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Measuring Crisis Decision Making for Public Health Emergencies

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Prepared for the Department of Health and Human Services
PREFACE

Public health emergencies often involve making difficult decisions, including when to notify the public of threats, when to close schools or suspend public events, when to dispense medication, and how to allocate scarce resources. Yet, public health practitioners often have little experience or training in crisis decision making and can be uncomfortable with the need to make decisions based on often-incomplete information and short time lines. Unfortunately, there are no established tools for identifying, measuring, and improving public health crisis decision making.

This report describes an approach for assessing key features of good crisis decision making. The written assessment tool focuses on decision-making processes—specifically, situational awareness, action planning, and process control. The initial development of the tool was based on a literature review, review of after action reports, meetings with subject-matter experts, and observation of exercises. Thus, while it was designed with end-user input, it should be considered a draft or prototype pending more-extensive validation.

This document will be of primary interest to those in public health. However, those involved in homeland security and emergency response will recognize familiar structures (e.g., the Incident Command Structure) and challenges (e.g., the need for contingency planning). The tool is designed to be used in a wide variety of decision-making group sizes and structures, including those in Emergency Operations Centers and distributed groups (to the extent that group discussion can be observed).

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SUMMARY

Public health emergencies often involve making difficult decisions, including when to notify the public of threats, when to close schools or suspend public events, when to dispense medication, and how to allocate scarce resources. Yet, public health practitioners often have little experience or training in crisis decision making and can be uncomfortable with the need to make decisions based on often-incomplete information and short time lines. Unfortunately, there are no established tools for identifying, measuring, and improving public health crisis decision making.

This technical report describes the development and first generation of a tool to measure key aspects of crisis decision making in public health emergencies based on performance in exercises (e.g., tabletops, functional exercises, full-scale exercises) and real incidents (e.g., outbreaks of waterborne disease). The tool is a paper-and-pencil assessment form that is intended to allow public health practitioners to assess their baseline crisis decision-making capabilities and identify shortfalls and shortcomings that may represent opportunities for internal process improvements. The items in the tool focus on public health crisis decision-making processes that the scientific and practical literatures identify as key “building blocks” of effective crisis decision making. Given the early stage of development, this tool is intended to facilitate improvement, not to test and rate health-department performance for purposes of accountability. This tool should be considered a first generation. Further testing and development will be required before the tool can be used for accountability purposes.

The Assessment Tool Focuses on Decision-Making Processes

The tool focuses on the quality of decision-making processes—how decisions are made—as opposed to the quality of the decisions themselves (which is exceedingly difficult to determine, except in retrospect) or the characteristics of the individuals and organizations involved in the decision (which tell us little about the ability to actually make decisions). The focus on decision processes has a number of practical advantages. First, processes are less dependent than decision outcomes (e.g., morbidity and mortality) on contextual factors, such as a community’s prior health status, and more controllable by decision makers. Moreover, group decision processes—whether real or simulated—typically occur in specific locations and thus can be observed and assessed directly, using standardized, objective categories.

We identified three sets of processes—developing situational awareness, action planning, and using process controls—that, taken together, represent a continuous loop within public health emergency preparedness decision making. Decision making begins as decision makers develop a common operating picture of the situation requiring a response (situational awareness), then decide on a set of actions to mitigate human health effects (or the risk of effects) created by the situation (action planning). Having chosen a course of action, decision makers initiate execution of their decisions by communicating and implementing orders. This execution phase, while not formally part of decision making, provides feedback for the next round of decision making. Progress through each decision-making step is influenced by a set of activities undertaken to manage the entire decision process (process control)—e.g., by keeping tabs on the flow of information and other resources (e.g., expertise and time).
Measurement Focuses on Observable Activities

To allow for objective observation and coding of performance, the tool focuses on group decision making and overt behaviors, such as explicit discussion among decision makers and completion of Incident Command System (ICS) forms. Thus, the tool requires decisions that require deliberation among two or more individuals, where decision-making processes can be directly observed.

Evaluators (who should be expert practitioners themselves) use the tool to rate the performance of specific activities, using a 5-point response scale designed to assess sufficiency in performing key processes (ranging from “0, Should have been done, but was not,” to “4, Completely sufficient”). For assessment purposes, sufficiency implies that the action or activity in question is both complete and timely enough so that the assigned task and/or response could be accomplished. The tool also provides space for evaluators to make notes regarding the performance of specific tasks. The tool provides a characterization of crisis decision making, but does not currently provide a way to aggregate the individual items into a single score—a process that will require further pilot-testing. The tool is designed to be used prospectively (i.e., while decision processes are under way) but can also be used retrospectively (i.e., after an incident or exercise). Data collected using the tool should also provide valuable input for after action reports (AARs).

The assessment-tool items assess the execution of specific observable activities, which can be categorized within the three general processes just described.

Situational Awareness. Situational awareness incorporates an assessment of threats and vulnerabilities for human health and the resources available for mitigating health effects during a response. It includes making sense of the current state of affairs and making projections about future trends (Endsley, 2000). Items in the tool cover four main components of situational awareness:

- **Assessing the incident**, including the number and location of people affected, the agent/cause and severity of the incident, potential countermeasures, and the response time line. Specific items also address key “unknowns.”
- **Determining personnel** (staff and volunteers) needed and available to respond to the incident.
- **Determining nonpersonnel resources** (e.g., materiel, supplies, equipment, facilities) needed and available to respond to the incident.
- **Projecting future changes** in the severity of the incident, the number of people affected, as well as need for and availability of response personnel and nonpersonnel resources.

Action Planning. Action planning involves the identification, evaluation, and selection of courses of action to mitigate or control the health effects of the incident, including plans for contingencies. The tool focuses on two aspects of action planning:

- **Developing, evaluating, and selecting options**, which includes courses of action, potential consequences of each action, their assumed pros and cons, contingency planning, and the clear stating of a decision.
Initiating execution, which includes specifying the concrete steps needed to execute a decision, responsibility and time line for those steps, trigger points for initiating actions, and signals that a chosen course of action may have failed.

**Process Control.** Process control involves steps taken to manage the flow of the entire decision process and to keep track of the flow of information and resources. The tool focuses on two aspects of process control:

- *Managing decision-making resources*, including recognizing who needs to be involved in the decision, delegating decision-making authority, identifying critical decisions, establishing and adhering to a decision-making time line, and maintaining the speed and effort required to meet the time line.
- *Engaging multiple perspectives*, including acknowledging expertise, discussing information known only to specific individuals, and encouraging multiple perspectives.

In addition, the final sections of the tool help evaluators to collect information needed to contextualize the data collected, including details about the exercise or incident being observed and the individual(s) using the tool.

**Conclusion and Next Steps**

The assessment tool is currently best suited for exploratory analysis and process improvement. Future testing, including field-testing and more formal pilot-testing, and refinement of the tool might provide a tool ready for accountability. Although the tool was designed for use in measuring crisis decision making for public health emergencies, and primarily at the local and state levels, it could ultimately have applications at the federal level and beyond public health emergency preparedness, such as other areas of homeland security and emergency management.

In the future, the tool might also be adapted to serve as a real-time decision aid or operational tool, or as a complement to computer-based simulation approaches to measuring crisis decision making in public health emergencies. The tool’s use as a process-improvement resource could also be enhanced by pairing it with decision aids and suggested strategies for overcoming problems revealed by use of the tool.
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We begin by thanking the staff of the Centers for Disease Control and Prevention’s Division of the Strategic National Stockpile (CDC/DSNS) for helping us over the years to understand the operational realities faced by state and local health departments. In particular, we thank Linda Neff, Stephanie Dulin, Mike Moore, Jason Zimmerman, Curt Mast, and Mike Staley.

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We alone, however, bear responsibility for the content of the report and the assessment tool.
# ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AAR</td>
<td>after action report</td>
</tr>
<tr>
<td>HHS/CDC/DSNS</td>
<td>Centers for Disease Control and Prevention’s COTPER Division of the Strategic National Stockpile</td>
</tr>
<tr>
<td>CRM</td>
<td>Crew Resource Management</td>
</tr>
<tr>
<td>DHS</td>
<td>Department of Homeland Security</td>
</tr>
<tr>
<td>DOC</td>
<td>Department Operations Center</td>
</tr>
<tr>
<td>EOC</td>
<td>Emergency Operations Center</td>
</tr>
<tr>
<td>HHS ASPR</td>
<td>Department of Health and Human Services’ Office of the Assistant Secretary for Preparedness and Response</td>
</tr>
<tr>
<td>HSEEP</td>
<td>Homeland Security Exercise and Evaluation Program</td>
</tr>
<tr>
<td>IC</td>
<td>incident commander</td>
</tr>
<tr>
<td>ICS</td>
<td>Incident Command System</td>
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<tr>
<td>ILI</td>
<td>influenza-like illness</td>
</tr>
<tr>
<td>IOM</td>
<td>Institute of Medicine</td>
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<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
</tr>
<tr>
<td>MSEL</td>
<td>Master Scenario Events List</td>
</tr>
<tr>
<td>NIMS</td>
<td>National Incident Management System</td>
</tr>
<tr>
<td>OB/GYN</td>
<td>obstetrics and gynecology</td>
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<tr>
<td>PHEP</td>
<td>public health emergency preparedness</td>
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<tr>
<td>PIO</td>
<td>Public Information Officer</td>
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<tr>
<td>PLG</td>
<td>Pick List Generation</td>
</tr>
<tr>
<td>POD</td>
<td>Point of Dispensing</td>
</tr>
<tr>
<td>PPE</td>
<td>personal protective equipment</td>
</tr>
<tr>
<td>RSS</td>
<td>Receipt, Staging, and Storage</td>
</tr>
<tr>
<td>SNS</td>
<td>Strategic National Stockpile</td>
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<tr>
<td>TAR</td>
<td>Technical Assistance Review</td>
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<tr>
<td>TCL</td>
<td>Target Capabilities List</td>
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1. INTRODUCTION

Recent Events Illustrate the Importance of Crisis Decision Making

Public health emergency management involves making a multitude of difficult decisions, including when to notify the public of threats, when to close schools or suspend public events, when to dispense medication, and how to allocate scarce resources. Indeed, decision making can be viewed as a fundamental capability that ensures that other capabilities, such as biosurveillance, countermeasure dispensing, and public communication, are deployed in a timely and coordinated manner.

The importance of decision making in public health emergencies was evident during Hurricane Katrina in 2005. Response efforts were hampered seriously by well-documented failures in decision making, including decision makers’ delayed recognition of threat magnitude; lack of coordination in resource and personnel deployment; communication failures; faulty situational awareness; resistance to consideration of alternative viewpoints; unfamiliarity with policies and plans; and unclear lines of authority (U.S. Government Accountability Office [GAO], 2006; U.S. House of Representatives, 2006; U.S. Senate, 2006; U.S. White House, 2006; Ringel et al., 2007). Other crisis decision-making challenges include balancing the needs of multiple stakeholder groups and managing the political pressures that often attend these high-stakes decisions.

Crisis decision making presents particular challenges for public health practitioners, who are often uncomfortable making decisions based on the incomplete information available during an emergency. Similarly, the top-down nature of decision-making structures used by emergency first responders (e.g., involving a strict chain of command) can conflict with the more consensus-based decision-making style common to public health practice.

New Tools Are Needed to Define, Measure, and Improve Public Health Emergency Decision Making

Efforts to improve crisis decision making—in public health and elsewhere—have been limited by the absence of a clear definition of what good crisis decision making is and a lack of practical tools for measuring and improving it in practice. The need for crisis decision making tools is especially acute in public health emergency preparedness (PHEP), given that, unlike firefighters, law enforcement, and emergency managers, most public health officials do not handle emergencies regularly.

Other, ongoing efforts provide important building blocks to facilitate decision making, but they do not fully address the need (e.g., investments in biosurveillance increase access to critical information, but such information must still be integrated with other considerations into strategic decisions). The National Incident Management System (NIMS) and the Incident Command System (ICS) that NIMS incorporates have established a standardized set of roles for decision makers (e.g., command, finance, logistics, operations, and planning) and practices for reporting relationships and responsibilities (U.S. White House, 2003; DHS, 2007d). But these materials provide little guidance about how decision makers occupying the “boxes” in the NIMS
organization charts should actually use information and weigh trade-offs in deciding upon courses of action.\textsuperscript{1}

In PHEP, recent advances have been made in identifying decisional \textit{triggers}, or conditions for initiating a course of action, for responses to influenza pandemics (U.S. Government, 2008). However, deciding when those triggers should be activated involves considerable judgment. Similarly, while the Pandemic and All Hazards Preparedness Act (Public Law 109-417, 109th Congress) has provided resources for significant investments in new data-gathering systems for improving situational awareness, considerably less focus has been placed on using information from these systems in decision-making contexts.

