

An ACRM evaluation typically assesses a variety of process-oriented criteria. Teamwork performance is typically assessed using behavioral markers based on the 10 teamwork skills

identified in the previous section.¹¹⁴ One measure of these teamwork behaviors is a checklist analogous to the Line/LOS Checklist used in commercial aviation CRM programs.¹¹³ Trained raters evaluate team performance on each behavioral dimension, using a five-point scale.¹¹⁴ Measures of inter-rater agreement exhibit r_{wg} values ranging between .60 and .93;^{114, 115} an r_{wg} of .70 is considered sufficiently high to reflect a satisfactory degree of agreement among the raters.¹¹⁵

Most of the thousands of ACRM training participants evaluate the experience favorably; these positive responses generally last for up to 6 months after training.¹¹¹ Moreover, recent research suggests that participation in ACRM training further increases the trainees' self-worth and decreases their reported anxiety.¹¹⁶

Despite these positive assessments, no studies to our knowledge have pursued the next logical step: a detailed investigation into the potential links between team process and patient safety criteria. In fact, virtually no research has tested the effect of any aspect of ACRM training on actual medical performance outcomes. With respect to individual (i.e., technical) performance, this lack of outcome-related validation is, at least in part, due to the difficulties inherent to quantifying the performance of anesthesiologists.¹¹⁴

With respect to the effects of the team process, however, the lack of outcome-related validation cannot be so easily explained. Programmed outcomes, such as the “death scenario,” are part of the ACRM simulations. We believe that the development of measures to assess teamwork effectiveness, as it relates to facilitating positive outcomes and managing or eliminating negative outcomes, constitutes an important focus for future research. Furthermore—and given the current state of simulation—the development of training scenarios in which the outcome is contingent upon the trainee's demonstrated teamwork skills also might be worthwhile.

The MedTeams Program

MedTeams Purpose and Strategy

The MedTeams training program is based on the CRM training program originally developed to train U.S. Army helicopter crews in specific behavioral skills, and was tailored first to the emergency medicine environment.^{106, 117} The MedTeams developers, Dynamics Research Corporation (DRC), had noted a number of similar responsibilities shared by emergency medicine and aviation managers. These include the need to make decisions that are based on incomplete or conflicting information, the requisite coordination among professionals with varied skills and ranks, and the direct relationship between a poor team performance and a potentially grave outcome, including death.¹¹⁸

The MedTeams program is designed solely to reduce medical errors through the use of interdisciplinary teamwork. It was founded on the theory that most errors are caused by breakdowns in systems-level processes and are revealed over time.^{119, 120} According to the MedTeams curriculum, each team member has a vested interest in patient safety and is expected to take a proactive role, doing everything possible to break the chain of errors.¹²⁰ The MedTeams training strategy focuses on generic teamwork skills and behaviors, rather than context-specific

competencies, since the makeup of the teams undergoing the training varies from day to day and shift to shift.

The MedTeams training curriculum is the result of an evaluation-driven course design. DRC identified five critical dimensions necessary for effective teamwork, based on needs-analysis data. They further identified 48 specific and observable behaviors linked to these dimensions and constructed Behaviorally Anchored Rating Scales (BARS)¹²¹ for each behavior. Finally, they reviewed and refined the curriculum with the assistance of emergency department (ED) physicians and nurses from 12 hospitals of various sizes, to ensure the validity and effectiveness of the course content.¹²²

MedTeams defines a core team as a group of 3 to 10 medical personnel working interdependently during a shift, each of whom has been trained to use identified teamwork behaviors in coordinating their clinical interactions. Each core team includes at least one physician and one nurse.¹²³ A separate coordinating team oversees several of the core teams simultaneously, assigning new patients and providing each group with additional resources as the need arises. The members of each team wear the same visible armbands, badges, or colored scrubs, to make themselves recognizable to one another and to identify them as members of a particular core team.¹²⁰

The MedTeams course is comprised of an 8-hour block of classroom instruction and a 30-minute video depicting good and bad examples of performance, followed by a 4-hour teamwork behaviors practicum and feedback from a trained instructor. Coaching, mentoring, and review sessions are also provided during subsequent work shifts.¹²²

