Chapter 9. Synergistic Opportunity To Connect Quality Improvement and Emergency Preparedness

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Background

A critical element in the mission of health care organizations is high quality health care. Organizationally, the hospital enterprise is a hierarchical structure that has separate functional charges, lines of authority, and personnel resources for quality improvement and emergency management. The overall umbrella of safety and health care delivery can be viewed to encompass quality improvement and emergency preparedness, and nursing plays an integral role in ensuring continuous quality improvement. The interaction of quality improvement and emergency preparedness resources in hospital settings promises to yield a combined effect that is greater than the sum of their individual efforts to ensure patient safety and enhanced health care quality. By strengthening communication channels and fostering opportunities for collaborative project implementation across quality improvement, emergency preparedness and organizational functions can be highly synergistic.

Engaging People in Place

According to the current working knowledge of quality improvement and emergency management in hospitals, it is suggested that the bioterrorism/emergency response function resides in the facilities management area, while quality improvement is incorporated into clinical operations. Job enlargement of selected nursing staff can serve to bridge the quality improvement–emergency preparedness gap. Quality improvement and patient safety initiatives are led by executives who report directly to the chief medical officer and/or vice president for quality/safety. Emergency management typically has a less direct reporting route through the chain of command; however, there are exceptions. Exceptions are likely to appear in hospitals and health systems that have experience with natural disasters (e.g., University of North Carolina Hospitals' experience with hurricanes), known manmade threats (e.g., Intermountain Healthcare's experience with chemical stockpiles and manufacturing research facilities), and/or specialized facets of bioterrorism threats (e.g., University of Pittsburgh Medical Center Health System). The boards of directors of such health systems are beginning to request methodologically rigorous research and comparative preparedness data for benchmarking and quality improvement of emergency management—the customary practice over the past decade for health care quality and, more recently, patient safety.

The Agency for Healthcare Research and Quality (AHRQ) sponsored the Integrated Delivery System Research Network (IDSRN),[*] a network of five health systems with nearly 70 hospitals in seven States across the United States committed to applied research representing a cross-section of the hospital industry. In-depth knowledge of these health care systems—and more

[*] RTI Master Task Order Contract No. 290-00-0018, L.A. Savitz, Director; 2004.

general knowledge of the hospital industry—was obtained, affording the opportunity to identify several common practices. The leadership of the administrative emergency management function in health care organizations was often former military personnel with security experience or individuals who had worked their way up through increasing responsibility in facility/environmental services. Only those organizations with the most visible commitment to emergency preparedness also had clinical champions who partnered with the administrative emergency management function. Conversely, quality management typically had clinical leaders (i.e., physicians and/or nurses) with some training or on-the-job experience in health care administration. These individuals were repeatedly trained through continuing education and professional society meetings, used a journal specifically dedicated to implementation science (visit http://www.implementationscience.com), and reinforced change management principles using the Institute for Healthcare Improvement collaborative model (visit http://www.ihi.org). A corollary for support of similar change management efforts does not exist for emergency management. However, fostering transfunctional collaboration of emergency preparedness and quality improvement is promising; both the Joint Commission (see the Joint Commission–issued, revised emergency management standards that were effective January 1, 2008 – visit http://www.jcrinc.com/28380) and the American Hospital Association are working toward increasing opportunities for such dialogues.

Recent experience with Hurricane Katrina has highlighted the "soft underbelly" of hospital preparedness and emphasized the inseparable role that emergency management plays in the overall quality and safety of health care delivery. The emergency preparedness of this country is based on a robust health care delivery system. The public expects and is entitled to receive the highest quality evidence-based care within the most efficient delivery system possible. At times of crisis be it a disaster, natural or man made, or a major infectious disease, SARS or Pandemic, the already stressed health care system operating at the margins will be challenged to deliver this level of care without concerted planning and cooperation. Nurse executives must lead a cultural shift towards using evidence-based management and clinical practices (Williams 2006) in both quality improvement and emergency preparedness. Principal team players must include nurses, who are the essential back-bone of successful change efforts in hospitals (Savitz & Kaluzny, 2000). The extent to which nursing leaders, including middle managers, can be engaged in change management activities (Dopson & Fitzgerald, 2006) for emergency preparedness will be an important investment in successful design and implementation of targeted interventions. There is not good visibility for emergency preparedness commitment on the part of clinical staff in operational areas demonstrated, for example by most staff avoiding required drills failing to see the priority from their leaders. Health system leadership can change this by appropriately acknowledging and rewarding such efforts and modeling the commitment.