**An Assessment Tool for Measuring Public Health Emergency Decision Making Can Support Improved Preparedness**

This document presents the first generation of an assessment tool for measuring key aspects of decision making in PHEP based on performance both in exercises (e.g., tabletops, functional exercises, full-scale exercises) and real incidents (e.g., outbreaks of waterborne disease).\textsuperscript{2} The tool was created as part of a larger set of activities to develop performance metrics for assessing and improving operational capabilities related to PHEP (e.g., Nelson et al., 2007). The tool is intended to allow public health practitioners to assess their baseline crisis decision-making capabilities and to identify shortcomings that may represent opportunities for internal process improvements.

Assessment-tool items are based on evidence from experimental and observational studies and focus on decision-making \textit{processes}—how decisions are made—as opposed to the quality of the decisions themselves (which is exceedingly difficult to determine, except in retrospect) or the characteristics of the individuals and organizations involved in the decision (which tell us little about the ability to actually make decisions). In this way, the tool resembles Crew Resource Management (CRM) tools and other assessments that measure team decision making in aviation and, increasingly, in medicine (Helmreich, Merritt, and Wilhelm, 1999; U.S. Air Force, 1998; Gawande, 2007).

The tool captures a critical set of crosscutting capabilities that apply across a broad spectrum of decision-making contexts. Chapter 4 provides an example of how the tool could be used to assess the decision to request medical countermeasures from the Strategic National Stockpile (SNS), but the tool could also be applied to decisions to close schools, initiate evacuations, provide antiviral drugs to at-risk populations, and so on. Furthermore, given that many of the decision-making capabilities assessed by the tool also apply to normal, “everyday” practices (e.g., consideration of contingency plans in the face of resource scarcity), addressing these capabilities should have significance beyond emergencies.

It should be emphasized that, while the tool is intended to support internal process-improvement efforts, it is \textit{not} designed for accountability purposes at this stage. Additional

\textsuperscript{1} The Target Capabilities List (TCL; DHS, 2007c), for instance, includes just seven references to decision-making, most of which involve planning for and coordinating decision-making processes, and none of which involve criteria for evaluating the ability to actually make decisions.

\textsuperscript{2} Scheduled events, such as major sporting events, festivals, or political rallies, might also provide opportunities to assess public health decision making under pressure, if not under a crisis.
testing and development of the tool will be required before the tool is ready to support high-stakes decisions.

**Organization of This Report**

The remainder of this report is organized around four questions:

- Chapter 2: What aspects of crisis decision making for public health emergencies are most worth measuring?
- Chapter 3: How should key processes be measured?
- Chapter 4: When and by whom should the measures be used?
- Chapter 5: What are the next steps for refining and rolling out the assessment?
2. WHICH ASPECTS OF CRISIS DECISION MAKING ARE WORTH MEASURING?

To be useful in supporting improvement, a decision-making assessment must focus on the most critical processes. This chapter describes a conceptual framework used to help answer the question: “Which aspects of crisis decision making for public health emergencies are most worth measuring?” This process draws on multiple perspectives, which are summarized first. Subsequent sections demonstrate the need to assess decision-making processes and describe the key processes that were identified.

Identification of Key Aspects of Crisis Decision Making Drew on Several Sources

The framework for considering crisis decision making was guided by review of the research literature and discussions with expert practitioners. It provided the structure for the tool, which drew on conversations with expert practitioners, development of process maps for key decisions, analysis of after action reports from real public health emergencies, and real-time exercise observation.

Research literature review. We reviewed research on crisis decision making that bridged multiple domains. Specific lessons from the literature are provided in the discussion of the tool, but we drew on two main categories of literature: first, studies of how expert decision makers actually make decisions in real crisis conditions, including research that examines research in naturalistic environments (see, e.g., Klein, 1999) and research based on examination of best practices in fields such as aviation, military operations, nuclear power plants, and others (see, e.g., Weick and Roberts, 1993, Weick and Sutcliffe, 2001; LaPorte, 1971; Sagan, 1993); second, experimental and laboratory studies that focus on group decision-making processes (see, e.g., Hackman, 2002; Laughlin, 1999; McGrath, 1984). Although not often directly focused on crisis decision making, these studies provide important insights on common biases that limit groups’ ability to process information, generate and weigh alternatives, and select courses of action. Perhaps more important, this standardized approach to studying group decision making also provides insights into potential countermeasures for dysfunctional decision-making tendencies.

Discussions with expert practitioners. We conducted discussions with expert practitioners--specifically, individuals from public health and related disciplines with recent experience in managing public health emergencies ranging from relatively low-level disease outbreaks to terrorist attacks. To provide guidance in drafting early versions of the tool, these discussions were held at the beginning of the project; to guide refinements, they were held again after the assessment had been drafted.

Process mapping. As one means of ensuring that the selection of constructs represented in the tool applied to decisions that would need to be made during a real emergency, we created process maps of initiating the Strategic National Stockpile request process as a sample public health crisis decision. Other RAND work (e.g., Nelson et al., 2008; Willis et al., 2009) on SNS-related decision making informed this process. A process map is a visual depiction of a series of tasks that turn inputs into products or outputs. These tasks can be a variety of activities, including concrete decisions that must be made (Aft, 2000). The process maps provided a means
to identify ways in which decision making might go wrong (failure points) and thus to identify items warranting inclusion in the tool.

**Analysis of AARs from real events.** To complement the process maps’ depiction of stylized decision-making processes, after action reports (AARs) from recent major exercises and incidents helped identify likely failure points in actual decision-making processes.

**Real-time observation of exercises.** Finally, earlier drafts of the tool were employed while observing two functional exercises as a way to evaluate the relevance of items in the tool and the tool’s feasibility.

The following sections provide the rationale for focusing on decision-making processes and introduce three key sets of processes. Chapter 3 provides more detail on the actual tool.

**Focusing on Decision-Making Processes Provides a Feasible Approach to Measuring Decision-Making Capabilities**

Building on the work of Yates (2003) and Parker and colleagues (Parker and Fischhoff, 2005; Bruine de Bruine, Parker, and Fischhoff, 2007), we can consider public health emergency decision making as a production flow, with inputs, processes, outputs, and outcomes (see Figure 2.1). Taken together, these components provide a menu of what might, in principle, be measured:

- **Inputs** refer to the people, organizational structures, and technologies involved in decision making. Measures of decision-making inputs might focus on the roles, skills, organizational position, and other characteristics of the decision makers or on the properties of surveillance systems that provide the information inputs for decision makers. NIMS and ICS focus on decision-making inputs, so defined, and many existing attempts to measure decision making (and the related concept of leadership) have focused on this aspect of decision making.

- **Processes** are the “how” of decision making. From a production perspective, processes are used to translate raw materials into outputs.

- **Outputs** are the decisions themselves. A useful definition of a decision is “a commitment to a course of action that is intended to yield satisfying states of affairs for particular parties” (Yates, 2003, p. 24). Thus, decisions are concrete points in a chain of events at which individuals and groups seek to change, shape, or react to the course of events.

- **Outcomes** are the effects that decisions have on human health and well-being. They might include the number of individuals successfully evacuated after a decision to conduct a mass evacuation, the public’s reaction to a risk-communication message, or morbidity and mortality from an event.

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3 For construct validation, the framework presented here can be thought of as defining the domain over which decision making could be measured (Nunnally and Burnstein, 1994).
Figure 2.1

Public Health Emergency Decision Making as a Production Flow

Ultimately, the most definitive measure of decision-making quality would be resulting health outcomes. Understanding such issues is often a key focus of after action reports of real events and of blue-ribbon panels convened to determine “what went wrong” (e.g., after the Katrina response). However, the fortunate rarity of large-scale health emergencies, along with the politically charged environment that often accompanies them, limits these events’ utility as opportunities for measurement and continuous process improvement.

Smaller-scale public health emergencies (e.g., low-level outbreaks of foodborne disease) provide more frequent and less politically charged data-collection opportunities. However, as is also the case in large-scale incidents, the health outcomes that result from smaller incidents are difficult to distinguish from other influences on health. As noted in Chapter 5, computer models might be used to simulate the effects of decision-making processes. Modeling offers a promising avenue for future research and development; however, the need is for lower-cost measurement strategies that can be made available immediately.

It might be possible to assess the quality of decisions (i.e., outputs), rather than outcomes, based on normative criteria outside the context of real events. Parker and Fischhoff (2005) and Bruine de Bruin, Parker, and Fischhoff (2007), for instance, have developed approaches to measuring decision-making competence in individuals by measuring susceptibility to fallacies in reasoning derived from theories of rational choice (e.g., consideration of costs already sunk into a venture, susceptibility to irrelevant variations in how information is framed, overconfidence in knowledge). Because many aspects of the individual decision-making process, unlike group deliberation, are not directly observable, such approaches infer process from the decisions themselves. However, these approaches require long questionnaires and capture neither the rich context of public health emergency decision making nor the complex (and often observable) dynamics among multiple decision makers.

The overwhelming majority of previous efforts to measure public health emergency decision making have focused on decision-making inputs. For example, recent work on “meta-leadership” focuses on the skill in building relationships across organizational units that can support public health emergency decision making (Marcus, Dorn, and Henderson, 2006).
Others, such as the Strategic National Stockpile Program’s Technical Assistance Review (TAR) tool, focus on the organizational aspects of decision making.

The presence of decision-making inputs, however, is no guarantee that such inputs can be used to make decisions in real-life operational contexts. Thus, the assessment tool described in this report focuses on decision-making processes, which focus on how decisions are made, as opposed to who makes them, what the decisions are, and what effect they have. Decision-making processes include the ways in which information and expertise are shared and acted upon. As pre-9/11 intelligence failures starkly demonstrate, information and expertise are of limited value if they are not brought together in venues for aggregating, analyzing, and interpreting them effectively (National Commission on Terrorist Attacks, 2004). To cite another example, an expert practitioner consulted on this project noted that, in some large-scale preparedness exercises, expert observers would often focus on what they knew and forget to ask about the other aspects of decision making with which they might not have been as familiar.

Focusing on decision processes has a number of practical advantages. First, processes are less dependent than decision outcomes upon contextual factors. Thus, whereas the health effects of a decision might be highly conditional upon a community’s prior health status and other community factors, decision makers have more control over decision processes. Second, decision processes—whether in real or simulated environments—typically occur in specific locations and are thus amenable to direct observation using relatively standardized, objective categories. Third, there is a relatively robust social scientific literature on the relationship between decision-making processes and the quality of decision outputs and outcomes (e.g., Bruine de Bruin, Parker, and Fischhoff, 2007; Radecki and Jaccard, 1995). Thus, it is possible to develop measures that are informed by an evidence base about the linkages between decision-making processes and outcomes.

Three Key Public Health Emergency Decision-Making Processes Were Identified

Development of the assessment tool drew on Parker and Fischhoff’s (2005) approach to categorizing key decision-making processes (see also Bruine de Bruin, Parker, and Fischhoff, 2007) and identified three core sets of processes within public health emergency decision making: situational awareness, action planning, and process control (see Figure 2.2). Together, these constructs represent a continuous loop within the decision-making processes box of Figure 2.1.

The process begins as decision makers develop a common operating picture of the situation in need of response (situational awareness), then decide on a set of actions to mitigate human health effects (or the risk of effects) created by the situation (action planning). Having chosen a course of action, decision makers initiate execution of decisions, whereby orders are communicated and implementation begins. While not formally part of decision making, this initiating-execution phase does provide the feedback for the next round of decision making. Management and control processes influence progress through each step in this loop by helping

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4 This process flow mirrors the Military Decision-Making Process (Headquarters, Department of the Army, Staff Organization and Operations, Field Manual 101-5, 1997), which includes steps for information collection, analysis of that information, and selection among courses of action; and Klein’s (1999) identification of the following steps in problem-solving processes: detecting the problem/opportunity; diagnosing and representing the problem; generating courses of action and applying leverage points; and evaluation.
to keep tabs on the flow of information and other resources (e.g., expertise and time). Process control, therefore, influences how well situational awareness, action planning, and initiating execution are implemented.

Figure 2.2

Core Processes in Public Health Emergency Decision Making

Building on this description of decision making, the next chapter steps through each of the three sets of core processes, taking a closer look at the ways in which the items included in the tool assess the observable activities that reflect these processes.5

5 For purposes of this report, situational awareness, action planning, and process control are referred to as key processes. These processes can be assessed by the observation of key activities. Finally, the assessment tool itself, which is organized generally by process, contains specific items assessing each activity.
3. **HOW ARE THE KEY PROCESSES MEASURED?**

This chapter focuses in more detail on the proposed crisis decision-making assessment tool itself, discussing (1) the tool’s relation to similar types of assessments that have been developed in other fields, (2) the response scale used in the tool, and (3) the types of items included in each of the three main sections of the tool (situational awareness, action planning, and process control).

**Assessment Tool Draws Upon Similar Assessments in Other Fields**

To facilitate objective coding, the tool focuses mostly on overt behavior—specifically, explicit discussion among decision makers and completion of ICS forms. Because it focuses on discussions, the tool is most appropriate for assessing group decision making, rather than the decision making of individuals (which may not involve open discussion and, therefore, would not be as directly observable).

