

**AGAINST DESPERATE PERIL: HIGH PERFORMANCE IN
EMERGENCY PREPARATION AND RESPONSE**

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INTRODUCTION

Governments are routinely called upon to assist when their citizens are confronted by any of a wide variety of disasters—from floods to earthquakes, pandemic disease to terrorist attacks, fires to tornadoes. Governments are especially likely to be called to respond to the kinds of communicable disasters that are the subject of this book: situations still evolving, where damage is continuing, where we are still (and may be for an extended period) in the grip of the unfolding disaster itself, where we have not yet entered into the “aftermath.” Because governments will inevitably be expected to meet reasonable standards of performance in these assistance efforts, most modern governments (in the developed world, at least) expend considerable resources and effort to prepare for such events, and respond when events do occur. The long history of societies coping with recurrent tragedy—unpredictable in detail, but distressingly predictable in general pattern—has taught them a great deal about how to arrange response capabilities in advance and how to deploy them effectively in a moment of crisis. For this purpose, societies have “evolved” fire departments, emergency medical services, search and rescue organizations, famine and other disaster relief organizations, and a myriad of other organizational structures. Each is specialized and professionalized—staffed by well-trained and experienced people who have relevant equipment and tools. Although some degree of confusion and chaos characterizes all

significant emergencies, in locations around the world on a daily basis these organizations do good (and often remarkable) work in high-stress, rapidly evolving situations—at least so long as the situations they are confronting fit reasonably within the scope of what they were designed and resourced to do.

Yet sadly, we have also seen instances of woefully inadequate government response. Perhaps the most vivid in recent history is the multiple failures of effective response to the unfolding catastrophe wrought by Hurricane Katrina on the Gulf Coast of the United States in August and September of 2005. Government response to Hurricane Andrew in Florida in 1992 was also slow and disorganized, compounding unexpectedly devastating naturally inflicted damage. These failures are not limited geographically or by the cause of the disaster. Criticism about the sluggish response by the Soviet government to the Armenian earthquake in December 1988, that took 25,000 lives and left half a million people homeless, eventually resulted in an unprecedented opening of the USSR to outside relief shipments and assistance (BBC, 1988). In some cases—many areas within the South Asian tsunami impact zone in December 2004, for example—local resources were simply overwhelmed by the extraordinary size of the event. In other cases, incompetence, poor coordination, and sloppy execution yielded disastrously inadequate efforts in jurisdictions that should have been reasonably well prepared.

What accounts for whether governments will be able to provide effective responses to unfolding disaster events? How can they best be organized to respond to significant emergencies? What must they do in advance to create the capacities they will need in the face of disasters? In this chapter, we advance five major arguments about how governments need to structure their disaster response capabilities.

First, there are *three different types of disaster situations*. Each presents a different set of challenges in both execution and planning, and yields to different forms of leadership. Each requires different skills and processes for effective performance, and therefore, requires different forms of organization, resourcing, skill-building, practice, and other preparation in advance.

Second, while *all effective disaster responses require excellence in (a) situational awareness, (b) planning and decision making, and (c) execution*, excellence in these domains requires different responses in different types of disasters.

Third, in any significant emergency, *both (a) technical/operational issues and (b) political issues or value choices* need to be addressed. Common forms of organization for disaster response, however, tend to focus principally on the technical issues, and they need to be redesigned to handle the political issues and value choices more effectively.

Fourth, *the “Incident Management System” provides a generally useful and flexible framework*—suitable in a variety of disaster types—for coordinating diverse emergency response organizations and personnel, many of whom may never have interacted before being cast together in an emergency.

Fifth, *government is an important part of disaster response, but by no means its entirety*. This implies that governments need to think through both (a) what responses they can and ought to provide; and (b) what they can do to support, enable, accommodate, and adapt to responses by business firms, nonprofit organizations, and organized and spontaneous communal action.

KEY FEATURES OF EMERGENCY EVENTS

Significant emergency events are characterized by high *stakes*—the likelihood of major losses (to life, limb, property, heritage, or other highly valued social or private assets). They generally also exhibit a high level of *uncertainty* about just what the outcomes will be and a high degree of *contingency* (significant variability in the possible outcomes that may result under different choices of action). Much is at stake, and the results will depend on what we do—but we do not know for certain which course of action will be best. This implies that those working on the emergency will be operating in conditions of high stress.

Many types of emergencies arise regularly and are closely related to others that have come before. House fires occur in urban communities sufficiently frequently to be commonplace. Widespread (but relatively mild) influenza occurs several times per decade. Hurricanes—at least up to Category III—come ashore every year. Earthquakes of magnitude 5 or higher take place every day, and of magnitude 6 or higher every week or so. The planet experienced 12 earthquakes of magnitude 7 or above in 2005. An earthquake of magnitude 8.6 struck near the sites of the devastating earthquake that caused the South Asian tsunami and took about 300,000 lives in December 2004, and the earthquake of magnitude 7.6 that took 85,000 lives in Pakistan in October (USGS 2006).

“Routine” vs. “Crisis” Emergencies. When a particular type of emergency happens sufficiently frequently in an area where people have (or should have) resources to organize and prepare, it becomes a routine event. This doesn’t make it good, and it may still be quite severe—but it does tend to make it potentially manageable. We refer to such situations as *routine* or *familiar* emergencies to emphasize the opportunity that their regularity creates for organized preparation and practiced response. A house fire in a jurisdiction that has a well-resourced and practiced fire department, a moderate earthquake in an earthquake zone in which people have prepared for such events, a typical hurricane in a region where hurricanes are frequent and hurricane preparation is practiced—these are routine emergencies.