Opportunity for Learning Exchange

Development of meaningful working relationships and opportunities for learning exchanges between quality improvement and emergency preparedness initiatives could fundamentally enhance change management efforts within these separate functional areas in hospitals. There are differences in the degree to which initiatives in emergency preparedness are germane to quality improvement with respect to knowledge utilization (e.g., community collaboratives, data sharing, information technology solutions, measurement and feedback reporting to involved staff). This is because nurses can be involved in both quality improvement and emergency response in their

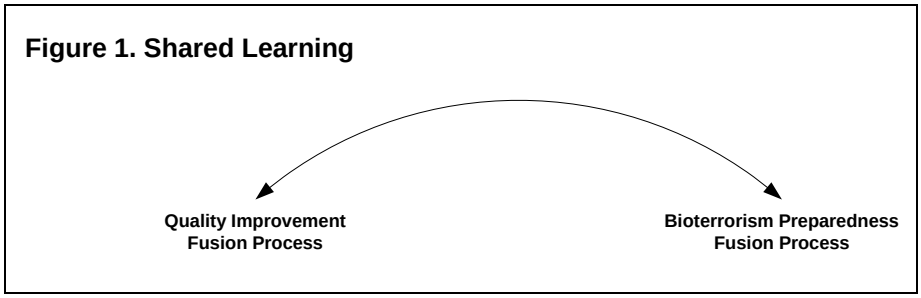
role as caregivers and clinical managers. Consequently, it would be possible to link knowledge-based learning about how interventions are implemented (a.k.a., implementation science) so that advancements in our understanding are not confined to any single aspect of quality health care delivery, but are opportunities for cross-fertilization and synergy.

As stated by Mittman,[4] implementation science focuses on a second level of research translation where one takes evidence-established benchmarks from limited settings (i.e., level 1 translation) to practice innovations, and more broadly to disseminate that knowledge. Implementation science (or second-level research translation) is an evolving, multidisciplinary area, and the terminology has not yet been consistently established. For example, Chapter 7 ("The Evidence for Evidence-Based Practice Implementation") in this *Handbook* discusses "translation science" to describe the same concept. Despite the inconsistent terminology, researchers and practitioners are committed to implementing and disseminating promising practices.

Disseminating and Implementing Promising Practices

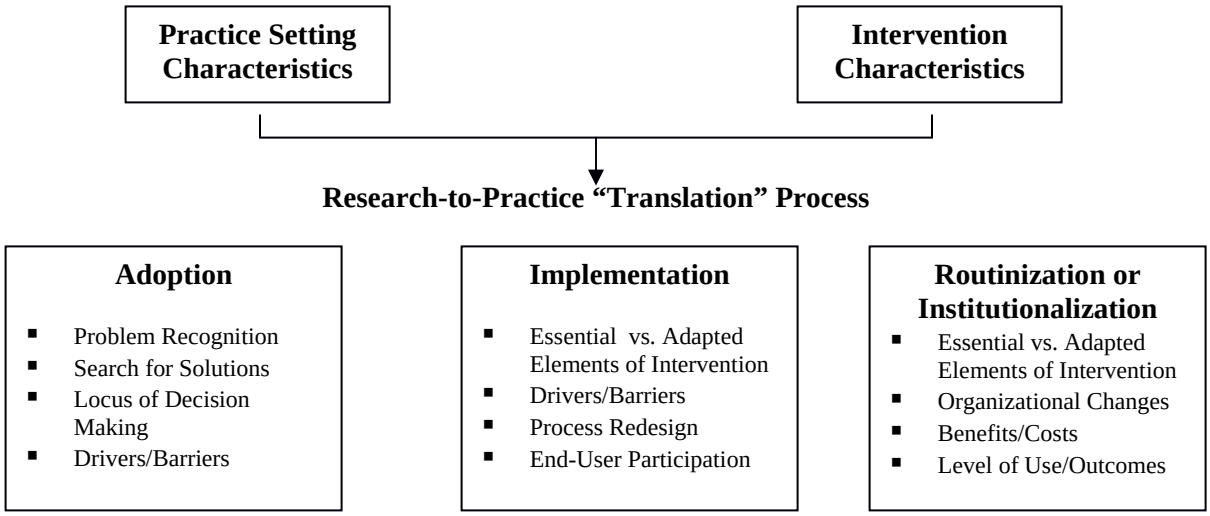
The difficulty of disseminating innovations is a persistent conundrum across settings and situations. There is limited ability to spread successful interventions across a single health care organization, let alone to unaffiliated organizations. The real challenge for health care implementation science is figuring out how to "flatten our world."[5] Opportunities for shared learning (Figure 1) could serve to accelerate the diffusion of innovation processes.[6] By directly engaging nursing leadership, current organizational barriers that inhibit application and shared approaches that promote quality improvement[3] and readiness for emergency response could be ameliorated, but integrating both tacit (i.e., personal experience) and explicit knowledge (e.g., evidence) can be difficult to achieve.[7] The challenge to nursing will be translating quality improvement research into practice to address both functional roles—quality and preparedness.