A simple paper-and-pencil assessment was developed to reduce administration cost and other practical limitations, and was modeled from similar tools in other fields. For example, Crew Resource Management is widely used in military and domestic aviation and focuses on reducing errors through a variety of cognitive and interpersonal skills, including communication, teamwork, problem solving, and decision making. Much of the emphasis is on team performance, and checklists have been employed as a means of assessing team coordination and communication. Although the approach has not been validated rigorously, anecdotal data suggest that it has had a positive effect (Helmreich, Merritt, and Wilhelm, 1999; Salas et al., 2001). Similar assessments have been developed to improve quality in tank companies’ decision making during live-fire exercises (Hallmark and Crowley, 1997), in obstetrics and gynecology (OB/GYN) medical teams (Gawande, 2002), and when incorporating new members into intensive care unit teams (Gawande, 2007).

**The Response Scale Assesses Sufficiency in Performing Key Processes**

The response scale accompanying the assessment tool is derived from Hallmark and Crowley (1997) and is shown in Table 3.1. It is designed to assess sufficiency in performing key processes. For assessment purposes, *sufficiency* implies that the action or activity in question is both *complete* and *timely* enough so that the assigned task and/or the response can be accomplished. The timeliness criterion is important, because public health emergencies require rapid decision making with incomplete information.

The scale is designed to provide an adequate number of categories to capture variation among ratings and to allow for nonratings (i.e., through the N/A and N/D response options), when appropriate. An item should be scored N/A, rather than 0, when the parameters or assumptions of an exercise render discussion of an issue (e.g., number and location of people affected) moot. Similarly, N/D is the appropriate response if the person scoring the exercise is not able to observe whether an item was accomplished (either because it was done by an individual with no discussion or was performed away from the observer’s attention). The response format helps improve interrater reliability by facilitating the interpretation of response categories and avoiding confusion when the main response scale does not apply.
Table 3.1
Response Scale for Assessment Tool

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – Not done</td>
<td>The action or activity should have been done, but was not.</td>
</tr>
<tr>
<td>1 – Not sufficient</td>
<td>The action or activity was done, but performance was so incomplete, timely,</td>
</tr>
<tr>
<td></td>
<td>or poorly done as to be insufficient.</td>
</tr>
<tr>
<td>2 – Somewhat sufficient</td>
<td>The action or activity was done and sufficient in minor respects, but was</td>
</tr>
<tr>
<td></td>
<td>not entirely sufficient in major ways.</td>
</tr>
<tr>
<td>3 – Mostly sufficient</td>
<td>The action or activity was done and sufficient in major respects, but was</td>
</tr>
<tr>
<td></td>
<td>not entirely sufficient in minor ways.</td>
</tr>
<tr>
<td>4 – Completely sufficient</td>
<td>The action or activity was performed in a sufficient, timely, and complete</td>
</tr>
<tr>
<td></td>
<td>manner.</td>
</tr>
<tr>
<td>N/A – Not applicable</td>
<td>The action or activity was not appropriate (i.e., not necessary) in this</td>
</tr>
<tr>
<td></td>
<td>situation (requires explanation).</td>
</tr>
<tr>
<td>N/D – Not able to determine</td>
<td>It is not clear whether the activity was performed.</td>
</tr>
</tbody>
</table>

An underlying assumption of the scale is that completion of any particular task should not, under normal circumstances, be any more than sufficient, because exceeding that threshold might involve opportunity costs for other tasks. This assumption, however, should be evaluated during continued field- and pilot-testing (see Chapter 5). Indeed, a counterargument could be made that raters will be reluctant to score participants (who will often be peers and colleagues) as less than sufficient, thus reducing the scale’s ability to distinguish varying levels of performance.6

Specific Items on the Assessment Tool Focus on Three Decision-Making Processes

Appendix A contains the draft assessment tool. The tool focuses on the three general decision-making processes, described in Chapter 2 (situational awareness, action planning, process control), each of which has been broken down into more-specific constructs. Specific tool items are derived from theory and doctrine, and adapted from earlier assessments developed for non–public health applications. The following sections summarize these processes. A more detailed review of the research literature underlying these constructs is provided in Appendix B.

Situational Awareness.7 Situational awareness incorporates an assessment of the “facts on the ground”—i.e., the threats and/or vulnerabilities for public health and the resources available for a response. Situational awareness includes making sense of the current state of affairs and projecting into the future (Endsley, 2000).

The tool focuses on four main aspects of situational awareness:

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6 Development of scoring methodologies will need to await further validation of the response scale through field-testing and pilot-testing.

7 The exact terminology differs across sources, and is referred to variously as situation awareness or situational awareness. To be consistent with the Pandemic and All-Hazards Preparedness Act, S. 3678 (109th Congress), we use the latter term.
- **Assessing the incident**, including the basic details of the incident—number and location of people affected, the agent/cause and severity of the incident, potential countermeasures, and the response time line. Specific items also address key unknowns and strategies for addressing those unknowns.
- **Determining personnel** (staff and volunteers) needed and available for responding to the incident.
- **Determining nonpersonnel resources** (e.g., materiel, supplies, equipment, facilities) needed and available for responding to the incident.
- **Projecting future changes** in the number of people affected, as well as the need for and availability of response personnel and nonpersonnel resources. A final item addresses strategies for dealing with projected resource shortfalls.

The presence of situational awareness was specifically cited by the U.S. Senate report on Hurricane Katrina (2006) as one of the reasons that the Coast Guard was particularly effective in contrast to other responders in that emergency; the lack of situational awareness was cited by the U.S. House (2006) report to explain why government-wide efforts fell short.

To make decisions during an emergency, one needs to know the following:

- The current scope of the incident, to gauge resource needs
- The cause/agent of the incident, as well as its severity, to figure out how to mitigate the health consequences
- The necessary response time line, to ensure that public health interventions are not too late to be effective.

For example, lack of awareness of needy populations could lead to insufficient response and worsening conditions for those groups. An inaccurate understanding of the agent causing an emergency could lead to deployment of the wrong countermeasure. In one study from aviation, the majority of pilot errors derived from such basic situational misperceptions (Jones and Endsley, 1996). An incorrect application or recognition of trigger points could lead to a mismatch between the incident and the response.

Inherent to developing situational awareness is an appreciation of the uncertainty surrounding a decision (e.g., Fischhoff, 2006; Weick and Roberts, 1993; Weick and Sutcliffe, 2001). The need to prioritize information collection appropriately is emphasized by the well-documented difficulties involved in making decisions under high uncertainty (e.g., Fischhoff and Beyth-Marom, 1983). Because emergency decision making typically involves the need to act upon incomplete information, it is critical to recognize unknowns and, when feasible, to develop strategies for reducing uncertainty by gathering more information. Given limited time, emphasis should be placed on gaining a better understanding of those unknowns that are most easily addressed and most likely to affect decisions (see, e.g., Clemen, 1991; Dewar, 2002; Fischhoff and Beyth-Marom, 1983; Gartner, 1997; Howard, Matheson, and North, 1972; Raiffa and Schlaifer, 1961).

An example of a decision involving situational awareness would be determining whether an uptick in the number of reported cases of influenza-like illnesses (ILIs) represents the start of an annual influenza outbreak or is evidence of a bioterrorist attack. Furthermore, an ongoing understanding of the extent of the event, as well as an awareness of the current and potential assets available (e.g., hospital beds) for response, would inform a decision of whether to draw on
a wider radius of resources (e.g., from neighboring jurisdictions). Note that this determination involves both awareness of data from the outside world and the ability to interpret and characterize those data. In other words, it involves both the “what’s so?” and the “so what?”

This example highlights the importance of sources of uncertainty, including decisions about whether or not to delay action while more information is gathered.

Situational awareness also involves an understanding of current and ongoing response efforts and resource allocations, including knowledge of resource needs, current local availability of resources, outside sources, and potential shortfalls (this consideration is reflected in the “Resources Summary” section of the “Initial Incident Briefing,” ICS Form 201, DHS, 2007d). Also necessary to address both current and future needs are projections for changes in the number and location of people affected, as well as in resources or personnel needed (Endsley, 2000).

**Action Planning.** Action planning involves the identification, evaluation, and selection of options to mitigate or control the incident’s health effects, including contingency planning. Action planning also requires specifying and assigning responsibility for tasks.

The tool focuses on two aspects of action planning:

- **Developing, evaluating, and selecting options,** which includes considering the relevance of existing plans and doctrine and courses of action, along with the potential consequences and pros/cons of each action, contingency planning, and making a clear statement of a decision.
- **Initiating execution,** including specification of concrete steps to execute a decision, responsibility and time line for those steps, trigger points for initiating actions, and signals of potential strategy failure.

Action planning involves the examination of the options, consequences, likelihoods, and values behind a decision (e.g., Edwards, 1954; Fischhoff, 2006; Yates, 2003; Yates and Tschirhart, 2006). To make a well-reasoned decision, decision makers need to clearly define potential courses of action, including whether to maintain or alter previous plans. In many instances, it is desirable to consider more than one alternative, although doing so might not be desirable under extreme time pressure (see, e.g., Klein, 1999).

Critical is the capacity for matching a specific threat of vulnerability with potential solution strategies. The presence of preexisting plans usually means that decision makers do not need to start from scratch; however, such plans will often need to be adapted or reformulated. To the extent that decision makers participated in plan creation, a certain level of awareness might be expected. Nevertheless, a lack of basic awareness of plans, or of policies and doctrine, is one potential limiting factor. The White House report on Hurricane Katrina (2006) stated that “key decision makers at all levels simply were not familiar with the plans,” and the U.S. House of Representatives (2006) report on the same disaster noted a lack of common understanding of protocol.

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8 As with clinical decision making, characterization might involve a process of pattern matching or perhaps some sort of Bayesian hypothesis testing and belief updating (Elstein and Schwarz, 2002; Tetlock, 2005).
Potential actions need to be evaluated for expected consequences and competing values (e.g., speed of dispensing medications versus accuracy of dispensing).\(^9\) These evaluations need not be formal or rigorous, but discussion should be based on the best available evidence. Failure to consider such evidence could result in a failure to incorporate unintended consequences or key trade-offs. Explicit discussion could reduce the natural tendency of people to focus disproportionately on evidence that confirms their prior expectations, neglecting contradictory evidence (Klayman and Ha, 1987; Schulz-Hardt et al., 2000; Skov and Sherman, 1986).

In addition, some sort of a decision needs to be made. While this point might seem trivial, at least one expert practitioner pointed out that the drive to make the “right” decision all too often impedes timely mobilization of resources, and even a preliminary decision providing general guidance is sufficient to set the right wheels in motion. Thus, this decision might be provisional or might be a decision to take intermediate action (e.g., collect more information).

Decision making must be adaptive to the situation. While involved in contingency planning, decision makers should identify key assumptions that lie behind alternative courses of action--i.e., those assumptions that are both critical to the overall success of the response and most vulnerable to failure. For example, communications-systems failures in Hurricane Katrina—a contingency not planned for by many state and local responders—contributed to diminished situational awareness and response capability (U.S. House of Representatives, 2006). Identifying such assumptions establishes the basis for foreseeing possible conditions that could compromise current objectives and indicate where plans need to be altered. Projecting future states, including unexpected contingencies, allows for a more adaptive response (e.g., Dewar, 2002; Endsley, 2000; Fischhoff, 2006; Weick and Roberts, 1993; Weick and Sutcliffe, 2001) and could reduce behavioral tendencies to focus on information that everyone already knows (Gigone and Hastie, 1993; Klayman and Ha, 1987; Skov and Sherman, 1986), as well as the aforementioned focus on evidence supporting expectations. Ideally, such information would be incorporated into standing plans, with important potential decisions considered in advance (Fischhoff, Dombroski, and Fischbeck, 2006). However, many contingencies may come to light only during the evolution of an incident.

Finally, action planning involves the development of concrete actions to implement the decision (Klein, 1999; Yates, 2003; Yates and Tschirhart, 2006). To the extent that these actions are explicitly laid out, they are more likely to be accomplished. Delineating each step’s responsibilities and time line will help ensure that the decision-making process is transparent to all stakeholders.

It might also be necessary to tie certain actions to key events--i.e., “if X happens, do Y.” For instance, those implementing decisions might be instructed to report back if demand for medication at a single Point of Dispensing exceeds a certain critical threshold.

**Process Control.** Process control involves the management of the entire decision process (including both situational awareness and action planning) and ensures appropriate information sharing. Good process control should ensure that leadership, group norms, and organizational structure facilitate, rather than hinder, group process.

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9 As stated in the Institute of Medicine guidance on Antivirals for Pandemic Influenza (IOM, 2008), “Judgments about the optimal allocation of scarce resources are value judgments.”
The tool focuses on two aspects of process control:

- **Managing decision-making resources** includes recognizing who needs to be involved in the decision, delegation and decision-making authority, a focus on critical decisions, adherence to a decision-making time line, and maintenance of the speed and effort devoted to decision making appropriate for the time line.