By contrast, some of the emergencies we confront are *not* like those we have previously experienced. By virtue of unusual scale, a previously unknown cause, or an atypical combination of sources, responders face challenges in these *crisis* or *novel* emergencies, the facts and implications of which cannot be completely assimilated in the moment of crisis. These emergencies are thus distinguished from more familiar emergencies by the presence of significantly new circumstances and different kinds of intellectual challenges. The 2004 South Asian tsunami in Banda Aceh far exceeded immediately available capacities for response. Hurricane Katrina, with novel combinations of flooding and infrastructure loss, created unusual needs and simultaneously invalidated standard responses. The 2005 earthquake in Pakistan

simultaneously created needs and destroyed available capacity. These are crisis emergencies.

The distinction between routine and crisis emergencies would be useful only for academic interests if these types differ in degree alone—if, for example, the appropriate approach to coping with or preparing for the challenges of one were very much like that which works best for the other. This is not true, we argue in the next section, which explores the implications of the differences between routine and crisis emergencies.

ROUTINE EMERGENCIES

A wide range of implications flows immediately from the underlying familiarity of routine emergencies. Imagine a serious highway accident in which three passenger cars collide with a jackknifing tractor-trailer on a freeway, injuring six people—three severely—while disrupting traffic for miles in both directions. Emergency calls go out to state police, the fire department, the ambulance service, a nearby hospital, and the highway department. Each group responds and takes care of different dimensions of the emergency. The police take command of traffic flow, routing lines of vehicles past the accident site, and maintain security around the crash scene. Emergency medical personnel minister to the victims, quickly assessing which ones should receive what kinds of attention in what order of priority. Firefighters douse the flames enveloping an auto. Hospital emergency staff, alerted by the emergency medical technicians, ready teams to treat the specific medical needs of the most severely injured victims. Highway department personnel oversee private wrecking crews that remove damaged vehicles from the site. Within a few hours, the injured have been cared for, damaged vehicles have been removed from the accident scene, and traffic is once more flowing.

While each highway accident differs in its details, the fact that similar situations have been faced many times before gave us the opportunity to think about and try many possible approaches, choosing and refining the techniques that work best into a set of routine practices. We have developed rules and lessons, trained professionals to use them, given them practice in their application so that they can deploy them quickly and

by ingrained instinct. Thus, by preparation, anticipation, and adaptation, we produce excellence in routine emergency response. The key elements of excellent response are:

- **High Awareness:** Developing a detailed understanding of the nature of this “kind” of situation and an understanding of its key elements—so that we know what facts and observations are relevant and, therefore, which to collect;
- **Comprehensive Scripts:** Well-engineered general “routines” that provide step by step scripts for dealing with the emergency;
- **Modest Customization:** Well-defined methods for adapting the general routine to the specific instance;
- **Precision Execution:** Implementing well-designed and practiced routines precisely and accurately;
- **Well-Defined, Highly-Developed Skills:** Training in the skills necessary to customize and execute the routines;
- **Leadership:** Leaders who are
 - Trained in the knowledge and methods of the situation and response;
 - Practiced at organizing, deciding, and directing execution in this type of situation;
 - Selected on the basis of their prior training, experience, and performance as better able than others to organize and direct responses of this kind;
- **Command presence:** A leadership approach (generally, an authority-based command and control structure) that performs well in directing the customization and execution of the routines;
- **Recognition-primed decisions:** The ability, through training, practice, and operational experience, to recognize patterns of circumstances and trigger appropriate, nearly autonomic responses; and
- **Hierarchical Structure:** An organizational structure (generally, a hierarchical system) well suited to customizing general routines to specific circumstances and executing them effectively.

In short, organizations that perform well in a routine emergency environment are based in a well-defined, well-developed, and ingrained *expertise* about the nature of

emergencies of this type, in the knowledge of how to handle them, and in the skills necessary to deploy that knowledge. This expertise is at once substantive, procedural, and organizational. It involves factual knowledge of how situations of this kind evolve and what the key factors are, an understanding of and ability to deploy the relevant response actions and routines, and an ability to operate effectively in an organizational setting. This ensures the development of sufficient understanding of the situation to make decisions and to issue instructions and commands to direct the response. By virtue of familiarity with the type of emergency, we have the opportunity of understanding and preparation. Where things have gone well, moreover, we have equipped people and organizations with expertise that will allow them to perform ably in spite of the danger, stress, and urgency of the situation. The essence of a well-prepared response to a routine emergency is that it is deeply rooted in expertise—an expertise that immediately triggers a practiced and well-targeted series of actions.