Figure 1. Shared Learning



The notion of an implementation deficit between what is planned versus achieved and the challenge of effectively translating research into practice has a long-standing literature base, primarily in organizational studies and public policy analysis.[6, 8, 9] In terms of nursing, the research has been inconclusive even about the evidence for specific interventions.[10] A generalized conceptual model of translational implementation, based on Rogers's seminal work,[6] has been incorporated into numerous change management efforts such as the RE-AIM[11, 12] (Figure 2).

Figure 2. Conceptual Model



What we know from reported studies and have been learning in subsequent research is that change will be a nonlinear process stymied by individual and organizational barriers.[2, 13–16] Attempts to advance implementation science in health care have focused on the factors that affect adoption and sorting out different strategies to accelerate that second level of translating of research into practice.[2, 17, 18] A recent report by Hamel[19] described the conditions necessary for management innovation that produced bold breakthroughs in how business was done, including commitment to a big problem (e.g., bioterrorism preparedness), new approaches (e.g., application of information technology such as electronic medical records), deconstruction of management orthodoxies (via exchanged resources and knowledge between the quality improvement and emergency management silos), and shared stories from diverse organizations that redefined what is possible. Early adopters lead the way.

Over the past decade, targeted research related to understanding how clinical process innovations are adopted has been funded by the AHRQ. Building on that base effort, the AHRQ funded the Partnership for Advancing Quality Together (PAQT) grant[*] (part of the AHRQ's Partnerships for Quality initiative) to achieve the following specific aims: strengthen an existing research network that promotes sharing of local innovations, explore factors that impede and facilitate inter- and intra-organizational sharing of knowledge, provide a mechanism to test the transportability of clinical process innovations, influence the breadth and depth of the evidence base for quality improvement, and accelerate the rate at which knowledge utilization occurs. Underlying these aims was a directive to explore the potential synergies between quality improvement and emergency preparedness.

Collaborative efforts to address these issues was done in a focused manner through 17 applied research projects, which led to several important findings and strategies for supporting knowledge transfer and implementation science that are relevant to both quality improvement and emergency preparedness. The three main findings are:

[*] AHRQ 5 U18 HS13706.

- Organizational modeling by credible organizations can accelerate knowledge transfer.
- The primary evidence base (the peer-reviewed literature) is limited to the extent that many innovations are not reported and there is a bias toward reporting only successful efforts, when we can often learn as much from failed attempts.
- Innovations in health care delivery are often complex interventions with multiple elements that are not fully reported, and essential versus adaptable elements of these complex interventions are not clearly delineated.