- **Engagement of multiple perspectives** includes acknowledging expertise, discussing and sharing information known only to specific individuals, and encouraging multiple perspectives.

Decision process management is a key component of effective decision making. Having the appropriate people present (e.g., legal authorities, those with intellectual and practical experience) is necessary to well-informed decisions and ensures key stakeholder buy-in (Sniezek, 1992; Hackman, 2002). Process control is facilitated by stakeholders’ awareness of relevant data, comprehension of those data, and ability to project into the future (e.g., Endsley, 2000; Weick and Roberts, 1993).

Also important are clear guidance concerning decision-making authority and understanding of the chains of authority. Both are critical for appropriate delegation and a clear understanding of when a decision has been made (Yates, 2003). Leadership is one source of process control, along with group norms and organizational structure, and as such can facilitate good (or bad) group decision-making processes (e.g., Larson et al., 1996; Peterson, 1997; Wittenbaum, Hollingshead, and Botero, 2004). Such leadership and structure were evident in one example from an expert practitioner, in which delegation of decision-making authority allowed for initiative at lower levels, thus freeing the incident commander to communicate more with external stakeholders.

Left to their own devices, groups do not use available or accessible information optimally. For example, group discussions often focus on information already known by all group members, rather than on information known to specific individuals (e.g., specialized experts) (Stewart and Stasser, 1995; Stasser and Titus, 1985). This phenomenon was highlighted in the U.S. Senate Report (2006), which cited a lack of recognition of specialized experts, and was described further by Ringel et al. (2007):

Some communications problems during Hurricane Katrina were due, not so much to technical failure on the part of the communications infrastructure, but to a lack of coordination between the relevant parties, whether within public health agencies or between public health and other public or private entities. For example, in some cases, one part of the health department did not know what another part was doing, leading to a duplication in tasks. In other cases, hospital administrators noted that they had received multiple visits by public health personnel asking them to fill out the same paperwork multiple times.

In a group or team decision-making environment, explicit acknowledgment of individual stakeholder expertise can help to alleviate this tendency (Stasser, Stewart, and Wittenbaum, 1995). Diverse groups also tend to consider a broader range of perspectives and are less likely to make extreme decisions (e.g., Isenberg, 1986; Schulz-Hardt, Jochims, and Frey, 2002); and dissent promotes the testing of underlying assumptions, the exploration of alternative strategies, and the modification of current strategies. However, the level of deliberation and dissent must
be appropriate to the decision-making situation, reflecting both the speed required for effective response and the importance of the decision. This point was emphasized by more than one expert practitioner consulted on the project and was also highlighted in GAO (2006) testimony following Hurricane Katrina:

In a catastrophe, streamlining, simplifying, and expediting decision making should quickly replace “business as usual” and unquestioned adherence to long-standing policies and operating procedures used in normal situations for providing relief to disaster victims.

**Final Sections of Assessment Tool Collect Information on Observers and Context**

Understanding the context in which an assessment is completed will be critical in how it is interpreted, and comparisons across assessments will be clearest for exercises or incidents that are similar. To provide context for the decision-making assessment, final sections of the tool collect information about the individual(s) observing and providing ratings, as well as the context in which the ratings were made (i.e., the scale, scope, and velocity of an exercise scenario or incident). *Information about the observer* includes the individual’s experience with PHEP, ICS, and the particular type of incident; his or her experience with both exercises and real incidents (in general); and his or her expertise within public health. *Contextual information* includes whether the data for the tool were collected from an exercise or real incident; the time, date, and location of the exercise or incident; the number and appropriateness of people involved; the objectives/decisions evaluated; and a brief written description of the exercise or incident.

Collecting information of this type will help in the analyses and interpretation of data from the assessment tool. This information will facilitate restricting the comparisons of assessments to those from similar events or incidents, or will, alternately, help to guide post hoc adjustments that might be required to take into account particularities of exercises and evaluators. For example, comparing data from different exercises might be more valid than drawing comparisons between data collected at exercises and that collected during real events. Similarly, comparing data from exercises simulating incidents of similar magnitudes and time lines might be more valid than other comparisons.
4. HOW SHOULD THE ASSESSMENT TOOL BE USED?

This chapter offers suggestions for using the assessment tool, including the following:

A description of the broad contexts in which the tool might be used

A description of the role and qualifications of the observers--i.e., those who use the tool to rate decision-making performance

An illustration of how the tool might be used to assess decision making related to an SNS request and implementation.

The Assessment Tool Is Designed for Use with Exercises or Real Events

The assessment tool is designed to be used in a variety of situations, but it will be most effective when PHEP staff are dealing with complex decisions that require deliberation. Decisions that involve substantial, observable deliberation will provide the best opportunities for applying the tool (see Chapter 3). In contrast, decision situations that have been foreseen and are completely spelled out in existing plans would not provide an accurate picture of response decision making. As described in more detail below, this focus has implications for exercise design.

The tool can be used to assess decision-making performance both during exercises and in real emergencies. However, the tool will be easiest to use during an exercise, since, under a simulated scenario, it is more likely that observers can anticipate where and when key decisions will take place. This anticipation can be most readily accomplished by inspecting the Master Scenario Events List (MSEL) in advance (DHS, 2007a).

Observers Should Determine the Scope of Observation

One decision that should be made by observers ahead of time is whether (or to what extent) to apply the assessment tool to individual decisions, operational periods, the entire exercise or incident, or some combination of all these. Some tool sections (notably, Process Control) may lend themselves to more global assessments, whereas other sections (notably, Action Planning) may apply readily to individual decisions.

Another option is to apply the tool to each operational period, as represented by the planning “P” of the Operational Period Planning Cycle in NIMS (DHS, 2007d). The items in the tool are worded such that they can refer to new situations (or action plans) or to updates of preexisting situations (or action plans). In this sense, the tool is designed to complement ICS/NIMS by targeting the “how” for decision making in the various stages of the planning cycle.

To give a proper context for the rating, a question before each section of the tool asks the observer to indicate the level of assessment (global, operational period, specific decision). We recommend that this process be planned out prior to the exercise, with multiple copies of the tool printed as needed.
The decision to apply the tool at a particular level will depend on the nature of the exercise or incident, the goals of the assessment, and the specific tool section. Many exercises or incidents will have predictable decisions of high significance (e.g., decisions to request SNS, close schools, alter the standard of care). In an exercise, the observer may choose to focus on just these discrete decisions, to the extent that such a focus reflects the goals of the exercise. In a real-world incident, a decision-specific assessment might reflect a desire to collect targeted lessons learned. In contrast, assessments that focus on operational periods or an entire incident can draw out larger trends by aggregating across specific decisions. Such aggregation may be more appropriate if general decision making is the focus, rather than specific decisions.

The Assessment Tool Is Designed for Prospective Use

Although, in theory, the assessment tool could be used after an exercise or real event as a means of evaluating performance retrospectively, doing so is not ideal. Retrospective accounts are less reliable than are those collected prospectively. Similarly, to the extent possible, assessments should be based on observed behaviors (e.g., overt discussion) rather than on inferences about unobserved processes (Ericsson and Simon, 1980; Nisbett and Wilson, 1977).

Used prospectively, results from tool-related observations should provide valuable information for construction of AARs. Aggregation across specific decisions (e.g., three different decisions selected in advance from the MSEL) could be used to look for common strengths and weaknesses, as well as to try to identify root causes of deficiencies (e.g., deficient plans, cultural issues). At this early stage, no formal procedures have been developed for numeric aggregation, but comparison across decisions should allow for the extraction of common themes.

The Assessment Tool Is Currently Designed for Process Improvement, Not Accountability

It is important to emphasize that, given the early stage of development, the assessment tool is intended to facilitate improvement, not to test and rate health-department performance for purposes of accountability. Additional testing and development will help ensure the level of interrater reliability necessary to obtain comparable measurements across sites. Ideally, the tool should be used on several occasions—first, to establish a performance baseline and identify areas for improvement, and then to track improvement. Regular use of the tool will help identify common points of reference across exercises and events and should facilitate analysis of improvement over time.

The Assessment Tool Can Be Used by Both External and Internal Evaluators

The assessment-tool ratings are most likely to reflect actual capabilities if the tool is administered by an external evaluator, particularly if the external evaluators can provide broad substantive expertise and experience to be able to reasonably evaluate decision-making capabilities. External observers are also more likely to be able to maintain an objective perspective, since they are not evaluating their close colleagues. Having an external observer also obviates the need to draw a key staff member (i.e., one who would most likely be involved in a real response) away from exercise participation into an observer role.
However, self-assessments may also be of value, particularly for process-improvement efforts, and the reduced burden of drawing the evaluator from the health department’s own staff could increase the ease and frequency of assessments. In such cases, it is recommended that the evaluator have sufficient experience to be able to reasonably evaluate a dynamic, multidisciplinary emergency response. An internal observer should also have enough seniority to feel comfortable providing feedback to participants at all levels.

**Observers Should Have Some Prior Knowledge of Public Health Emergency Decision Making**

Observers who administer the tool will need an understanding of and experience in crisis decision making. Examples and other materials in Appendix C (Additional Technical Detail) provide guidance on using the tool to evaluate performance, but it is not possible to fully specify what will count as evidence for each item in a given context. Some judgment will be required as well.

Furthermore, an individual with deep and broad public health and ICS experience will be more able to inspect the scheduled exercise events (e.g., as represented in the MSEL), pulling out points where difficult decisions should be (and are hopefully more likely to be) deliberated. For example, in one of the functional-exercise observations, the official evaluator (a former incident commander for a nearby jurisdiction) was able to quickly point to specific points in the MSEL as likely to require decisions worthy of in-depth deliberation. Such decisions can be focal points for the assessment. Observers with crisis decision-making experience are also likely to be able to provide greater insight into observations (e.g., through a better understanding of what is “appropriate” or should be expected), and, as real practitioners in the field, they can lend authority to findings.

Using multiple evaluators to provide added validity is recommended. One evaluator might have public health/medical knowledge while another brings experience in emergency management, fire, and law enforcement. Evaluators might also have significant experience managing responses to emergent events. Given the complexity of Emergency Operations Centers (EOCs) and Department Operations Centers (DOCs)—both potential locations for observation—the use of multiple evaluators could also facilitate simultaneous observation in multiple sections of the room.

**Modest Preparation Will Facilitate Use of the Assessment Tool**

Prior to using the assessment tool, observers should study it to ensure familiarity with the items to be evaluated. Observers should also study the MSEL to ensure familiarity with the exercise itself. It might be helpful to consider the examples provided in Appendix C, highlighting or adding evidence to look for.

An even more-effective strategy might be to build tests of the constructs enumerated in the tool into the actual design of the exercise. Such predetermined decision points should create situations in which a complex decision requiring group deliberation is required. Adding unexpected contingencies may be a good vehicle for accomplishing this situation, because it will “stress the system” by breaking the group out of the flow of events predicted by existing plans.
Such a strategy applies a more stringent test of response capabilities and provides a better environment for decision-making observation.

During the exercise, observers should make notes on performance. If specific decisions have been identified beforehand, the assessment tool (or portions of it) may be completed for each of them. The assessment can then be finalized after the exercise, with an additional copy of the completed assessment tool representing total exercise performance.

**Illustration Using SNS Request Decision**

To illustrate evidence that would be considered in completing the assessment tool, we present the following example, which focuses specifically on decision making surrounding an SNS request and implementation. For simplicity’s sake, not all items are illustrated. Rather, those most relevant to SNS are highlighted, providing examples of processes that are “completely sufficient” and those that are not. In practice, specific evidence will be dependent on the exercise or incident. Appendix C includes further examples.

For this illustration, consider a functional exercise taking place in a health department’s DOC. The scenario consists of a pandemic disease that is spreading through the United States but that has only recently begun to materialize locally. The incident commander (IC) and other decision makers start the exercise with outside information regarding affected populations (including local pockets of disease and extensive spread throughout a neighboring state), the infectious nature of the disease, and the fact that the spread of the disease has not yet begun to degrade services locally. The evaluator completing the tool is the head of Epidemiology from a neighboring health department, who has herself acted as incident commander in both exercises and a real meningitis outbreak.

Throughout the exercise, the evaluator moves around the DOC observing conversations, but spends most of her time shadowing the IC, who often confers closely with the planning chief. Among the other observations that she makes, the evaluator takes particular note of an early discussion of what information is needed to make decisions but is not yet available. The IC and other decision makers (in this case, the planning, logistics, and operations chiefs) extensively discuss sources of uncertainty (including the veracity of local reports and future disease spread), but stop short of determining which pieces of information should be sought first, leaving them with a somewhat vague plan for gathering that information. Table 4.1 highlights the evaluator’s observations.