CRISIS EMERGENCIES

By contrast, in emergency situations with major novelties—that is, in *crisis* emergencies—such comprehensive expertise is, by definition, not possible. When SARS (Severe Acute Respiratory Syndrome) arrived in Toronto in February 2003 as a result of an infected person flying from Hong Kong to Canada, medical personnel were only dimly aware of a then-unnamed, mysterious, virulent pneumonia that had been reported in southern China. Within months, before Toronto public health officials gained control of the outbreak, SARS had infected 375 people and killed 44. Many of these cases were contracted in hospitals, as afflicted people arrived in emergency rooms for treatment and passed the infection to other patients and hospital personnel. Normal ways of preventing the spread of respiratory infections in hospitals, adequate for ordinary pneumonia or influenza, fell far short of stopping transmission of SARS. Severely-ill patients who were transferred from community hospitals to specialized treatment centers spread SARS further. Several Toronto-area hospitals were forced to close their doors during the SARS siege because of contamination. These impacts were not the result of ineffective or incompetent medical practices; indeed, Toronto has a world-class medical system whose personnel are highly competent. Nonetheless, they were dealing with a new disease, the

characteristics of which were poorly understood. Not until hospitals—after several false starts—adopted much more stringent isolation practices, and public health officials invented extensive contact-tracking policies and required intrusive self-quarantine by people who might have been exposed to contagious SARS victims, did Toronto get traction in fighting the outbreak (Varley, 2005).

In a crisis emergency, the presence of significant novelty implies that understanding of the situation, at least at the outset, will be relatively low, and that there will be no executable script or routine that is known or identifiable and that provides a comprehensive, reliable, and fully adequate response. Existing routines are inadequate or even counter-productive. Dealing with a crisis emergency thus means that the response will necessarily operate beyond the boundary of planned and resourced capabilities. It will necessarily be *unplanned* (or, at least, *incompletely* planned), and the resources and capabilities will generally be (or seem) inadequate. We can divide the challenges into three phases: first, the establishment of *awareness*, during an “understanding” phase; second, the development of a *design for action*, during a “design” phase; and third, the *implementation of the chosen actions*, during an “execution” phase characterized by implementation of unpracticed actions that go well beyond our existing plans and resources. This process then continues as observations of the results of the actions build understanding of the new situation as it continues to evolve.

Understanding. In a situation with significant elements that people have not faced before, anticipated, or planned for, responders lack general understanding of the circumstances. More particularly, they lack understanding of the parts of the circumstances that might be most relevant. Faced by this form of uncertainty, no individual or small group is likely to be fully “expert.” Different people will observe or discover different bits of relevant information, displayed in different ways as events unfold. In a routine emergency, by contrast, responders would have a well-defined sense of what data they needed to achieve good awareness of the situation and an observational system for collecting and analyzing information. In a novel crisis, they would lack both a pre-existing list of the “parameters” of the situation and a disciplined system for

gathering and assessing data. It seems likely, therefore, that an effective process for developing good understanding would involve eclectic and relatively unstructured observation and analysis. A “flatter” organization would be likely to do a better job of observing and assimilating the relevant features of the situation than a more hierarchical structure.

Design. Since, by definition, the situation that is being addressed contains significant novelty—and, therefore, there is no comprehensive script available to address it—a major challenge of effective action lies in improvising or inventing a new approach. This requires both flexibility and creativity. It is likely to include, but not be limited to, the creative combination, in whole or in part, of existing routines, which may become elements of the newly-minted strategies. It must also be relatively unconstrained by what has been done before. In such a situation, organizational authority needs to be sufficiently hierarchical to assure that the pieces of a new approach fit together coherently and will not work at cross-purposes; but the difficulty of elaborating the details of new design elements requires sufficiently decentralized action to permit timely response.

Execution. Since the approach taken will necessarily contain substantially redesigned or newly improvised processes that have not been previously practiced, execution is likely to expose both imperfections in the new design and errors in implementation. Thus, an organization dealing with the novelty of a crisis situation will have to effectively implement new and imperfect routines, learn quickly to catch errors before they unfold further, operate in spite of difficulties and setbacks, and be tolerant of imperfections. In the “design” and “execution” phases, by contrast with the “understanding” phase, it will probably be more effective if the organization has a more hierarchical structure, with more traditional command-and-control, authority-driven leadership—but with a higher tolerance than that ordinarily connotes for imprecision in execution.

Excellence in coping with crisis emergencies, therefore, means dealing effectively with the specific challenges that novel circumstances generate:

- **Low Awareness:** By definition, the novelty of the situation implies that there is less than complete understanding of the circumstances—or even of which circumstances are relevant. Responders do not necessarily know which facts and observations are relevant and, therefore, which to collect;
- **No Comprehensive Scripts:** Scripts developed for routine situations may be applicable, but, by definition, there is no comprehensive “playbook” from which the response can be directed;
- **Major Customization:** The existence of significant novelty implies that significant customization or improvisation is likely to be needed. Existing routines may provide useful elements of the response, but may have to be creatively adapted and melded in unusual and unpracticed combinations;
- **Fault-tolerant Execution:** Because newly improvised approaches or previously untried combinations of existing routines may be implemented, execution is likely to be much less precise than in routine circumstances, which call for more tolerance of imperfections and errors in execution;
- **Incompletely Specified Skills:** Since new actions may be taken, skills will not have been comprehensively developed for either the design or the execution of the required response. While training in the skills necessary to use existing routines as elements of the newly developed response will be useful, the need for the relevant skill base for components of what is being invented and improvised cannot reasonably have been foreseen and will not be available;
- **Muted command presence:** A leadership approach generally oriented to producing collaboration that works for directing the development of understanding and the design through invention and improvisation of a new approach—followed by a more authority-driven approach during the execution phase;
- **Cognitively-driven decisions:** Given the uncertainties born of novelty and the corresponding lack of available comprehensive routines, decisions cannot reliably be driven by pattern recognition (because, by definition, the patterns are not available). Decision making must proceed through a standard analytical process:

the identification of objectives, the development of alternatives, the prediction of likely results from different approaches, and the choice of a best action;

- **“Variably Flattened” Structure:** An organizational structure well suited to collecting a broad range of information (because, at least in the early phases, it will not necessarily be clear what information is relevant) and to absorbing and processing it and developing a range of alternatives. This calls for a “flattened” structure, but the necessary ability to execute the chosen approach reasonably efficiently probably calls for a more hierarchical structure.