The bedrock propositions, common to all innovation packages, are that (1) how we deliver preventive or therapeutic services and how we organize those efforts within health care systems and facilities should, whenever possible, be based on knowledge of what works; and (2) effectively sharing such knowledge is a common feature of successful efforts generalized beyond a single program or facility.[20, 21] Understanding how knowledge (i.e., research information and data together with developed tools) can be used to drive high-quality and safe care delivery is critical. This understanding will allow for necessary and innovative changes in practice and processes at both the organizational level and at the point of service.[16]

Health care organizations typically view information and analysis in the context of local data derived from the experiences of patients served in their own organizational settings. Efforts to drive change innovations have expanded this notion of information to include both health services research conducted locally and studies reported in the peer-reviewed literature. Such research reports offer tested models for improvement; however, various barriers such as publication bias,[22] reporting time lags,[23] journal prestige,[24] and the overwhelming volume of a dispersed body of literature diminish the accessibility of such needed evidence. The problem of nontransportability of potential advances in health care information technology efforts is just the newest illustration of a much larger dilemma of generalizability beyond single institutions or systems. The challenge is to build an evidence base and place such evidence in the hands of those who are charged to operationalize knowledge transfer.

Evidence-Based Quality and Safety

Health services researchers and organizational leaders have more recently advocated evidence-based health care or EBHC.[8, 15, 20, 25–27] Sackett[28] defined EBHC as a "bottom-up approach based on good clinical management and supported by the best available evidence and taking into account patient priorities." The "enthusiasts of EBHC naively assumed that the case for implementation would be self-evident and that it would spread automatically and quickly"[8] (p. 29). Further, the authors contend, "There should be a strategy of creating evidence in priority areas, with concomitant systematic efforts to accumulate evidence in the form of robust bodies of knowledge" (p. 30). AHRQ has led the way for the synthesis of evidence through its Evidence-Based Practice Centers or EPCs (visit http://www.ahrq.gov/clinic/epc). Such evidence should be actively disseminated to where it is most needed and made available for the widest possible use.[8]

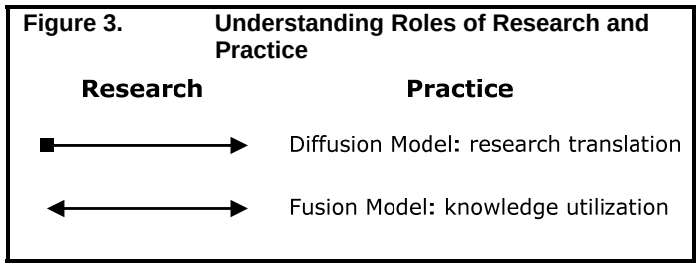
Health care organizations characterized by different levels of experience with clinical process innovation and staff tolerance for change set the "evidence bar" quite differently.[2] Mature organizations with extensive experience and local pilot projects require independent research by affiliated researchers whose results were published in the peer-reviewed literature. Less experienced organizations are comfortable simply modeling clinical process innovations based on evidence in the peer-reviewed literature, but without local development and testing. Further,

we have learned[29] that there is a life cycle associated with organizational learning, and where an organization or unit sits on that life cycle is influenced by staff tolerance for change and experience with innovation implementation over time. Whether the evidence is self-generated or modeled from reports in the literature, a primary issue is how to appropriately target intended end users. Novel approaches and use of preexisting dissemination channels will be needed to accelerate the rate at which such knowledge is put into practice.

Implementation Science in Practice

A great deal of attention has been paid to understanding the process of implementing science into practice.[30–33] Recent work conducted by Helfrich and colleagues[34] in studies funded by the Centers for Disease Control and Prevention and AHRQ suggest that it is more meaningful to examine how knowledge is used to influence changes in organizations and the microsystems of care by viewing this as a "fusion versus diffusion" process. Level 2 translation of research into practice (Figure 3) traditionally presumes a unidirectional flow or diffusion of information from research to practice; this presumption may act as a barrier to uptake quite apart from the limitations of the evidence base noted above. In contrast, a fusion perspective acknowledges shared learning between research and practice (i.e., knowledge utilization) whereby each informs the other to advance understanding.[35, 36] Concomitantly, the source of evidence and how that evidence is packaged and communicated greatly influences its use. Active engagement of organizational leaders and clinical investigators in the research process, as we propose herein, has proven critical to effective fusion/knowledge transfer.[13, 15, 37–39] Chapter 7 in this *Handbook* discusses steps for evidence-based practice in greater detail, drawing on Rogers's[6] work and the AHRQ model (Figure 3).