<table>
<thead>
<tr>
<th>Score</th>
<th>Item</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ASSESSING THE INCIDENT. Relevant decision makers discussed:</td>
<td>d. Potential countermeasures</td>
<td>Decision makers explicitly discuss what countermeasures may be appropriate and potentially available for the specific disease, including initiating a formal request for SNS assets.</td>
</tr>
<tr>
<td>Completely Sufficient</td>
<td>f. Unknown information likely to affect the understanding of or response to the situation</td>
<td>Decision makers explicitly identify pieces of information they would like to have before making a final SNS-request decision, including additional lab results and more-specific spread forecasts, but do not prioritize which information is most critical.</td>
</tr>
</tbody>
</table>
As the exercise progresses, discussion focuses on whether to initiate a request for SNS assets, and the evaluator notes to what extent decision makers go through each of the action-planning processes listed in the assessment tool (excerpts in Table 4.2). The evaluator notes that, whereas the decision makers consider the consequences of requesting SNS and weigh the pros and cons of each course of action, the group displays some confusion over what the exact policy is for requesting SNS. The evaluator notes that a copy of the local plan is not even in the room. One notably successful exchange, however, regards contingency plans in case SNS materiel does not arrive in the assumed 12-hour time interval.

Throughout the exercise, the evaluator noted that insufficient attention was paid to making decisions in a timely fashion. Instead, decision makers often continued to deliberate issues without clear consideration of the relative importance and urgency of a decision. The evaluator noted that, in a real event, such deliberation could potentially hamper response efforts. In contrast, the evaluator also noted that the incident commander made a concerted effort to engage multiple perspectives in important decisions, drawing on the expertise around him. However, since such engagement often contributed to inappropriately prolonged discussion, the evaluator judged this process to be only “mostly sufficient” (summarized in Table 4.3).

### Table 4.2
**Sample Action-Planning Evidence**

<table>
<thead>
<tr>
<th>Score</th>
<th>Item</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somewhat Sufficient</td>
<td>a. Discussed relevance (or need to adapt) pre-existing plans, policies, and procedures</td>
<td>When deciding whether or not to request SNS, decision makers disagree on what the formal process is. A copy of the local plan is not in the room, delaying resolution of the debate.</td>
</tr>
<tr>
<td>Completely Sufficient</td>
<td>e. Identified contingency plans to address deviations from key assumptions in Item 5d</td>
<td>Decision makers note that it is assumed that initial push packs will arrive 12 hours after request, and that materiel needs to be distributed to PODs within 12 hours of that. They discuss plans for expedited RSS if push packs arrive later than anticipated. Decision makers also discuss having other PODs ready to open if some are overwhelmed by demand surge.</td>
</tr>
</tbody>
</table>

### Table 4.3
**Sample Process-Control Evidence**

<table>
<thead>
<tr>
<th>Score</th>
<th>Item</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Sufficient</td>
<td>f. Spent an appropriate amount of time on deliberations, given the speed required for an</td>
<td>Decisions needed to be made on a quick time line, if only provisionally, so that response efforts could proceed. However, in several instances, deliberation extended far beyond what was</td>
</tr>
</tbody>
</table>
8. ENGAGING MULTIPLE PERSPECTIVES. Consistent with the incident time line, relevant decision makers:

<table>
<thead>
<tr>
<th>Mostly Sufficient</th>
<th>c. Encouraged full range of views</th>
<th>At several points, the IC explicitly asked for dissenting opinions, often addressing specific individuals. “What could go wrong with this approach?” “Are there better ways of accomplishing these objectives?”</th>
</tr>
</thead>
</table>
5. CONCLUSION AND NEXT STEPS

Although crisis decision making for public health emergencies is a key capability, public health practitioners have lacked tools to define, measure, and improve it. This report has described an initial attempt to create a paper-and-pencil assessment tool for evaluating decision making. The tool is intended to help identify the key components of crisis decision making and provides a feasible approach to measurement based on ratings of practitioners.

The approach taken here has several limitations. Perhaps most notable is the need for further field- and pilot-testing, as well as the development of a solid evidence base. We take up this issue in the next section. The tool also relies exclusively on observable behaviors, providing a low-tech tool that can, in principle, be administered without significant additional resources. However, since aspects of decision making can occur without being directly observable (e.g., at the individual level) or out of sight of the observer (e.g., in distributed groups), this approach is necessarily limited. Finally, it is as yet unknown what effect “training to the criterion” might have. In principle, training to score better on the assessment tool should improve decision-making processes, to the extent that we have identified key criteria or dimensions of decision-making quality. However, we do not yet know where to set thresholds (i.e., how much is enough). Care needs to be taken to avoid excess deliberation (a point explicitly incorporated into items on the process-control sections of the assessment tool), and empirical work to address excess deliberation should involve both field- and laboratory-based approaches.

This tool is best suited for exploratory analysis. Future testing and refinement might provide a tool ready for quality improvement and accountability. The assessment should help pave the way for more-systematic investigation of a critically important topic.

Although the tool was designed for use in measuring crisis decision making for public health emergencies, and primarily for use at the local and state levels, it could have applications at the federal level and beyond PHEP, such as other areas of homeland security and emergency management.

Next Steps Include Field-Testing, Pilot-Testing, and Building an Evidence Base

Initial field-testing. Before formal pilot-testing, the assessment tool should go through a more formative field-testing process. The goal of such testing should be to go beyond the preliminary observations and reality tests conducted so far and to further engage practitioners in actually using the tool. Such field tests should target the feasibility of using the tool and would provide feedback on the types of revisions that would make it more useful. In particular, the current tool addresses many important (but perhaps subtle) decision-making concepts. Clarity to an untrained user remains largely untested and should be addressed in formal pilot testing. More-stringent tests of the reliability of the tool across applications and raters, as well as the extent to which the tool accurately picks up differences in real-world decision-making processes (i.e., its validity), should be reserved for more-formal pilot testing.

Following the suggestions in Chapter 3, the field tests should examine interpretation and use of the response scale (e.g., for reluctance to rate colleagues less than completely sufficient), considering alternative scales. Following the guidelines outlined in Chapter 4, the field tests should focus on exercises in which there is a clear need to make difficult decisions. To build in
such decisions, discussions with exercise designers should precede field-testing, where possible. The testing would be facilitated by the addition of unexpected contingencies and the need to draw on diverse perspectives.

Preferably, one or two skilled observers will be recruited at each site to use the tool to evaluate performance on an exercise. As stated previously, these observers should be selected because they have some prior knowledge in public health emergency decision making. They could receive brief training ahead of time in using the tool, but should otherwise be allowed to use it as they would naturally. Field tests will also benefit from inclusion of expert raters--ideally, one to shadow a local observer and another to fill out the tool independently of the other two. This multiplicity would provide opportunities to get preliminary insight into important aspects of interrater reliability by (1) comparing the ratings provided by those with and without deep knowledge of the tool (but observing the same behaviors), and (2) comparing two independent observations of the same exercise (which will not necessarily focus on the same, exact behavior). These comparisons could be analyzed using intraclass correlations, along with a more qualitative comparative analysis.

It is possible, however, that interrater reliability at this level may not be desirable or expected. Because an EOC or other crisis decision-making setting is often complex and distributed, a single observer will witness only a sample of observable behavior. Multiple observers, as described above, would therefore see different sets of behaviors, potentially leading to different ratings. If so, average ratings across observers would be called for, as a means of obtaining a more reliable sample of behavior. To test whether such averaging is necessary, two teams of observers could be used, so that interrater reliability could be compared at the individual-rater level as opposed to across the two team averages.

More-formal pilot-testing. More-formal pilot-testing would involve a greater (but still manageable) number of observations, sampled across a modest number of jurisdictions. Jurisdictions should be sampled to provide a robust picture of the assessment tool’s performance across diverse locations (e.g., large and small, rural and urban). The design should also build in repeated assessments, if possible, to determine the ability of the tool to capture changes over time, the feasibility of multiple assessments, and utility for quality-improvement activities. Also important, pilot tests could lay the foundations for building an evidence base regarding decision-making capabilities. For example, Hallmark and Crowley (1997), in their examination of tank command, identified a clear link between planning and the ability to execute. Similar insights should be targeted with respect to public health emergency decision making.

Building an evidence base. Subsequent research should seek to validate the assessment tool, going beyond whether the tool appears to measure what it is intended to measure (face validity) and how it correlates with similar measures (concurrent validity). A critical exercise, reflecting Figure 2.1, will be to connect decision-making processes with decision outcomes. As noted, PHEP outcomes are (thankfully) rare, but such rarity poses challenges for validating the tool through prediction of real outcomes (predictive validity). Therefore, long-term data-collection strategies should be implemented. Definition and measurement of outcomes also need greater precision, and alternative characterizations of “outcomes” may help. For example, intermediate events (e.g., close calls, as with hurricanes, or first waves, as in the recent spring 2009 H1N1 influenza outbreak), while smaller from a public-health perspective, could provide the greater frequency needed to establish whether assessed decision making predicts real-world
outcomes. Another strategy would be to examine more-frequent public-health analogs, such as foodborne outbreaks.

**Other Tools Might Be Developed to Support Quality Improvement**

With modifications, the tool may be useful as a real-time decision aid or operational tool. The tool is designed to map onto a logical decision-making flow, similar to CRM checklists used in aviation. The idea here would be to build into the decision-making process the completion of a bulleted list of items (literally, by checking them off) as each step is accomplished. Note that not all of the items in the current tool represent concrete steps. In particular, many of the process-control items are presumed to operate throughout the decision-making process, so these items would need to be addressed differently in such an operational checklist. And, as noted above, attention should be given to unintended consequences of training to the test.

The current tool is designed specifically to assess response decision making, but as has been noted several times, many critical public health emergency decisions can be anticipated and should be considered in advance (e.g., Fischhoff, Dombroski, and Fischbeck, 2006; Florig and Fischhoff, 2007). In other efforts, RAND is pursuing this strategy by designing workshop-based tools for plan improvement that are focused on considering these critical public health emergency decisions in the planning process.

Another possibility would be to develop evidence-based interventions to help address problems revealed by the assessment tool. For example, the robust literature on process control in decision making (some of which is summarized in Appendix B) includes a number of countermeasures for well-known departures from optimal group decision making (e.g., incorporating natural diversity in perspective as a means of encouraging consideration of disconfirming evidence). These findings have often been validated empirically using experimental and other methods. Also, best practices in situational awareness and action planning can be derived from the literatures on organizational reliability and naturalistic decision making. Whereas the empirical evidence here is sometimes more case-driven (and, hence, methods can be less transparent and generalizability is unknown), the content-rich approaches lend a large degree of face validity.

Finally, computer-based simulation approaches could provide alternative methods for measuring crisis decision making in public health emergencies, in addition to offering practice for real events. These methods, while costly to produce, are often far less costly to administer, which greatly enhances the frequency with which they can be used (a clear benefit for process improvement). Moreover, simulations allow evaluators to gauge decision making against simulated health outcomes. Additionally, they allow for greater standardization, facilitating comparisons across assessments and locations. However, standardization comes at the cost of reduced ability to tailor assessments to the specific needs of the location at that time. Simulations may also be less flexible in the face of changing assumptions, which, for example, occurred as a result of Hurricane Katrina.

**Summary**

Public health emergency management involves making a multitude of difficult decisions, and decision making can be viewed as the capability that ensures other capabilities. Efforts to
improve crisis decision making in public health emergencies have been limited by a clear definition of good decision making and a lack of tools for measuring and improving it in practice. The Public Health Emergency Response Decision-Making Assessment Tool presented in Appendix A is a complement to NIMS and ICS. NIMS/ICS define the who, what, where, and when of public health emergency decision making, but provide few specifics on precisely how key decisions should be made.

The assessment tool is a preliminary attempt to fill this need, but one that is grounded in the academic literature, conversations with practitioners, modeling of the process flow of key decisions, review of AARs, and observations of actual exercises. The approach taken by the tool focuses on decision-making processes, rather than on inputs, outputs, or outcomes; hence, it provides a platform for process improvement. Future work should extend the development presented here through field-testing and pilot-testing.
This tool is designed to help assess and improve the quality of public health emergency decision making in exercises and real incidents. It provides a basis for evaluating crisis decision making that involves complex issues for which existing plans do not provide sufficient guidance and should be used in situations for which group deliberation is needed. It is recommended that at least three to five decisions form the basis for assessment. Items in the tool focus on evidence-based processes that apply to a wide variety of decision contexts, including, but not limited to, the decision to request SNS materiel, to allocate scarce resources, to close schools, and so on. The tool should provide a basis for both assessment and process improvement, but it has not been validated for use as an accountability tool.

The tool should be administered in real time by external observers who have familiarized themselves with the items ahead of time. During the exercise or incident, observers should take notes on relevant processes as they occur, and then review and finalize ratings after the exercise or incident. Alternately, observers could complete the tool after the exercise or incident (although the unreliability of memory makes this a less preferred option). All scoring should be based on overt discussions (although observer perceptions may be noted in the space provided for each item). Additional technical detail, including justifications for each item and sample evidence, is provided in a companion document.