The essence of effective response to novel or crisis emergencies thus *also* lies in a form of expertise, but in a very different form than the expertise used in routine emergencies. In the face of novelty, no one is a “substantive” expert—no one knows what to do. When no one knows what to do, response leaders, under stress, have to think their way through—developing an understanding of a situation with potentially great and unknown uncertainties, analyzing possible courses of action, and then executing untried, untested, and unperfected sequences of actions. Leading people and organizations through such an intrinsically chaotic experience requires a form of expertise—expertise in *adaptive leadership*, a very different form of leadership than that used by successful leaders in routine emergencies.

DECISION MAKING IN ROUTINE AND CRISIS EMERGENCIES

The form of decision making that dominates in routine situations deserves further comment, because it frames the central distinction between routine and novel crisis circumstances. In a series of landmark studies of the decision-making behavior of frontline emergency responders, Gary Klein has provided an intriguing set of insights into how decisions are made in routine emergencies by well-trained, experienced leaders (Klein, 1999). As he describes, he began his work trying to show how operational commanders implicitly used the standard rational action decision-making model (rational action model, or RAM). According to this model, one begins by formulating objectives, then developing and analyzing alternatives, then choosing a best course of action, and then monitoring results (and looping back to the beginning) to refine each step as

necessary. What Klein found when he interviewed emergency room doctors, fireground commanders, and other highly trained and experienced people managing urgent, high-stakes, high-consequence, rapidly unfolding events was that, in practice, most used nothing like the rational action model. Instead, they based their actions on rapid recognition of the pattern of which the new situation was a part, and moved quickly to the corresponding routines for action. Klein and his colleagues developed what they term the “recognition-primed decision-making” (RPDM) model as a description of how experienced people actually operate. The key to this form of choice-in-action is that it is driven by fitting the current situation against a series of patterns accumulated through training and experience. Each pattern group is associated with a prescribed (and tested and validated) course of action. The particular collection of actions chosen is customized by adaptation in the small to the individual circumstances of the instant event, but the general approach is selected as the accepted approach to this “type” of incident. The “types” are categorized in pattern groups.

People who are trained, experienced, and selected on the basis of prior performance thus have a set of patterns in their heads. When they see a new situation, they tend, more or less automatically and instantly, to fit it into one of the pattern groups that they recognize. Each pattern group, in turn, is associated with a “recipe” for action—which, while it may involve some customization, provides a general template for action.

By contrast, in a novel (crisis) emergency situation, current events do not fit a pre-existing pattern. Because they have no prescribed approach, the responders have no choice other than trying to work methodically through the different possibilities. In some cases, it will make sense to think about mitigating the consequences of a potential emergency; in other cases, it may make more sense to work on prevention of these consequences. There is no template or simplified autonomic response to offer. They have to think in detail through priorities among possible objectives, expand the array of available options, analyze the likely consequences of different actions, and choose the best choice, *ex ante*, that they can identify. In short, in the face of novelty, responders are more or less forced to apply the principles of the rational action decision-making model.

THE ROLE OF STRESS

Rapidly evolving, high-stakes situations are intrinsically stressful. Research on the role that stress plays in activating or blocking decision making casts important light on the challenges of managing routine and novel emergencies. Generally speaking, for trained and experienced experts, stress *activates* the recognition-primed decision making that is the centerpiece of decision making in routine situations—up to a point (Klein, 1996; Useem, 1998, 60; Rudolph and Reppenning, 2002). At least in the early stages as stress rises, recognitional powers become more acute as the hormonal responses to stress activate and “wake up” the sensory faculties and the response capabilities. (This is not true for inexperienced operational people—their performance is lower, and does not improve with stress.) By contrast, stress tends to block higher-order cognitive responses (Janis and Mann, 1977). Thus, for experienced responders, moderate levels of stress can be an asset in routine emergency situations where recognition-primed decision making is appropriate. In true (novel) crisis situations, however, stress tends generally to be a negative influence because of its effects on capabilities for decisions that require the rational action model.

One potentially important implication: The more general cognitive tendency to “see” the familiar elements in a situation (and to ignore the “novel” elements) may be exacerbated by the stress levels associated with any emergency situation—thus activating and increasing the inclination toward recognitional responses and reducing the forcefulness of cognitively-based engagement. If this is so, then one significant danger of novel situations is that their novelty may be systematically missed or underplayed—and the natural human responses to stress would seem to accentuate, rather than counterbalance, that inclination.

RECOGNIZING NOVELTY AS A CENTRAL CHALLENGE OF CRISIS RESPONSE

It follows directly from the nature of the differences between routine and crisis emergencies that in order to deal effectively with true crises, the novelty of the circumstances must first be identified and actively engaged. This is more difficult than it

might appear. In emergency situations, we commonly turn to traditional emergency response organizations, and the people in these organizations are generally trained to observe quickly and respond. This means they are likely to observe the familiar, rather than the unfamiliar, aspects of the situation. New York City firefighters, on September 11, 2001, heroically fought the fires in the Twin Towers simply as an enlarged version of a skyscraper fire. They missed the novelty of the structural damage high up that would fairly rapidly lead to the collapse of the buildings—an inevitability quickly spotted by, among others, many of the structural engineers who watched the events unfold on television that morning. FDNY approached the situation by marginally customizing its existing routines. Bravely and without hesitation, it moved into execution. FDNY did not, in the main, engage the question: “What, if anything, is materially different and novel about this situation—and what implications might that have?”