The postclassroom component of MedTeams training lasts approximately 6 months and uses a number of tools such as peer performance monitoring to sustain effective team performance. In addition, regular team meetings reinforce learned concepts while formalized mechanisms, such as status boards, are used to update team members with regard to particular patients; refresher training is also made available to those who need it. Additionally, the MedTeams training structure requires nurses to participate in meetings, and performance evaluations for all team members are weighted to reflect teamwork issues.¹²⁴ Thus, MedTeams incorporates all three core aspects of the CRM training model.

In summary, MedTeams evidences a number of desirable qualities. First, it was developed through the use of a needs analysis, based on archive records from the EDs of several hospitals. This methodology underscored key performance dimensions, while providing actual patient information used in the creation of specific behavioral markers.¹²⁵ Second, customized versions of MedTeams now are being developed for labor and delivery units, ORs, and ICUs.¹²⁵ Third, MedTeams offers annual refresher training for the purpose of maintaining proficiency in teamwork skills. Fourth, MedTeams requires trained staff members to participate in development projects or practica aimed at addressing specific intra- and inter-departmental teamwork issues.¹²⁶ Fifth, MedTeams provides trainees with physical tools (i.e., checklists, quick reference cards, flow diagrams) that can be reviewed periodically or used in the workplace. Finally, MedTeams training has an interdisciplinary organizational structure, promoting cooperation and shared responsibility among physicians, nurses, technicians, and other key constituencies.

Nevertheless, MedTeams training also exhibits certain limitations. First, much of the 8-hour classroom instruction focuses on the mastery of declarative knowledge. Substantially less time is devoted to the type of skills practice provided in ACRM training. Additionally, MedTeams does not employ a cultural assessment/evaluation component, prior to training implementation. As a result, it is entirely possible that MedTeams training would prove effective only in those

hospitals with a prior commitment to teamwork and upper-level management support, as well as an open, nonpunitive atmosphere that treats errors as an learning opportunity and a recognized need for change.²⁸ (This objection applies equally to all three programs, none of which gathers information from cultural assessments.) Finally, even though MedTeams is based on the “train the trainer” paradigm—in which certified trainers are returned to their workplace environment to train their colleagues—it does not appear to provide any mechanism for preventing trainer performance degradation over time.

MedTeams Effectiveness

The MedTeams evaluation tactics appear to be the most thorough among the three programs examined.^{28, 106} A quasi-experimental design was used to assess the relations among various process factors (e.g., quantity of teamwork behaviors) and enabling factors (e.g., attitudes toward teamwork, staff burnout) over a 1-year period. More significant from our viewpoint, the Morey and colleagues' investigations showed some positive effect of training on outcome criteria (e.g., medical errors, patient satisfaction).

The major limitation of this research stems from the fact that participating hospitals were permitted to specify their inclusion into either the experimental or control groups. To address this limitation, a subsequent evaluation of MedTeams training in labor and delivery environments is currently underway, using a randomized clinical trial design.¹²⁷ Thus, the MedTeams training developers are focusing their latest evaluations on the criteria that Donabedian and Coyle and Battles deem most critical: patient-related outcomes.^{107, 108}

The Medical Team Management (MTM) Program

Miscommunications and the disjointed teamwork that often arises from it led the U.S. Air Force to develop its own variation on the team training theme. Medical Team Management (MTM) training formally recognizes poor communications skills and ineffective teamwork as the primary source of many adverse medical outcomes. MTM training is based on the Air Force's fighter pilot CRM training program, in which team communication is central and tied directly to effective team performance.¹²⁸

MTM Purpose and Training Strategy

The Air Force began to explore the realm of MTM training following an incident at an Air Force hospital involving poor teamwork and a newborn child who was subsequently diagnosed with neurological problems.¹²⁹ The structure of MTM training is similar to that of MedTeams training—interdisciplinary teams of medical professionals are provided with human-factors concepts and specialized communications skills, in an effort to reduce medical errors. In contrast to the traditional military medical culture and its focus on individual performance, MTM training attempts to create a new culture of team performance values and improved communication effectiveness, resulting in fewer medical errors.¹³⁰