Each section may be completed for (a) the overall exercise or incident, (b) a single operational period, or (c) a specific decision within the exercise or incident. Action planning, in particular, may be more appropriately applied to specific decisions, with summary ratings made after the exercise or incident. In this case, it is recommended that multiple copies of each section be printed ahead of time and completed as necessary.

**Caveat:** This tool is a DRAFT that is currently in development. As such, the structure, items, examples, and response scales are evolving based on feedback.

<table>
<thead>
<tr>
<th>Scoring:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: Should have been done, but was not</td>
</tr>
<tr>
<td>1: Not sufficient</td>
</tr>
<tr>
<td>2: Somewhat sufficient</td>
</tr>
<tr>
<td>3: Mostly sufficient</td>
</tr>
<tr>
<td>4: Completely sufficient</td>
</tr>
</tbody>
</table>

| N/A: Not applicable to this situation (requires brief explanation) |
| N/D: Not able to determine |

**Key terms:**
- **Sufficient.** The action/activity was complete and timely enough so that the assigned tasks and/or response could be accomplished. Exemplary efforts that go beyond completely sufficient may be described in the notes section.
- **Relevant decision maker(s).** Those who, in the observer’s judgment, should be involved in the decision at hand. The tool does not assume that all present will or should be involved in every facet of decision making.
0 = should have been done, but was not, 1 = not sufficient, 2 = somewhat sufficient, 3 = mostly sufficient, 4 = completely sufficient

N/A = not applicable to this situation (requires explanation), N/D = not able to determine

**Situational Awareness**: Attention to and interpretation of threats/vulnerabilities and knowledge of resources; involves identifying and testing assumptions, recognizing uncertainties, and predicting the future development of the incident.

These ratings are of: the entire exercise/incident, one operational period, a specific decision (specify):

<table>
<thead>
<tr>
<th>Score</th>
<th>Item Notes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ASSESSING THE INCIDENT. Relevant decision makers discussed:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>a. Number &amp; location of people affected by the incident</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>b. Agent/cause of the incident</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>c. Severity of the incident</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>d. Potential countermeasures</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>e. Time line for responding to the incident</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>f. Unknown information likely to affect the understanding of or response to the situation</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>g. Strategies for gathering information to address unknowns in Item 1f</td>
<td></td>
</tr>
<tr>
<td>2. DETERMINING PERSONNEL (staff and volunteers). Relevant decision makers discussed:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>a. Number/skill mix of personnel needed for optimal response to the incident (above and beyond those currently deployed)</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>b. Number/skill mix of personnel currently available for deployment</td>
<td></td>
</tr>
<tr>
<td>3. DETERMINING NONPERSONNEL RESOURCES (materiel, supplies, equipment, facilities). Relevant decision makers discussed:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>a. Nonpersonnel resources needed for optimal response to the incident (above and beyond those currently deployed)</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>b. Nonpersonnel resources currently available for deployment</td>
<td></td>
</tr>
</tbody>
</table>
0 = should have been done, but was not, 1 = not sufficient, 2 = somewhat sufficient, 3 = mostly sufficient, 4 = completely sufficient
N/A = not applicable to this situation (requires explanation), N/D = not able to determine

### 4. PROJECTING FUTURE CHANGES

Relevant decision makers explicitly discussed predictions about future changes in:

<table>
<thead>
<tr>
<th>Score</th>
<th>Item</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>a. Number/location of people affected</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>b. Need for and availability of response personnel</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>c. Need for and availability of nonpersonnel resources</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>d. Strategies to deal with resource shortfalls</td>
<td></td>
</tr>
</tbody>
</table>
**Action Planning:** Identifying, evaluating, and selecting among options designed to mitigate or control the health effects of the incident, including planning for contingencies. Action planning also involves specifying and assigning responsibility for tasks.

These ratings are of: the entire exercise/incident, one operational period, a specific decision (specify):

<table>
<thead>
<tr>
<th>Score</th>
<th>Item</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. DEVELOPING, EVALUATING, AND SELECTING AMONG OPTIONS. Relevant decision makers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>a. Discussed relevance (or need to adapt) pre-existing plans, policies, and procedures</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>b. Discussed possible courses of action</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>c. Discussed likely consequences of alternative courses of action</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>d. Discussed assumed pros and cons involved in alternative courses of action (e.g., speed versus accuracy in prophylaxis dispensing)</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>e. Identified contingency plans to address deviations from key assumptions in Item 5d</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>f. Clearly stated a decision (or provisional decision) and how it will be communicated to stakeholders.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. INITIATING EXECUTION. Relevant decision makers discussed:</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>a. A concrete list of key steps required to execute the decision(s)</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>b. Responsibility and time lines for completion of key steps in Item 6a</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>c. Trigger points for initiating key actions</td>
<td></td>
</tr>
<tr>
<td>0 1 2 3 4 N/A N/D</td>
<td>d. Signals that will indicate a failure (or potential failure) in the current strategy</td>
<td></td>
</tr>
</tbody>
</table>
**0** = should have been done, but was not, **1** = not sufficient, **2** = somewhat sufficient, **3** = mostly sufficient, **4** = completely sufficient

**N/A** = not applicable to this situation (requires explanation), **N/D** = not able to determine

**Process Control:** Structuring group discussion to ensure adequate information processing; leadership, group norms, and organizational structure can all facilitate or hinder process control.

These ratings are of: the entire exercise/incident one operational period a specific decision (specify): _________________________

<table>
<thead>
<tr>
<th>Score</th>
<th>Item</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. MANAGING DECISION-MAKING RESOURCES. Leaders and other relevant decision makers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
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<tr>
<td>0</td>
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</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8. ENGAGING MULTIPLE PERSPECTIVES. Consistent with the incident time line, relevant decision makers:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
INFORMATION ABOUT OBSERVER

1. Number of years of experience in emergency response and/or public health emergency preparedness: ______

2. Number of years’ experience with ICS: ______

3. ICS roles/sections that you have experience in (check all that apply):
   - _____ Incident Commander
   - _____ Liaison Officer
   - _____ Logistics Section
   - _____ Public Information Officer
   - _____ Operations Section
   - _____ Finance/Administration Section
   - _____ Safety Officer
   - _____ Planning Section
   - _____ None of the above

4. Relative to other public-health first responders, how knowledgeable/experienced are you with this type of incident (e.g., anthrax, pandemic flu)?
   - 1 Much Less
   - 2 About Average
   - 3 Much More
   - 4 Experienced

5. In the past year, how many exercises have you participated in:
   - As a player: ______
   - As an evaluator: ______

6. How many incidents have you been involved in that required ICS: ______

7. Primary field(s) of expertise (check all that apply):
   - _____ Public Health (PH)
   - _____ Medicine
   - _____ Fire
   - _____ PH, Administration
   - _____ Nursing
   - _____ Police
   - _____ PH, Environmental Health
   - _____ Pharmacy
   - _____ Academia
   - _____ PH, Epidemiology
   - _____ Emergency Management
   - _____ Other: ___________________
   - _____ PH, Health Education
   - _____ EMS
INFORMATION ABOUT EXERCISE OR INCIDENT

1. This was an: Exercise: ______ Real Incident: ______

2. Date of the exercise/incident (mm/dd/yyyy): __________

3. Day of the week of exercise/incident (note if this is a holiday): __________

4. Exercise/incident start time (24-hour clock time HH:MM, e.g., 13:00): __________

5. Exercise/incident end date (date the drill will be declared done, mm/dd/yyyy): __________

6. Exercise/incident end time (time the drill will be declared done (24-hour clock time HH:MM): __________

7. Location of exercise/incident: ____________________

8. Number of relevant decision makers: ______, and if an exercise, number of evaluators: ______

9. Roles of relevant decision makers involved in the exercise/incident:

10. To what extent were all relevant decision makers present during the exercise/incident:

   1 2 3 4 5
   Few were present Some were present All were present
11. If decision makers were at multiple locations, systems used for communication among decision makers:

12. Main objectives of this exercise/incident:

13. To what extent did decision makers address exercise/incident objectives:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Few were addressed</td>
<td>Some were addressed</td>
<td>All were addressed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. Key decisions evaluated using the tool:

15. Brief written description of the exercise or incident:

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
APPENDIX B.
SUMMARY OF THE EMPIRICAL EVIDENCE BASE BEHIND THE ASSESSMENT TOOL

This appendix provides additional detail concerning the research base used in developing the assessment tool described in this report. It first summarizes the literature used in developing the general tool and selecting the processes included in the tool. It then describes the research base related to the selection of items in the process-control, situational-awareness, and action-planning sections of the tool.

Tool Development Drew Upon Both Normative and Descriptive Approaches to Decision Making

In designing the assessment tool, we sought a balance between relying on normative models of how decisions should be made under ideal circumstances and descriptive and behavioral approaches that reflect more faithfully how decisions are actually made in real-world contexts. The need for descriptive approaches is especially acute in the study of crisis decision making for public health emergencies, which typically involve complex tasks, uncertainty, and multiple objectives.

Perhaps the most fundamental normative model is decision analysis (e.g., Raiffa, 1968), which seeks to “help a decision maker think systematically about complex problems and to improve the quality of the resulting decision” (Clemen, 1991, p. 9). This model starts by identifying the basic elements of a decision, including relevant options, the potential consequences of those options, the value or utility of each consequence, and the uncertainties related to those consequences. An algorithm is then used to combine all this information into a final choice. Key to decision analysis is an “expected utility framework,” which weights the perceived value (or utility) of consequences by their likelihoods, summing these products into an aggregate expected utility for each option.

In contrast, more-descriptive approaches to studying decision making have focused on behaviorally realistic characterizations of how people actually make decisions (e.g., Edwards, 1954; Fischhoff and Beyth-Marom, 1983). These frameworks note that people are rarely as systematic and rational as the processes portrayed in normative models. Instead, people often rely on mental shortcuts, or heuristics, that reduce the cognitive effort of complex decisions (Kahneman and Tversky, 1979; Simon, 1978)--particularly when they are under intense pressure to make high-stakes decisions quickly (Yates, 1990), as is often the case in crisis decision making. Unfortunately, heuristics are not optimal; at times, they can open decision makers to systematic biases (additional biases imposed by groups of decision makers are considered in the next section).

The structure of the assessment tool draws on the basic elements of normative models of decision making; the choice of specific constructs was informed by the descriptive/behavioral approaches.
Common Frameworks Helped Identify Key Decision-Making Processes

Other decision-making models have focused on key processes that need to take place in most deliberative decisions of any complexity, combining the structure of normative models with features of real-life decision making that are not reflected in normative models. For example, Parker and Fischhoff (2005) drew on this literature to identify five core sets of decision-making skills, including the structuring of decisions, the assessment of beliefs about states of the world, the assessment of preferences for those states, the integration of beliefs and preferences into a coherent decision, and an individual’s understanding and management of his or her decision processes. This framework has been used successfully to measure individuals’ decision-making competence (Bruine de Bruin, Parker, and Fischhoff, 2007; Parker and Fischhoff, 2005), and it provides much of the motivation behind selecting the processes targeted by the assessment tool.

Specifically, this generalized set of decision-making processes was adapted for groups of individuals making decisions under crisis. Much of the situational-awareness section of the tool reflects the assessment of knowledge (essentially, beliefs about states of the world). Action planning targets systematic decision-making processes, decision structuring, the incorporation of values, and making the final decision. Process control reflects higher-level management of resources and information, analogous to aspects of individual decision-making competence.

Process Control: Laboratory Studies Show That Decision Making in Groups Has Both Benefits and Costs

Crisis decision making in public health emergencies is characterized by the need to incorporate groups of people into the decision-making process, and often these people have diverse backgrounds and areas of expertise. In part, the diversity of perspectives can be beneficial, since, for several reasons, groups have the potential to make better decisions than those same individuals could if acting alone (Hackman, 1987, 2002). For example, groups provide the opportunity for more-effective problem solving and error-checking (McGrath, 1984; Shaw, 1932). Groups can also be more efficient because of the division of labor (Surowiecki, 2004), a principle reflected in the ICS structure. Groups can capitalize on multiple perspectives (McGrath, 1984; Laughlin, 1999), can mentor new decision makers (Hackman and O’Connor, 2004; Straus and Olivera, 2000), and can increase buy-in from stakeholders (Hackman, 2002; Sniezek, 1992)--all of which would likely be amplified in situations in which an individual decision maker had limited expertise (e.g., someone new to the job). Such benefits of group interaction have come to be known as process gains.

However, these process gains are all too often limited by process losses--ways in which groups degrade decision making (Steiner, 1972). One way in which groups of decision makers often underperform is in the sharing of information among group members. Many studies have shown a tendency for group discussion to dwell on information already known to all group members (so-called common knowledge), rather than on information known to only select group members (so-called specific knowledge). This phenomenon, which has come to be known as the common knowledge effect (Gigone and Hastie, 1993; Stewart and Stasser, 1995; Stasser and Titus, 1985), can be damaging in situations in which adequate solutions to the problem depend

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10 Common, as used here, refers to the knowledge being shared, rather than to everyday events.
especially on the sharing of specific information—arguably the case with public health emergency decisions that rely on diverse expertise across multiple disciplines.