Novelties, by their nature, are often difficult to spot, because we don’t know to look for them, and we don’t know what we are looking for when we do. There tends to be a bias in emergency situations to noticing and addressing the routine elements, and to missing the more subtle, but potentially crucial, novel elements. It is essential, however, to identify what is different and what calls for a different form of response. Thus, developing personal and organizational mechanisms for testing the presumption of familiarity is a crucial element of building an apparatus capable of excellence in both routine *and* crisis emergencies. But the difficulty of spotting novelty is not easily solved. Even deciding when we should systematically look for possible novelty in the situation we are managing calls for judgment about the level of *potential* novelty and its implications, because carrying out an elaborate review in a purely routine situation wastes precious time and resources.

SUMMARY OF ROUTINE AND CRISIS EMERGENCY CHARACTERISTICS

Table 1 provides a summary and contrast of the characteristics of familiar (routine) and novel (crisis) emergencies. The differences between crisis and routine emergency situations are substantial and crucial. These differences are operationally significant—they imply important differences in the ways that:

- information should be sought (more broadly in a true crisis, with less attention to normal judgments about what information might be relevant);
- leaders should behave (more collaboratively and less through authority in highly uncertain, true crisis situations);
- organizations should be set up from the outset (in true crisis situations, with greater emphasis on the idea that observers in many different places may hold crucial information; and with recognition of the need for a flatter organization to keep from suppressing what subordinates do know that top management should know).

(Insert Table 1 about here)

THE SPECIAL CHALLENGES OF EMERGENT CRISES

Many emergency situations occur suddenly and are unavoidably noticeable. A major earthquake, the landfall of a major hurricane, a bomb blast—there is no doubting that something has happened, or when it happened. There may be more or less warning—an earthquake sequence signaled the recent minor lava eruptions of the Mount Merapi volcano complex in Indonesia—but the associated main event, if it arises, will not be subtle or difficult to notice.

By contrast, some forms of crisis do not arrive suddenly. They fester and grow, arising from a background of more ordinary circumstances that often masks their appearance. When SARS emerged in south China in the winter of 2002–2003, it appeared first as a series of unexplained deaths in a region that has, annually, many unexplained deaths. It was only in looking back, after SARS had clearly emerged as a major, definitively identified phenomenon, that its roots could be traced back and seen at all. At the beginning, it was an invisible part of a confused landscape in which a few deaths from an unusually lethal form of respiratory distress were mixed in with the larger, ordinary flow of deaths from pneumonia. When the 1979 nuclear accident at the Three Mile Island power plant in Pennsylvania began, it started as a simple pump failure—out

of which spun an increasingly tangled and escalating series of failures and mistakes until, hours later, it was no longer deniable that a major event was underway.

Crisis emergencies that arise from more normal operating conditions constitute a special—and especially difficult—category of crises, which we term “emergent” crises. In assessing many challenging crisis situations, we find early events that were in fact the genesis of the later disaster, but were intrinsically difficult to spot at the nascent stage of development. There had been previous pump failures at Three Mile Island, and these had always responded to the routine procedures that were applied at the time of the crisis. In fact, the initial moves to address the problem at Three Mile Island appeared to have worked. It was not the original pump failure, but the initially unnoticed failure of the operators’ responses that created the conditions that spiraled out of control (Perrow, 1984).

There are at least three reasons why emergent crises are particularly difficult to address. First, by nature they are difficult to recognize. Arising from normally variable operating conditions, emerging problems are intrinsically difficult to spot as a break from the normal operating patterns. But two other challenges also arise. When (and if) the problem is spotted, an individual or group with technical expertise in the issue (as it is currently understood) is generally assigned to address it. Through working on it, the responder(s) are likely to take “ownership” of the problem and its resolution. Generally, this will work: The situation will have been correctly diagnosed, the team chosen because of its capacity to address situations of this type, and the response sized appropriately to address the problem. But what if the diagnosis is not entirely correct, or if the standard approach doesn’t work, or if the response is too small or too late? Often, experts (and, perhaps even more so, teams of experts) are not adept at recognizing that their approach is not working. Often, they ignore “disconfirming evidence” (i.e., the flow of data tending to show that what they are doing is not working) and “escalate commitment” to their existing approach (see Bazerman, 1998; and Kahneman, Slovic, and Tversky, 1982, for extended discussion of these and related “cognitive biases”). The person or team working on the situation may not only believe (as a result of cognitive biases) that they

are about to succeed (with just a little more effort and time) but also feel pressure not to lose face or be seen publicly as incompetent by peers, subordinates, or superiors if they are unable to handle the assigned situation. (For example, investigations of wildland firefighting deaths from transitional fire “blow-ups” frequently find that teams violated firefighting rules that called for disengagement because they did not want to be seen by other teams as having been unable to handle their assigned fire. See, for example, MacLean, 1999.) Additionally, they may resist seeking help. As the experts (the reason they were dispatched in the first place), they may have difficulty imagining who else might be more expert and, therefore, able to help. Thus, a second major challenge of coping with emerging crisis situations is that the initial responder(s), if not immediately successful, either fail to diagnose their inadequacies or resist calling for additional help.