MTM training is lengthier than either of the other programs. It has two major components: a 3-day instructor-training course, and a military medical personnel course. Potential instructors must have at least 5 years of specialized clinical experience and at least 1 year of duty remaining in the Armed Forces. Furthermore, they must be competent speakers and previous training delivery experience is desirable. Graduates of the instructor training course return to their respective hospitals and clinics, where they train the remaining staff in human-factors principles.¹²⁹

The instructor training course is taught by commissioned doctors and nurses, each of whom has extensive clinical expertise and participation in the course development. Since the MTM training is interdisciplinary, participants include physicians, nurses, medical technicians, lab technicians, pharmacists, ward clerks, and admissions clerks, from inpatient and outpatient settings.^{10, 131}

The course for military medical personnel consists of three phases. Phase One is a Web-based training course that provides factual background information on human-factors principles. The course is self-paced and takes 2 to 4 hours to complete.^{128, 132} It includes a series of pre- and post-training tests to assess the participant's grasp of human-factors concepts.

Phase Two takes place in a classroom environment, approximately 4 to 6 weeks after Phase One. Trainees learn with their team members, and the classroom instruction includes formal lectures, seminar participation, application discussions, behavioral modeling, and case studies designed to reinforce and build on the principles learned in Phase One.¹⁰ The model for Phase Two is four sessions of 1 to 2 hours each week, for 4 consecutive weeks.¹³²

Phase Three of MTM training introduces practice and feedback in the work environment.¹³³ Instructors observe each team's performance and provide objective, process-based feedback to reinforce the lessons learned. The instructor may elect to schedule additional team meetings to address specific performance issues.

As noted previously, MTM training makes use of a variety of training strategies—Web-based exercises, formal lectures, participation seminars, application discussions, behavior modeling, and case study analyses.^{10, 132, 134, 135} Trainees also are required to complete a variety of homework assignments. For example, one assignment requires trainees to observe their own team, in an effort to identify obstacles to effective team performance. Another requires trainees to perform practice tasks in the workplace, using the tools they have acquired in training. They then are asked to identify their own performance strengths and weaknesses, and to discuss them at subsequent training sessions.¹³¹

Finally, MTM training includes a number of topics designed to reinforce and sustain the human-factors concepts disseminated to trainees. In fact, the program devotes an entire module to training knowledge retention, especially in unanticipated situations. Other topics include long-term planning, briefings, and continuous monitoring practices. Additional retention devices include periodic, scripted safety drills; periodic team leader meetings; formal teamwork recognition; and a followup progress report that must be submitted to the Air Force Patient Safety Office.¹³²

MTM purports to incorporate all three elements of CRM training—knowledge formation, practice, and recurrence—much as the two previously described medical team training programs do. However, most of the training time is devoted to the transfer of factual information regarding human-factors concepts. Substantially less time is devoted to actual skills practice. Furthermore, the included skills practice typically involves low-fidelity techniques, such as behavioral

modeling using videotaped vignettes. MTM does not, at present, make use of high-fidelity team training simulators, such as those used in ACRM.

MTM does offer a number of advantages over the previously described programs. First, it uses a series of active learning techniques—formal lectures, behavioral modeling, and experiential learning—to develop the trainee’s knowledge of teamwork, skills, and attitudes.¹³⁶ It also builds upon well-established learning theories, requiring the trainees to master factual material in advance of the hands-on skills practice. Third, it provides a comprehensive approach to human-factors research. That is to say, MTM training (1) explicitly distinguishes between constructive and destructive conflict resolution, (2) recognizes the workload-performance relationship is curvilinear, and (3) distinguishes between authority (based on rank) and leadership (based on skills knowledge). Additionally, MTM training focuses on specific techniques for improving team performance (e.g., constructive conflict resolution) and is interdisciplinary in nature, teaching physicians, nurses, and other key constituencies to work together. Finally, it provides trainees with a reference list for continuing education and skills refinement after completion of the training.^{137, 136}