Figure 3. Understanding Roles of Research and Practice



Our review of literature reporting on health care innovations suggests that there are three overarching problems to the dissemination of evidence-based innovations: (1) incomplete reporting of interventions being implemented, (2) biased literature, and (3) the fact that interventions evolve over time as an effort moves through various stages from adoption to implementation through institutionalization/routinization.

Implementation efforts are not fully reported, limiting dissemination and uptake in other places. With this limitation in mind, we demonstrated our ability to fully capture all elements of complex interventions in a recent study of diabetes management in 15 community-based sites: *Evaluation of the Robert Wood Johnson Foundation Diabetes Initiative* (2003–2005), L.A. Savitz, Qualitative Research Director. A key finding from the formative evaluation was the breadth and complexity of interventions that evolved as the programs were implemented. Indeed, without probing, none of the sites visited had fully reported the breadth of intervention elements (ranging from 9 to 37) they developed and were using.

We have observed that interventions are adapted as they are implemented in varying clinical settings and/or for different patient populations. In addition to our understanding of the extent to which innovations are underreported and bias in the literature (limiting knowledge transfer), our observation that interventions evolve during implementation through institutionalization/

routinization is important; and we have the tools to monitor such evolution in comparing and contrasting a single intervention across multiple clinical sites.

Generalized Approach for Implementing Quality and Safety Interventions

Basic tenets of quality improvement in health care organizations include the necessity to embed and routinize an intervention into the normal work process. From an emergency preparedness perspective, this same issue is addressed through the design of dual-use tools and technologies. The shared intent is to ensure that an intervention is practiced and available when needed (e.g., resuscitation procedures on medical units, personal protective equipment and isolation precautions hospital-wide). The construction of such interventions follows a knowledge management and decision support model whereby

- A problem is identified and has visibility with executive management.
- A clinical champion is identified and a team is formed.
- The process is flow charted before and after implementation of the intervention so that changes in responsibility and resource needs are transparent.
- Necessary tools to support the change are developed and used (outcomes tracking, built into decision support information systems, and education/training materials).
- Monitoring with feedback is provided to involved staff on a periodic basis for review.
- Continual detailing of the intervention is recorded for ongoing improvement and maintenance.

While quality improvement in health care has built on the existing evidence base around how to manage and guide change, similar evidence is virtually nonexistent in the emergency/bioterrorism preparedness literature. Nevertheless, similar strategies for improved functioning are observed (e.g., systematically conducting drill exercises with evaluation measures for monitoring, feedback, and improvement), and these initiatives would likely benefit from the growing implementation science evidence base.

Specific examples of similar, yet separate, strategic interventions for enhanced functioning used in hospital settings include the following:

- **Drilling:** Scenario-based event drills are used in both functional areas; for example, emergency preparedness drills[40–42] and maternity ward eclampsia drills[43] have been used to train and refresh staff knowledge of key processes and protocols in the event of an infrequent yet crisis situation.
- **Training and simulation technology:** Skill-based training is deeply rooted in both areas with tools developed to support such efforts.[44–46] For example, simulation as a training and assessment tool has been used at Cornell-Weill, UPMC Wiser Center, and in the United Kingdom for intubation training.
- **Triage:** This is a common concept used in providing quality health care and in emergency response.[47, 48] However, a major departure from clinical training for triage activities occurs when a health care facility has scarce resources and is overwhelmed by the victim load, requiring battlefield triage in which the most likely survivors are treated first (i.e., frail elderly and small children may not be the highest priority given their vulnerability to succumb).[49]
- **Surveillance:** Quality improvement and infection control have long-standing experience in conducting surveillance for nosocomial infections, and a growing area in patient safety

is targeted injury detection systems. Surveillance systems for bioterrorism have been deployed at the health system (e.g., Intermountain Healthcare during the Winter Olympics) and regional levels for monitoring select illness and disease patterns to mitigate potential events.