The third reason that emergent crises are challenging is that they present crisis managers with all of the standard challenges of managing true crises—the difficulty of recognizing novelty, the challenge of creativity and improvisation of new approaches and designs under stress, the painful realities of the errors and rough edges that arise when executing new and untested routines. But these standard challenges now arise in the context of organizations and teams that are already deployed and working on the situation. Operationally and organizationally invested in their original approach, they are likely to be resistant to the idea that they need to switch to a different mode of analysis and response to take account of the emerging scale, scope, and novelties of the circumstances. As specialists or experts, they are likely to feel that they are doing as well as possible under difficult conditions, that their approach is working, that they know better than anyone else, and that what they need is more authorization, and less oversight and “help.” In a sudden crisis, obvious to all as a crisis, the response organizations may not be as resistant to engagement with others (senior political officials, for example) because they see immediately that the situation makes extraordinary demands and is not “business as usual.” In an emergent crisis, however, the initial responders are less likely to see the novelty and more likely to resent the intrusion of those they may regard as untrained and unneeded.

The communicable crises that are the subject of this book may be particularly likely to arise as emergent crises (rather than sudden onset crises) because they involve ongoing processes and continuing evolution of damage and response. The emergence of new and lethal diseases (or disease vectors) is an obvious example: Ebola repeatedly, SARS in November of 2002, and, perhaps, A(H5N1) today, are archetypal instances. Fires are another common source of emergent crises because they nearly always start out small. Large fires that reach significant emergency proportions and confront responders with novel challenges have almost always emerged after a less than completely successful earlier response. They, therefore, typically involve tired and embarrassed responders who have a high (personal) investment in how the situation is seen and managed. These responders may understandably (and perhaps forgivably) lack perspective on the best way to manage now that the fire is emerging with true crisis characteristics, and they may resist and resent the intrusions of others coming into what they regard as *their* decision making arena.

POLITICAL AND OPERATIONAL ENGAGEMENT IN CRISES

By their nature—their high stakes, urgency, and associated fear and stress—significant emergency events are necessarily political as well as operational matters. The senior policy officials in any given setting are, in some sense, intrinsically political (they are usually directly elected to represent the interests of their constituents, or appointed by and serving at the pleasure of elected officials), and they are generally uncontested in seniority to the operational commanders involved. In effect, they have a choice about how engaged to be and what role to play in any given crisis situation. In routine situations, political officials may be willing to defer to the expertise of operational commanders and to rely on their assessments, decisions, and command systems. In situations that transcend the routine, by contrast, political officials are likely to feel impelled to be engaged, to be involved in decision making and communication about the situation—and perhaps to be (and be seen as) “in charge.”

Political officials, on one side, and operational commanders, on the other, may have very different styles and approaches to managing crisis situations (Leonard and

Howitt, 2004). Operational commanders are generally quick to make assessments and oriented to act. Recognition-driven, they are prepared to move quickly; and their experience and instincts tell them that delays are costly. Politicians vary widely in their inclination to move quickly to action; but many prefer to keep their options open, to see how the situation evolves, to avoid committing all of their capacity at the outset. In the Cuban Missile Crisis of October 1962, military leaders (the operational commanders in that event) quickly recommended to President Kennedy that he authorize one of several aggressive military responses. Fortunately—given what we now know of the situation at the time, which included the presence of active nuclear warheads on both sides, and given how events subsequently evolved—Kennedy demurred. Instead, he sought other options, waited until the situation evolved, and eventually chose from a very different decision set. The differing inclinations of politicians and operational officials may be a source of conflict at the heart of crisis decision making, and in any case is an important situational feature to which crisis leaders need to pay attention and manage.

This is rendered more difficult, in the United States at least, and to a lesser extent in many other countries, by the fact that nearly any major emergency will involve both multiple *jurisdictions* and multiple *levels of government*, rendering coordination both necessary and highly complex. In the United States, state and local government officials have no formal hierarchical relationship to federal officials; they may both be acting in the same geographic space at the same time with separate or overlapping authority, and differing ideas about what needs to be done and how to do it. In late 2005, Hurricane Katrina presented the world with myriad examples of the imperfections of such coordination, and the resulting snarls and poor performance. The White House report issued in the aftermath of Katrina proudly pointed out that a joint law enforcement coordination center, with senior federal, state, and local law enforcement officials co-located, was established only on September 6—eight full days after the hurricane came ashore (White House, 2006). Eight days seemed, to many, like a very long time to wait for the creation of an integrated law enforcement response in a situation that had cried out for a better law enforcement presence since at least the day before the hurricane came ashore.

In significant crisis events, both political and operational officials will have important—and different—roles to play. True crisis events—in which, by definition, the responders are operating beyond the bounds of what they have planned, practiced, and are resourced for—will necessarily confront senior decision makers with conflicts of *values*. Values are intrinsically political in nature and should involve determinations by people with the political legitimacy to authorize, warrant, and defend the choices made. Thus, political officials should be involved in the most crucial decisions involving conflicting priorities, and in the communication to the public describing and justifying the approaches being taken. Operational officials should help to frame those decisions, and should organize and direct the chosen responses, taking responsibility for the most effective possible execution under the circumstances. While these roles interact, and in some cases may partially overlap, governments need to develop effective processes for parsing the tasks and decisions as effectively as possible between these roles. This calls for the presence—and presence of mind—of both political and operational commanders working in concert in significant emergency events.