Like the aforementioned programs, MTM does have its share of disadvantages. First, there is the large amount of training time devoted to the transfer of factual knowledge and the relatively small percentage of time devoted to actual skills practice; the practice provided is of the low-fidelity, nonsimulator variety. Then there are the tools provided to MTM trainees, in an effort to reinforce and sustain their teamwork skills. Many of these aids are not tools in the strictest sense of the word (i.e., checklists, quick reference cards, flow diagrams), but rather briefings on practices or cross-check procedures. And while the MTM and MedTeams programs both focus on trainer certification, MTM does not appear to include a specific and reliable mechanism for preventing instructor performance degradation over time.

MTM Effectiveness

Relatively little information on MTM training evaluations is available, in comparison with that of the other two programs. MTM training developers seem to use a summative evaluation to determine if the training should be continued, discontinued, or redesigned. Furthermore, MTM training gathers reaction data and measures trainee knowledge during the Web-based program component.

Despite the apparent absence of MTM effectiveness data in the form of patient-relevant outcomes, it should be noted that this training program has gained wide acceptance in the Air Force. The Air Force Surgeon General made MTM a mandatory training component, beginning in 2001, for all high-risk specialties—emergency departments, operating rooms, obstetric departments, intensive care units, and neonatal care units.¹²⁹ More than 2,000 Air Force medical treatment facility personnel had received MTM training by February 2003,¹²⁸ and the program is to be made available to all Department of Defense medical staff on a voluntary basis.

Additional Medical Team Training Programs

Several other team training programs have been developed over the past few years, for a variety of medical specialties.^{138–140} Unfortunately, few of these programs have been properly

documented. It is, therefore, difficult to draw comparisons or evaluate their overall effectiveness. In any case, this section provides a review of several alternative programs, compared for the sake of thoroughness and in an effort to supplement our more detailed descriptions of ACRM, MedTeams, and MTM.

Team-oriented Medical Simulation (TOMS)

TOMS training provides interdisciplinary team training to surgeons, nurses, anesthesiologists, and orderlies, in an effort to reduce the number and severity of OR medical errors. The program draws heavily on CRM training from commercial aviation,^{110, 139} and was developed at the University of Basel in Switzerland. TOMS training seeks to reduce and limit potential patient safety threats through better workload management, and improved problem-solving and decisionmaking skills.[‡]

TOMS training can be described as a scaled-back version of ACRM training. The first hour is a pretraining brief that highlights relevant teamwork concepts (i.e., situational awareness, communication, and decisionmaking). The second hour of training is devoted to simulated laparoscopic and anesthetic procedures, with a lifelike mannequin in the role of the patient. The third hour consists of a team-led debriefing, complete with videotaped examples of the team's performance that are used to diagnose problems and identify strategies for improvement.¹³⁹

More than 50 teams from the University of Basel Hospital had completed TOMS training as of August 1997 (See footnote this page). Evaluation data for the TOMS training program is limited, focusing almost exclusively on the participants' impressions of the training. The responses were generally favorable,¹⁴¹ though a small sample size and the generalized nature of these findings make them difficult to assess. To date, we have been unable to discover any other quantifiable evidence, such as posttraining changes in the participants' knowledge or skills base, changes in organizational effectiveness, or the degree of behavioral transfer.

Dynamic Outcomes Management (DOM)

DOM training provides surgeons, nurses, and anesthesiologists with various interdisciplinary, team-building skills, adverse-situation recognition techniques, and stress-reduction tactics, in an attempt to reduce medical errors, and improve the quality of health care.[§] The program draws heavily on aviation CRM training¹⁴⁰ and was developed by Crew Training International (CTI), a developer of specialized training programs for various industries.