- **Performance measurement:** Performance measurement in quality improvement is currently getting a great deal of attention[50] due to the early mantra of leading thinkers like Juran—*you can't manage what you can't measure*. Boards are now asking for emergency preparedness measures to ascertain comparative readiness.[*]

As illustrated by these examples, both areas—quality improvement and emergency preparedness—are focused on preparedness, and both face the challenge of how to implement targeted interventions. As one seeks to implement new programs and interventions in complex health care settings, one faces the same challenges associated with adoption, implementation, and maintenance of the intervention. Teams in both domains should consistently report both successes and failures within their settings and in publications that reach those most likely to use such information and be open to understanding how such reports can advance their respective work. Further, taking successful quality improvement or emergency preparedness interventions and disseminating such promising practices across a health system, a community, and/or to the industry is a hurdle at best.

Generalized Approach to Dissemination and Implementation

As part of the PAQT work, a committed group of organizational liaison staff was established that has worked successfully together on 17 projects in both bioterrorism preparedness and quality improvement. This PAQT grant has allowed the investigators to bring staff from partner health systems together for in-person meetings to discuss key organizational and care process issues, create a community for shared issue identification and learning, and explore the diffusion of knowledge within and across integrated delivery systems. In particular, the focus has been to study successful bioterrorism preparedness and quality improvement interventions, their adoption, and diffusion across the research network, together with identifying synergies across quality/safety and emergency preparedness. From the assessment of required implementation in the PAQT grant, a six-step strategy to promote cross-system diffusion of learning has been identified (Table 1).

Table 1. Generalized Strategy for Dissemination and Implementation

	"Implementation Science" Learning from Partnership in Advancing Quality Together
Step 1	Pilot innovation in credible place by a credible clinical champion with an engaged team that is empowered with resources.
Step 2	Create a toolkit or manual that serves as a conduit with audit tool for performance monitoring and feedback to involved staff.
Step 3	Review by adopting organization/unit facilitated by linking agent/clinical champion and his/her team.
Step 4	Adaptation by adopting organization/unit.
Step 5	Phased implementation: seeding the innovation on a small scale to support minimal adaptation and demonstrate value.
Step 6	Spread; organization-wide diffusion as appropriate.

[*] The American Hospital Association is currently fielding a survey that is intended to generate data that will yield comparative results on hospital preparedness.

Visibility with facility leadership and a six-step approach have been developed from observed implementation efforts over the past 2 years. This generalized approach to dissemination and implementation is both evidence- and experience-based, having been used successfully in leading partner health systems for both bioterrorism preparedness and quality improvement interventions.

Key among these six steps is the preparation of the training manual (the *conduit*) and the site-specific clinical champions (*linking agents*), which are believed to be essential in accelerating innovation diffusion and institutionalization.[*] The constructs of conduits and linking agents were recently conceptualized by Rogers[6] within his diffusion of innovation framework and related literature. Conduits are those tools or dissemination vehicles developed to facilitate uptake of research into practice (i.e., a DVD and companion training manual). Using conduits has been a major focus of our applied research and dissemination efforts to date. Linking agents have been described both in terms of agencies within a system (e.g., community hospital policies) and individuals (e.g., staff nurses implementing guideline recommendations); linking agents are the same as opinion leaders/champions or change agents. While the importance of conduits and linking agents are separately acknowledged in the change management and quality improvement literature, integration of the conduit and linking agent constructs into formal implementation planning processes has not been done.

Practice Implications

As a hospital addresses quality improvement throughout its operating structure, it should be examining all aspects of performance relating to delivering safe and high-quality services to its patients in all situations. These quality improvement efforts not only address the day-to-day services and functions, but also address the ability to meet those challenges presented during an emergency. Institutions should be incorporating evidence-based quality improvement measures that build on efforts already in place and begin to build the evidence and experience for emergency preparedness that complement these efforts. Maintaining separate structures for these activities is not only inefficient, but counterproductive.

As health care systems institute change management efforts, they should be incorporating emergency preparedness initiatives. Health care organizations should address a series of emergency preparedness activities and should initiate them within their quality improvement framework. For example, if an exercise is conducted to test the emergency preparedness plan, meeting one of the performance standards of the Joint Commission accreditation, it should be set up within a quality improvement framework. The institutional or unit performance should be measured for emergency preparedness using evidence-based tools like the one developed by AHRQ.[51] This quality improvement strategy—deployed throughout the system to address efficiency, effectiveness, and safety/quality—is no different or separate from this one dimension of emergency preparedness. As the metric of preparedness performance is measured, focused quality improvements can be initiated.