ORGANIZATIONAL STRUCTURE AND THE INCIDENT MANAGEMENT SYSTEM

The challenges of appropriate parsing of responsibilities between political and operational officials, and the challenges of coordinating multiple jurisdictions and multiple levels of government in the absence of any hierarchical structure of subordination among the governments involved, have immediate implications for practice. To be ready to address both routine and novel emergency circumstances, we will need an organizational structure that is able to adjust to situations of different sizes, and to incorporate variable numbers of jurisdictions and organizations that may have an important role to play in the circumstances. Given the nature of required responses in the face of novel circumstances, this organizational form needs to have six essential characteristics to be robust against both routine and true crisis situations. It needs to be:

- 1) flexible in *scale*—so that it can address situations of different sizes and, as events unfold, can adjust by shrinking or growing as conditions dictate;

- 2) flexible in *scope*—so that it can, usefully and effectively, integrate representatives and decision makers from different agency types or jurisdictions;
- 3) capable of distinguishing *roles*—so that it can appropriately differentiate *political values* decisions from *technical or operational* decisions;
- 4) capable of *re-establishing situational awareness in the context of novelty and significant uncertainty*—so that it can organize and effectively direct scanning for information, organizing what is known, defining and seeking information about what appears to be relevant and unknown, and processing and disseminating the resulting “common operating picture” to the relevant response officials and organizations;
- 5) capable of *improvisational design*—so that it can organize a creative process of invention, probably combining existing response routine elements and possibly developing new ones; and
- 6) capable of *fault-tolerant execution*—so that it can effectively direct and coordinate actions that are previously untested, and which are therefore likely to work imperfectly.

The Incident Management System (IMS), now in wide use by emergency response organizations around the world, is well designed as a foundation for such a comprehensive disaster response organization. There are many variations on the specific design of IM Systems, but most share key structural characteristics. IMS generally calls for a centralized operational authority (the “incident commander,” or IC) to have overall responsibility for design and coordination of the response to the designated “incident.” He or she reports to political officials who provide authorization for the response and who generally define its goals and scope. The operational response is organized in units reporting to the IC, generally including four functional groups, each headed by a “chief”:

- (1) operations, which directs the current execution of activities;
- (2) planning, which organizes plans and orders resources for the next operational cycle and thereafter;
- (3) logistics, which provides and manages the flow of resources and people to and from the zones of activity; and
- (4) finance, which tracks expenditures and resource consumption.

The central staff team supporting the IC generally includes a safety officer responsible for safety procedures throughout the operation and a public information officer responsible for managing the flow of information to other agencies and to the public.

IMS was originally developed as an organizational form through which large numbers of firefighters could be coordinated in fighting large wildland fires. Confronted frequently by the challenge of integrating the work of agencies and personnel from many different jurisdictions and authority hierarchies, IMS has evolved a mechanism for coordinating at the command level across agencies. In essence, “unified command” consists of a voluntary association of the relevant commanders, who agree to coordinate decision making, resource allocation, and strategy. Below this level, IMS works in similar fashion, whether headed by a single incident commander or a plural, unified command. This system has performed to good effect in a wide range of severe fires and, more recently, other emergencies. When the Columbia space shuttle disintegrated above Texas in February 2002, it was the U.S. Forest Service, well-practiced in rapidly deploying and coordinating incident management teams, that organized the bulk of the search activities to recover evidence, dangerous materials, and human remains from the wide area over which they were scattered.

While IMS was designed principally to organize operational response to routine emergency situations, it has also proven highly effective in circumstances involving more novel elements. The bombing of the Alfred P. Murrah federal office building in Oklahoma City created unprecedented combinations of challenges involving urban search and rescue, crime scene protection and investigation, and multiple conflicts over who had jurisdiction. IMS proved a useful organizational framework within which these issues could be identified, analyzed, and resolved, and through which the resulting decisions could be implemented (Rounsaville, 2004).

While the IMS is a good foundation for building *operational* response organizations that are robust against both routine and crisis emergency situations, as currently implemented, it does not produce a fully effective framework within which the

political issues raised by severe and novel circumstances can be effectively identified and handled. In the San Diego fire siege in October 2003, there were major confrontations between political officials, who felt that they should have some role in decision making, and operational officials, who felt that the issues were largely technical in nature. The IMS system provided no natural way to integrate political leaders' concerns and participation in the decision-making process, nor a means to distinguish which issues called for engagement of political leaders and which, by contrast, were appropriately the realm of expert operational/technical officials—to the great frustration of both political and operational officials involved (Madaffer, 2005).

COORDINATING PUBLIC, NONGOVERNMENTAL, AND PRIVATE RESPONSES

While the effectiveness of governmental response to any major emergency is a key determinant of how well or poorly public welfare is protected, and how quickly damage ends and recovery begins, government is by no means the sole actor or influence on the quality of society's overall performance. Nongovernmental organizations are often explicitly designed and expected to provide assistance. In the United States, the Red Cross is directly chartered by Congress to do so; many other nonprofit organizations, from inside and outside the community affected, play explicit roles in disaster response planning. Private organizations also can and often do bring substantial additional capacity to bear—and they can frequently contribute in ways that governmental institutions cannot. In the aftermath of Hurricane Katrina, actions by private companies like FedEx, UPS, Wal-Mart, Office Depot, and many others played important roles in minimizing losses. Often operating under the discretion of local store and office managers, private companies reduced the general level of chaos, permitting governmental and other organizations to function more effectively and to recover some of their lost capabilities more quickly. Self-help is also quite obviously a prominent feature of response to many disasters. For example, the great majority of people in New Orleans wisely evacuated before Hurricane Katrina came ashore. They did so under a mandatory order, but in most cases by their own means—and many of those who were rescued in the aftermath of the storm either engaged in self-rescue or were helped by neighbors or others who simply pitched in to help.