DOM, which is quite similar to the MedTeams and Medical Team Management training programs, includes 12 hours of skills-based, interactive training comprised of facilitated discussions, role-playing exercises, case studies, behavior modeling, and knowledge testing.¹⁴⁰ The training is divided into three 4-hour sessions. The first session provides effective team-building guidelines, techniques for recognizing adverse situations, and recommendations for constructive conflict management.

The second session, scheduled approximately 2 months later, provides guidance for mitigating the effects of stress, training in decisionmaking skills, and recommendations for providing effective performance feedback. The third session, scheduled an additional 2 months

[‡]Available at <http://www.medana.unibas.ch>.

[§]Available at <http://www.cti-crm.com>.

later, includes a course review, cross-checking and challenging guidance, and principles for mitigating the effects of fatigue.¹⁴⁰ High-fidelity simulators, such as those used in ACRM training, are not part of the DOM program. Instead, CTI developed a “challenge and response checklist” that trainees are required to use in the OR, to reinforce the principles of DOM training.

Data concerning the development and evaluation of DOM are limited. As of January 2003, more than 160 members of the surgical staff at Methodist University Hospital in Memphis had completed DOM training. Evaluations of DOM include documented improvements in participants’ attitudes toward the importance of OR teamwork issues, favorable reactions to the usefulness of DOM training, and a 50-percent reduction in surgical material-count errors.¹⁴⁰ At the same time, the small sample size and generalized nature of the findings prohibit a thorough assessment. Moreover, the lack of control groups makes a determination regarding the specific source of the improved outcomes all the more difficult.

Geriatric Interdisciplinary Team Training (GITT)

GITT provides interdisciplinary team training for physicians, nurses, nurse practitioners, social workers, pharmacists, therapists, and administrators,¹⁴² leveraging the effects of interdisciplinary teamwork to improve patient care. The program, sponsored by the Rhode Island Geriatric Research Center, also serves as an instrument of responsive change, establishing academic–industry partnerships to address the needs of health care providers.

GITT training is also fundamentally similar to the MedTeams and Medical Team Management programs. It includes a full day of team self-evaluation and skills training. The self-evaluation exercise makes use of the Strength Development Inventory, which helps team members to recognize their preferred interpersonal styles of relating.¹⁴³ It also incorporates the Team Signatures Technology tool, which assists each team to identify the underlying system of social dynamics, using the team's cohesion, leadership, and diversity quotients, as well as other measures.¹⁴⁴ The team’s self-evaluation exercises are followed by formal classroom instruction in the principles of effective teamwork, the phases of team development, conflict management, leadership, and other interdependence skills.¹⁴² A half-day followup training class is provided approximately 1 year later, to reinforce learned concepts. High-fidelity simulators, such as those used in ACRM training, are not a component of the GITT program.

Data pertinent to the development and evaluation of GITT are, again, limited. Just three of the original eight teams that took part in the GITT program—all from geriatric treatment facilities in Rhode Island—participated in the followup training 1 year later. The remaining five teams had been disbanded, following administrative reassignments. As a result, the evaluation of GITT instruction has been extremely limited. The program was assessed using a comparison of participant pre- and posttraining test scores for a variety of dimensions, including communications abilities, team cohesion, attitudes towards health care teams, and self-described skills.¹⁴² Posttraining statistical means were higher than pretraining levels on all measured variables. But the small sample size, the high level of attrition, and the absence of control groups prohibit useful generalizations. To date, we have been unable to identify any other forms of validation evidence (i.e., posttraining changes in trainee knowledge or skills levels, changes in organizational effectiveness, or the extent of behavioral transfer) for this program.

Summary

This chapter has summarized the general state of medical team training. We focused our discussion primarily on Anesthesia Crisis Resource Management (ACRM), MedTeams, and Medical Team Management (MTM) programs, because these are the most thoroughly documented medical team training processes. Together, these programs have provided documented improvements in patient safety. Nevertheless, and despite the encouraging nature of the data, the degree to which CRM-based medical team training is an enhancement to patient safety remains in question. Our next chapter will integrate the findings into conclusions and recommendations relevant to medical team training, in an effort to provide a strategy that is useful for further investigation and comparison. The final chapter will propose avenues for future research.