This effect has been studied extensively in the laboratory, where problem-related information is distributed unevenly among group members, so that no one individual has all the information necessary to solve the problem—the so-called *hidden-profile paradigm* (Stasser, 1988). This sort of situation gives groups the opportunity to outperform individuals, since the combined group has strictly more information relevant to the solution than any individual. Unfortunately, most studies show that groups rarely solve the problem of sharing information, instead basing their decisions on common rather than specific knowledge (Gigone and Hastie, 1993; Greitemeyer and Schulz-Hardt, 2003).

The common-knowledge effect is addressed in the assessment tool through items on recognizing expertise and incorporating specific knowledge (both in Process Control, Items 8a–b).

Groups also tend to exacerbate individual-level tendencies to focus on evidence that confirms assumptions, rather than on information that could potentially shed light on false assumptions—a phenomenon called *confirmation bias* (Klayman and Ha, 1987; Schulz-Hardt et al., 2000; Skov and Sherman, 1986). In hidden-profile situations, confirmation bias can influence decisions even if all specific information is brought out (Greitmeyer and Schulz-Hardt, 2003). This phenomenon could degrade crisis decision making in public health emergencies, since decision makers will often have incomplete information about the situation and will need to make assumptions before they can plot courses of action. Similar biases appear to work in hindsight, with past evidence supporting events and decisions construed as more compelling (Fischhoff, 1975; Tetlock, 2005).

Items on the assessment tool addressing confirmation bias include discussion of assumed pros and cons, as well as contingency planning in the face of deviations from those assumptions (Items 5d–e).

When groups of public health emergency decision makers share a common background and set of experiences (e.g., a team has worked together a long time), they may tend to think alike (i.e., be more homogeneous in opinion). This shared view may put them at risk for *group polarization*—a natural tendency for groups to amplify the attitudes held by individuals within the group (Myers and Lamm, 1976), and by extension group decisions. This phenomenon has been demonstrated extensively in laboratory and real-world studies, and is more pronounced in homogeneous than heterogeneous groups (Isenberg, 1986). For example, if a set of individuals all enter group discussion with a mildly positive attitude toward an option (e.g., taking the risk of deploying scarce resources now, rather than holding some in reserve), their interaction as a group will tend to emphasize that preference. Subsequently, group members tend to hold far more extreme preferences on those positions than they did before entering the discussion. This phenomenon appears to be due, in part, to a tendency of group members to be more likely to raise arguments in favor of their predisposition, rather than against it (Brauer, Judd, and Gliner, 1995; Isenberg, 1986)—a tendency likely to be exacerbated by the common-knowledge effect and confirmation bias.

The assessment tool addresses group polarization indirectly through an item encouraging multiple viewpoints (Item 8c).
Other process losses have been identified in the scientific literature, including a tendency of groups to increase individuals’ overconfidence (Sniezek, 1992; Zarnoth and Sniezek, 1997) and pressures toward conformity within groups (see, e.g., Asch, 1951; Hollingshead, 1996; Jonas et al., 2001). However, because these processes are more difficult to assess in the observational format used by the assessment tool, they are not directly addressed.

Several known countermeasures have been discovered to address process losses, and three of these are targeted in the assessment tool. Incorporating natural diversity in perspective, through the inclusion of individuals from diverse backgrounds, has been shown to reduce confirmation bias (and overconfidence). Contrived diversity in perspective, such as assigning an individual to be devil’s advocate, has also been used successfully as a countermeasure, but with somewhat less success than natural diversity (Schulz-Hardt, Jochims, and Frey, 2002). Including diverse opinions in group decision processes also increases the diversity of information discussed (Isenberg, 1986; Myers and Lamm, 1976). Explicitly noting group member roles and expertise has been shown to reduce the common-knowledge effect (Stasser, Stewart, and Wittenbaum, 1995; Stewart and Stasser, 1995). Finally, leadership that manages the group decision-making process and group norms that encourage differing opinions tend to facilitate better decision making (Larson et al., 1996; Peterson, 1997; Wittenbaum, Hollingshead, and Botero, 2004). Items 7a and 8a–c within the process-control section of the assessment tool address the incorporation of multiple and varied perspectives.

Finally, note that group processes (including generating new ideas, solving concrete problems, and making difficult decisions) are increasingly conducted in a distributed fashion, including through audio- and videoconferences and computer-mediated formats, such as chat rooms (Wainfan and Davis, 2004). The medium for discussion does affect group interaction and productivity (see, e.g., Straus and McGrath, 1994), and should be taken into account when considering group decision making. Item 11 in the “Information About Exercise or Incident” section of the assessment tool notes the communication medium.

Situational Awareness: Field Studies of Crisis Decision Making Informed the Overall Approach and Specific Items

Many researchers have studied decision making during actual crises. For obvious reasons, such decision making does not lend itself to laboratory experimentation, so evidence tends toward observational studies of one form or another. The sources of evidence described in this section informed the situational-awareness section of the tool.

A growing literature exists on situational awareness in complex, information-rich environments, such as those that pervade crisis decision making. Endsley (2000) defines situational awareness as including perception of the elements of the current situation (SA1), comprehension of the current situation (SA2), and projection of future states (SA3). As conceived by Endsley, situational awareness is a stage separate from decision making and performance. Klein (2000), on the other hand, defines situational awareness in terms of what can be done in reaction to changing events—a characterization that is much more intimately tied to both decisions and actions. Specific definitions notwithstanding, situational awareness is usually presented as a key ingredient in adaptive decision making in response to changing circumstances. Weick and Roberts (1993) and Weick and Sutcliffe (2001), for instance, document cases in which superior situational awareness (or “collective mindfulness”) helps
“high reliability” organizations operate safely and effectively in volatile environments (e.g., aircraft carrier operations).

Situational awareness comprises the entire first section of the assessment tool and is largely separated from action planning, during which the actual decision is made. Furthermore, since the tool focuses on observations of discussion (versus comprehension or other possible standards), it most directly targets Endsley’s first level of situational awareness (SA1). This focus on SA1 is also motivated by the finding by Jones and Endsley (1996) that the majority of pilot errors were connected with perception. Later sections of the assessment tool do, however, indirectly address interpretation and comprehension (SA2; e.g., assumed pros and cons, Item 5d) and provide basic assessment of projection (SA3; Items 4a–d). Notably, consideration of the temporal and dynamic nature of an event, both important aspects of situational awareness (Endsley, 2000; Adams, Tenney, and Pew, 1995), are explicitly included in the tool (e.g., time line for execution, contingency planning; Items 1e, 5e, 6b–c, 7e). However, given the difficulties with self-reported introspection (e.g., Nisbett and Wilson, 1977), an overall emphasis is given to discussion of “the facts” (Klein, 2000).

Klein (2000) makes the point that situational awareness is of keenest interest when decisions are difficult, as in public health emergency decision making. Klein, Calderwood, and MacGregor (1989) suggest the Critical Decision Method, which uses difficult real-world decisions that require expert judgment as a means of assessing situational awareness. This method is based on the notion that nonroutine incidents carry the most information, and it attempts to characterize situational awareness during the course of the incident. The notion of applying the assessment tool to real incidents is consistent with this finding, and applying the tool to exercises acts as an approximation of real incidents.

In principle, groups should improve the quality of situational awareness, since there can be a division of labor and a bringing to bear of multiple perspectives and sets of expertise—as is reflected in the process gains discussed in the previous section, but the discussion of process losses should temper this optimistic view.


As with the overall structure of the assessment tool, the general decision-making literature frames portions of the tool focusing on action planning. Options, consequences, likelihoods, and values form the basic structure of a decision situation (e.g., Edwards, 1954; Fischhoff, 2006; Yates, 2003; Yates and Tschirhart, 2006) and are the focus of Items 5b–d. In addition, implementation of the decision will be facilitated by a clear and shared understanding of what decision has been made, as reflected in Item 5f, and turning decisions into reality requires steps to ensure execution (Yates, 2003; Yates and Tschirhart, 2006), as in Items 6a–d.

The consideration of costs and benefits of options is central to both the normative and descriptive decision-making literatures (e.g., Raiffa, 1968; Edwards, 1954; Yates, 1990), and is targeted by Item 5d. Such an analysis, however, is enriched, and responses become more adaptive to the extent that unexpected future contingencies are considered (e.g., Dewar, 2002; Endsley, 2000; Fischhoff, 2006; Fischhoff, Dombroski, and Fischbeck, 2006; Lempert, Popper, and Bankes, 2003; Weick and Roberts, 1993), as reflected in Items 5e and 6d. Klein (1999)
emphasizes that the robustness of options can be evaluated through informal mental simulation, in which decision makers mentally “step through” likely sequences of events (e.g., extricating a victim from an automobile) in order to identify potential problems.

However, Klein (1999) also points out that, in situations involving extreme time pressure, such as firefighting, decision makers may not have (and should not take) the time to consider multiple alternatives. Hence, the level of deliberation devoted to a decision must be in accordance with the importance and time constraints placed on that decision, a concept reflected in process-control Items 7d–f. Nonetheless, time pressure in public health emergencies varies widely, sometimes playing out in hours, but often playing out over days, weeks, or even months. Hence, consideration of options will usually be a sound strategy.
APPENDIX C. ADDITIONAL TECHNICAL DETAIL

PUBLIC HEALTH EMERGENCY RESPONSE DECISION-MAKING ASSESSMENT TOOL: ADDITIONAL TECHNICAL DETAIL

The Public Health Emergency Response Decision-Making Assessment Tool addresses a gap in current assessments

Existing doctrine (e.g., National Incident Management System [NIMS], Homeland Security Exercise and Evaluation Program [HSEEP]) often specifies structures for decision making (e.g., when, where, and by whom decision should be made) and some key decision-making inputs (e.g., planning, biosurveillance, tactical communications, logistics support). However, little guidance is provided for how information derived from those inputs should be used during the decision-making process to help ensure desired outcomes. The tool is intended to fill in that process gap by providing a basis for evaluating crisis decision making that involves complex issues for which existing plans do not provide sufficient guidance. It should be used in situations in which group deliberation is needed.

The structure of the assessment tool is motivated by a process view of decision making

Based on a review of literature and consultations with practitioners, the assessment tool focuses on three general decision-making processes, each broken down into more specific sections. *Situational awareness* incorporates an assessment of the “facts on the ground,” making sense of that information, and making informed projections about the future. *Action planning* brings to bear goals and values for outcomes, evaluates options, and plans for contingencies. Action planning also sets the stage for execution to be handed off to operations. *Process control* involves management of the entire decision process (including both situational awareness and action planning) and ensuring information-sharing.

This document outlines the justification for each section of the tool

The instructions and table below provide information to assist users in applying the tool. They are intended as supplementary information for when clarification is needed. The following page provides basic instructions for how the checklist should be used. The first column of the subsequent table lists the sections in the tool, and includes broad justification for each section. The second column lists each item from the tool. The final column provides examples of the types of evidence that might be used in scoring performance. The SNS-request decision is a running example for many of the items.
HOW SHOULD THE ASSESSMENT TOOL BE USED?

The assessment tool may be used with exercises or real incidents
The assessment tool can be used in a variety of situations, but it will be most effective when the users are dealing with complex decisions that require deliberation. The tool focuses on observable behavior—in most cases, explicit discussion. Consequently, the tool will be easiest to use during an exercise, since, under a simulated scenario, it is more likely that observers can anticipate where and when key decisions will take place. This anticipation can be most readily accomplished through advanced inspection of the Master Scenario Events List (MSEL) (DHS, 2007a). Decisions that require deliberation (often those that are not anticipated) could be included in exercise design.

The assessment tool is designed for prospective use
Although, in theory, the tool could be used after an exercise or real event as a means of evaluating performance retrospectively, doing so is not ideal. Retrospective accounts are less reliable than are those developed concurrently. One decision that should be made by observers ahead of time is whether (or to what extent) to apply the tool to individual decisions, operational periods, the entire exercise or incident, or some combination of these (a question at the beginning of each major section indicates the scope of the assessment). Evaluators may find that some sections of the tool (notably, Process Control) lend themselves to more global assessments, whereas other sections (notably, Action Planning) apply readily to individual decisions. During the exercise or incident, observers should make notes on performance. With exercises (and to the extent possible, real incidents), advanced preparation can include specifying decisions to be evaluated.

The assessment can be used by external or internal evaluators, but evaluators should have knowledge of PHEP decision making
The assessment tool is likely to function most effectively if it is administered by an external evaluator. Having an external observer may provide a more objective perspective (since he/she is not evaluating close colleagues) and removes the need to draw a key staff member (i.e., one who would most likely be involved in a real response) away from participating in an exercise into an observer role. Multiple observers, possibly from different fields, may provide added validity. Self-assessments may be valuable in process-improvement efforts, thereby increasing the ease and frequency of assessments.