There is an impressive body of quality improvement literature that can be brought to bear on emergency preparedness. However, the literature on the metrics for preparedness and quality

[*] The research evidence for this approach is reviewed in depth in Chapter 7 of this *Handbook*.

improvement is scant and inconclusive.[52] Health care organizations on the cutting edge of this field are encouraged to report the use of evidence-based tools and piloted quality improvement measures in the literature and share their experience with colleagues. It was mentioned earlier in this paper that there are few forums that address institutional emergency preparedness measures that are initiated within a quality improvement framework. Hospitals and health systems should create opportunities for dialogue and shared learning; they should support the development of leaders within their organizations who bridge the chasm between the two activities. Nurses are well positioned to provide such leadership. The astute manager of these organizations should address vital strategies for reorganization that merge these activities and consider the career path for clinical leaders within the organization who can participate and provide leadership in the planning and evaluation strategies for these innovations. To achieve organizational awareness and commitment, the merged mission activities need to be supported though open dialogues and structured committee discussions at all levels of the organization affected by emergency preparedness.

The emergency preparedness activities thrust on an organization can either be presented as an annoying add-on function that distracts the organization from its primary mission, or they can be incorporated into the fabric of the mission and staff roles. The unique exercises and training activities required for emergency preparedness could be expanded to incorporate testing and evaluating new quality improvement measures. For example, resuscitation competency training in the emergency department could easily be incorporated into a drill testing the emergency department's response to an explosive or mass-casualty attack—thereby testing a day-to-day activity that can be measured for improvement and instituting remedial training alongside other skills and competencies for an effective emergency response. Also, essential in emergency preparedness planning are critical functions and strategies that require activities to protect the staff and the facility (e.g., avoiding contact with an infectious agent or a contaminant). Strategies such as fit testing masks, decontamination procedure, mass prophylaxis of staff and their families, and enhanced infection control measures are not unique to emergency preparedness and, therefore, are easily accommodated in day-to day-quality improvement, education, and training requirements of any health care institution. A good clinical champion from the infectious disease department (usually a nurse) can easily translate the interrelatedness of the two functions and readily get on board with an integrated approach.

Research Implications

This is an exciting and dynamic area in which little is currently known. Nurse leaders, nurse researchers and other nurses should and can have a critical role in taking these aforementioned concepts and design strategies, building on quality improvement and emergency preparedness methods, and demonstrating their effectiveness and impact. High priority should be given to developing and testing models that can be generalizable and actionable for clinicians that clearly define the roles and impact of nursing leadership. In so doing, the actual process of integrating quality improvement and emergency preparedness needs to be clearly delineated so that the successes of demonstration projects can be understood and replicated, particularly in preparation for unanticipated catastrophic events.

Conclusions

Nursing leadership has the opportunity to use new emergency preparedness evidence- and experienced-based measures that are or can be developed and disseminated. To realize this integrated approach locally, it is essential to embed interventions into the fabric of work and make these efforts visibly present so that staff are perpetually readied for the day-to-day issues of improving quality and safety, and the extraordinary issues of an unanticipated catastrophic event. With strong mission leadership to merge the two areas structurally and functionally, acceptance of valid measures and cross-integration can be achieved. In conclusion, hospital leadership should

1. Recognize the synergies between quality improvement and emergency preparedness, providing support, visibility, and performance feedback for these shared functions;
2. Empower clinical leaders to formally bridge the gap and share knowledge across these functional areas; and
3. Support the evidence base by providing resources to contribute to the literature on implementation science that can foster modeling in other facilities and communities.

Building the evidence base and recognizing the synergies between quality improvement and emergency preparedness is vital for the safety of patients in the resource-constrained environment in which we provide hospital care. Executive management is challenged to think prospectively to connect the dots and take advantage of these synergies to efficiently provide the highest quality health care possible to their patients.

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