Beyond well planned, organized intervention of (mostly nonprofit) organizations, disaster response organizations may not welcome decentralized action or regard it as a good idea. Untrained people who attempt to help others in disaster situations may wind up endangering themselves and the additional rescue workers needed to extract them. Often, disaster response organizations focus on what they and their peer organizations are doing, leaving what others are doing aside (and essentially acting as if it were irrelevant) (Curran and Leonard, 2005). Nonetheless, the inevitability of private action by nonprofit organizations, private companies, and individuals (whether neighbors or, sometimes, strangers) suggests that one of the elements of government planning and response should be to anticipate, facilitate, and where possible, direct, these actions in ways that are most likely to be helpful. Taking explicit account of what others might do—and thinking ahead about how to organize, coordinate, and facilitate those actions that might be most helpful—would be a useful capacity for preparedness organizations. Expanding the concept of unified command to include some capacity for coordinating with nonprofit and private sector organizations—and building the infrastructure of agreements and relationships in advance that would make it easier for organizations to work effectively across sectoral boundaries—might have significant payoffs in a wide range of possible future circumstances.

IMPROVING PREPARATION FOR, AND PERFORMANCE IN, ROUTINE AND CRISIS EMERGENCY SITUATIONS

Our long history of experience with emergencies, ranging from the small and routine through the large and routine, has led us to build disaster response organizations that provide generally effective performance against routine challenges. These organizations tend to be highly professional, well-trained and practiced, hierarchical, and deeply rooted in substantive expertise and skills for addressing their assigned routine situations.

Episodically, however, we confront situations of significant novelty—by virtue of their scale, unusual sources of damage or a combination of sources, or because they

involve eventualities that we have not seen or thought about before (whether or not we should have). The mechanisms that we have constructed for routine situations do not perfectly fit, nor do they constitute full preparation for, such events. These true crisis events—which involve coping with novelty—require systems for rapid information search and analysis, improvisational design, and then “good enough” execution.

IMS, as a general approach for organizing in the face of emergency circumstances, provides a good foundation for building a system that is robust against routine and true crisis situations. IMS was developed for, and generally is well-designed for, routine emergencies. But, just as it can stretch to address larger events, so it can also stretch to take on events of a different kind. Indeed, it probably provides the best organizational structure that we are likely to have available to address such events. But current practice does not always ensure that IMS implementation will be capable of coping with the novelty and improvisational demands of true crises. Among the new capacities that need to be designed and practiced into IMS systems, to make them more fully robust against true crises, are:

- 1) further developing the means for parsing political from operational challenges, and for facilitating effective and useful interactions between political decision makers and operational commanders;
- 2) developing better means for recognizing and addressing significant elements of novelty, and overcoming the bias of trained response organizations to focus on and address only the familiar;
- 3) developing means for early identification of emergent crises, and ensuring that they are not allowed to fester and develop;
- 4) strengthening mechanisms for (re)building situational awareness in circumstances with many unknown elements;
- 5) building processes to enhance the capacity to undertake creative improvisation of new actions and responses, including novel combinations of existing elements;
- 6) enhancing the capacity to undertake incompletely designed actions with an appropriate level of tolerance for their consequent rough edges in

execution—and the ability to learn rapidly about how to correct for, and redesign quickly in the face of, inevitable imperfections.

While much has been accomplished, a great deal of work still lies ahead to make governmental organizations as effective as can reasonably be expected in the face of events both routine and novel. We can be grateful for the level of performance achieved by well-resourced and practiced response agencies—and still be concerned that we are not fully prepared or organizationally adapted to the novel circumstances yet to be encountered. Building organizations that can master both routine and novel situations is a profoundly important organizational development challenge, but we believe that great progress can be made toward this goal by beginning with an understanding of how routine and crisis circumstances are similar—and how they are different.

Table 1

Summary of Contrasting Features of Routine and Crisis Emergencies

| Attribute: | Routine (/Familiar) Emergencies | Crisis (/Novel) Emergencies |
|--------------------------|--|---|
| Situational Awareness | High; well-defined | Low; many unknowns |
| Scripts | Comprehensive | Fragmentary |
| Customization | Limited and modest | Central |
| Skills | Comprehensive | Partial |
| Leadership | | |
| Understanding Phase | Authority-based | Collaborative |
| Design Phase | Authority-based | Collaborative |
| Execution Phase | Authority-based | Authority-based |
| Command Presence | | |
| Understanding Phase | High | Modest |
| Design Phase | High | Modest |
| Execution Phase | High | High |
| Decision Making | Recognitional | Cognitive |
| Organizational Structure | | |
| Understanding Phase | Hierarchy | Flattened |
| Design Phase | Hierarchy | Flattened |
| Execution Phase | Hierarchy | Hierarchy |
| Defining Competence | Routine execution of trained and practiced scripts | Recognition of novelty; creative improvisation of response; execution of untested actions |

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