The assessment is designed for process improvement, not accountability
Given the early stage of its development, this tool is intended to facilitate improvement, not to test and rate health-department performance for purposes of accountability. Ideally, the tool should be used on several occasions: first, to establish a baseline of performance and identify areas for improvement, and then to track improvement. Regular use of the tool will help identify common points of reference across exercises and events and should facilitate analysis of improvement over time.
**Situational Awareness:** Attention to and interpretation of threat/vulnerabilities and knowledge of resources; involves identifying and testing assumptions, recognizing uncertainties, and predicting the future development of the incident.

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<tr>
<th>Justification</th>
<th>Item</th>
<th>Sample Evidence</th>
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<tr>
<td>To make decisions/action plans, one needs to know:</td>
<td>a. Number and location of people affected by the incident</td>
<td>Discussion of surveillance data regarding who is currently affected, where they are, and when they were affected; discussion of multiple data sources (Health Alert Network, media, response partners); discussion of number of people exposed, as obtained through plume modeling.</td>
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<td>o Current scope of incident, to gauge resource needs</td>
<td>b. Agent/cause of the incident</td>
<td>Explicit discussion of symptoms and what agents they might be consistent with; discussion of what this information implies for countermeasures; attention to whether incident is man-made (versus natural) and, if so, whether it is intentional or accidental.</td>
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<td>o Cause/agent, to figure out how to mitigate health consequences of incident</td>
<td>c. Severity of the incident</td>
<td>Explicit discussion of how heavily affected the area is, including potential disruption to infrastructure crucial to response; discussion of what disruption implies for distribution of countermeasures.</td>
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<td>o Necessary response time line, to ensure that interventions are not too late to be effective.</td>
<td>d. Potential countermeasures</td>
<td>Discussion of what actions can act as leverage points for achieving key objectives; what medications can treat a disease; what level of hospital care is required; whether social distancing is required; discussion of use of personal protective equipment (PPE), both with regard to first-responder safety and risk communication.</td>
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<tr>
<td>Also, crisis decision making for public health emergencies will most often involve the need to act with incomplete information. Thus, it is critical to recognize unknowns and (where feasible) develop strategies for reducing uncertainty by gathering more information (e.g., additional lab tests). But, given limited time, focus should be on those unknowns that are both most addressable and most likely to affect decisions.</td>
<td>e. Time line for responding to the incident</td>
<td>Explicit mention of time lines for making critical decisions; discussion of likely time line of event, time for external resources to arrive, etc.; windows of opportunity; whether a longer incident, such as pandemic flu, will likely place fatigue on decision makers and other responders; regular discussions to update awareness and revise time line.</td>
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<td>f. Unknown information likely to affect the understanding of or response to the situation</td>
<td>Explicit discussion of confidence in key estimates and whether additional evidence is needed and obtainable; decisions to move forward or to wait for additional lab results before making a final decision; identification of assumptions that depend on unchecked information; consideration of credibility of sources.</td>
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<tr>
<td>g. Strategies for gathering information to address unknowns in Item 1f</td>
<td>Explicit discussion of key informational needs, the potential cost and benefit of acquiring additional information, and strategies for acquiring key information; could include discussion about querying experts, waiting for additional threat data, incorporating information-gathering efforts into Incident Action Plan; could also include consideration of strategies that are robust to a wider range of plausible futures.</td>
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2. PERSONNEL (staff and volunteers). Relevant decision makers discussed:

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<td>Action plans must be based on not only the extent of the incident but also current and ongoing efforts and resource allocations, including knowing resource needs and current availability.</td>
<td>a. Number/skill mix of personnel needed for optimal response to the incident (above and beyond those currently deployed)</td>
<td>Discussion of the scope of the incident; discussions might leverage preexisting planning scenarios, results of computerized staffing models, etc.</td>
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<tr>
<td>b. Number/skill mix of personnel currently available for deployment</td>
<td>Decision makers have and discuss the number of volunteers signed up to staff PODs; discussion of current pools of staff/volunteers, including possible backups; consideration of use of alternative staffing sources, such as retired medical personnel; discussion of Memoranda of Understanding (MOUs).</td>
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3. NONPERSONNEL RESOURCES (materiel, supplies, equipment, facilities). Relevant decision makers discussed:

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<tr>
<td>Action plans must be based on not only the extent of the incident but also current and ongoing efforts and resource allocations, including knowing resource needs and current availability.</td>
<td>a. Nonpersonnel resources needed for optimal response to the incident (above and beyond those currently deployed)</td>
<td>Discussion of the scope of the incident. Discussion might leverage preexisting planning scenarios, results of computerized staffing models, etc.</td>
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<tr>
<td>b. Other resources currently available for deployment</td>
<td>Discussion of currently available resources, including possible backups; expiration dates on materiel; resources potentially available through SNS; alternative locations for sheltering.</td>
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4. PROJECTIONS. Relevant decision makers explicitly discussed predictions about future changes in:

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<tr>
<th>Changes in the number and location of people affected, as well as changes in needed personnel and other resources, are necessary for considering response needs over the next several operational periods.</th>
<th>a. Number/location of people affected</th>
<th>Discussion of the infectious nature of possible agents, and how currently affected populations may grow; use of data from information technology/Geographic Information System (IT/GIS) mapping to project spread; estimation of likelihood of spread to closed communities; discussion of how evacuation plans and likely evacuation refusals may affect spread.</th>
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<tr>
<td>b. Need for and availability of response personnel</td>
<td>Discussion of expected future shortfalls; how sick personnel or families will cause attrition.</td>
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<td>c. Need for and availability of nonpersonnel resources</td>
<td>Discussion of medications that are likely to run out and of shortages of all kinds.</td>
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<tr>
<td>d. Strategies to deal with resource shortfalls</td>
<td>Discussion of where availability does not meet needs (likely show-up rates for staff and volunteers, or noting that local supplies of medication will be insufficient for the projected scope of the incident); discussion of alternative means for acquiring resources; consideration of expanding the radius of response, drawing on resources from more-distant jurisdictions.</td>
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**Action Planning:** Identifying, evaluating, and selecting among options designed to mitigate or control the health effects of the incident, including planning for contingencies. Action planning also involves specifying and assigning responsibility for tasks.

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<tr>
<td>To make a well-reasoned decision, decision makers must clearly define all relevant courses of action, including whether to maintain or alter previous plans. In most instances, it is desirable to consider more than one alternative while recognizing that, with extreme time pressure, doing so might not be feasible. The existence of preexisting plans usually means that decision makers do not need to start from scratch, but such plans will often need to be adapted or reformulated.</td>
<td>a. Discussed relevance (or need to adapt) pre-existing plans, policies, and procedures</td>
<td>Discussion of the feasibility of the default plan, given the current situation, and whether modifications are necessary; discussion of when MOUs with other jurisdictions may fail or not apply.</td>
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<td>b. Discussed possible courses of action</td>
<td>Explicit discussion of the options available to decision makers; reference to specific decision flow diagram in an SNS or other plan, noting options at each stage; recognition of when there is not enough time to actively consider alternative options; reference to incident objectives for the current operational period.</td>
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<td>Alternatives need to be evaluated, both in terms of expected consequences and competing values (e.g., dispensing speed versus dispensing accuracy). These evaluations need not be formal and rigorous, but discussion should be based on the best available evidence.</td>
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<td>c. Discussed likely consequences of alternative courses of action</td>
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<td>Explicit discussion of specific options and how likely they are to facilitate achieving operational objectives or, alternately, how likely they are to create negative side effects. Discussions could include how events may unfold over time.</td>
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<td>d. Discussed assumed pros and cons involved in alternative courses of action (e.g., speed versus accuracy in prophylaxis dispensing)</td>
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<td>Discussion comparing the benefits from versus adverse reactions to medications; discussion of the costs and benefits of social distancing or the multiple consequences of school closure; recognition of uncertainty in public reaction; discussion of the costs of quarantine versus the risks of no quarantine.</td>
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<td>e. Identified contingency plans to address deviations from key assumptions in Item 5d</td>
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<td>Discussion of potential failure points (where things could break down); clear discussion of backup plans; decision makers searched for options that are “good” under many contingencies, rather than “best” for events as they are expected to unfold; consideration of how events would likely unfold under less likely contingencies.</td>
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<td>e. Clearly stated a decision (or provisional decision) and how it will be communicated to stakeholders.</td>
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<td>Clear recognition from relevant decision makers that a decision was actually made, even if it was only provisional, and what the decided course of action is (possibly including a decision to seek more information or take intermediate action, as a clear step in itself); discussion of who the decision will affect (e.g., political authorities, those executing the decision, Public Information Officer [PIO], the public) and how the decision will be communicated to those stakeholders; evidence that decision makers have documented decisions, discussions, and disagreements.</td>
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### 6. INITIATING EXECUTION. Relevant decision makers discussed:

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<th>Once a decision is made, concrete steps must be taken to implement it. To the extent that these steps are well laid out, they are more likely to be accomplished. This includes the tying of certain actions to key events and understanding signals that things are not going as planned. Clear responsibility for each step and how long each</th>
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<tr>
<td>a. A concrete list of key steps required to execute the decision(s)</td>
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<tr>
<td>Clearly including in the Incident Action Plan the steps necessary before a formal SNS request can be made; discussion of input to ICS Form 202 (“Incident Objectives”); discussion of critical indicators that objectives have been successfully met. Note that these may be either sequential steps or coordinated concurrent steps.</td>
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step should take to accomplish will help ensure transparency in execution. The focus here is on the initial stages of execution, when the decision heads toward implementation, not the actual movement of people, materiel, etc.

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<tr>
<td><strong>b. Responsibility and time lines for completion of key steps in Item 6a</strong></td>
<td>Drawing from the SNS plan those individuals with authority to request SNS and the time lines for doing so; discussion of input to ICS Forms 203 (“Organization Assignment List”) and 204 (“Division/Group Assignment List”).</td>
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<td><strong>c. Trigger points for initiating key actions</strong></td>
<td>Explicit discussion of the criteria for the consideration of school closure, a request for SNS assets, or notifying the public.</td>
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<tr>
<td><strong>d. Signals that will indicate a failure (or potential failure) in the current strategy</strong></td>
<td>Discussion of events that would indicate that things are not going as planned—e.g., noting that POD throughput is not sufficient and that going to a head-of-family model is needed.</td>
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**Process Control:** Structuring group discussion so that adequate information processing is ensured; leadership, group norms, and organizational structure can all facilitate or hinder process control.

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<tr>
<td><strong>7. MANAGING DECISION-MAKING RESOURCES. Leaders and other relevant decision makers:</strong></td>
<td>Recognition that all the relevant decision makers are present or alternately noting who is missing; specifying stakeholders to be consulted; noting if key decision makers are unavailable; acknowledgment of ICS structure. Note that this item regards whether the group discussed whether the right people are at the table. Question 10 in the final section of the assessment tool asks whether the observer felt that all necessary decision makers were present.</td>
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<tr>
<td><strong>a. Discussed people who needed to be involved in the decision process and who is missing</strong></td>
<td>Information flows to decision makers at appropriate levels; people appearing overwhelmed by information.</td>
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<td><strong>b. Appropriately delegated decision-making authority</strong></td>
<td>An IC mentioning at the beginning of an exercise who is ultimately responsible for making the decision; an organization chart present in the room with an order of succession; discussion of what decisions should be made by the incident.</td>
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<tr>
<td><strong>c. Discussed who has ultimate authority to make decisions</strong></td>
<td>NOTE: Such processes are not always easily</td>
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observable. If they are not observed in group discussion, but the observer perceives some level of unobserved sufficiency, that item should be scored as N/D (not able to determine), but with notes regarding these impressions.

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<tr>
<th>8. ENGAGING MULTIPLE PERSPECTIVES. Consistent with the incident time line, relevant decision makers:</th>
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<tr>
<td>Decision-making groups often do not adequately draw out information known only to select individuals, limiting situational-awareness and action-planning efforts. Explicit acknowledgment of expertise can help to counter this tendency. Leadership and group norms can also play an important role in enhancing utilization of potentially hidden information. Dissent promotes testing of underlying assumptions, exploring of alternative strategies, and honing of current strategies. However, the level of both deliberation and dissent must be appropriate to the decision-making situation.</td>
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<tr>
<td>a. Explicitly acknowledged roles, skills, knowledge, and expertise possessed by specific individuals</td>
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<tr>
<td>Introduction of roles and specific experience of team members; requesting the presence of subject-matter experts; alternately, evidence that roles and experience are well known in advance (this will likely be related to size of the group).</td>
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<tr>
<td>b. Discuss information and perspectives specific to certain individuals</td>
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<tr>
<td>Clear requests of information from those responsible for knowing it; consultation with experts and key stakeholders.</td>
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<tr>
<td>c. Encouraged alternate views</td>
</tr>
<tr>
<td>Leadership explicitly requests dissent (e.g., by encouraging decision makers to question assumptions) or assigns/plays a devil’s advocate.</td>
</tr>
</tbody>
</table>
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