

Building Evidence for Legal Decision Making in Real Time: Legal Triage in Public Health Emergencies

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ABSTRACT

Similar to the triaging of patients by health care workers, legal and public health professionals must prioritize and respond to issues of law and ethics in declared public health emergencies. As revealed by the 2009-2010 H1N1 influenza outbreak and other events, there are considerable inconsistencies among professionals regarding how to best approach these issues during a public health emergency. Our project explores these inconsistencies by attempting to assess how practitioners make legal and ethical decisions in real-time emergencies to further critical public health objectives. Using a fictitious scenario and interactive visualization environment, we observed real-time decision-making processes among knowledgeable participants. Although participants' decisions and perspectives varied, the exercise demonstrated an increase in the perception of the relevance of legal preparedness in multiple aspects of the decision-making process and some key lessons learned for consideration in future repetitions of the exercise and actual, real-time emergency events.

(*Disaster Med Public Health Preparedness*. 2011;5:S242-S251)

Key Words: Public health law, public health ethics, modeling, simulation

For more than a decade, national, state, and local practitioners and policy makers have echoed the importance of legal preparedness as a component of public health emergency responses and planning. This recognition, however, has failed to generate a plethora of meaningful emergency legal preparedness exercises or other tools. Instead, legal elements of emergency preparedness are more often incorporated into larger preparedness exercises with no significant way to discern how actors make decisions on the effective use of law to further public health objectives in real-time emergencies. As consequence, although law is an accepted and critical component of national and regional emergency preparedness, the public health workforce lacks input into and knowledge about how legal and corresponding ethical decisions are made in emergencies. In essence, lawyers, public health practitioners, emergency managers, and others must prioritize and resolve legal issues with incomplete information and guidance during declared emergencies.

With the support of the Robert Wood Johnson Public Health Law Research Program, we developed an exercise that combines legal and ethical theory and practice with decision-making science to explore how decision makers use law in public health emergencies to advance critical public health objectives. Using state-of-the-art technology at Arizona State University's (ASU's) Decision Theater, we designed and ran a unique tabletop exercise with an expert group of public health lawyers and ethicists focusing on legal and ethical issues arising during a pandemic influenza scenario. We also

assessed the nature of and justification for the participants' key legal and ethical decisions using existing evidence-based decision-making tools. As discussed below, although the results of this initial study must be replicated to validate findings fully, the initial assessment illuminates the varying criteria and substantive skills used by practitioners to make difficult decisions regarding law, ethics, and policy in major emergencies.

EMERGENCY LEGAL RESPONSES IN REAL TIME

Law is a critical component of public health emergency preparedness not only because laws may directly affect emergency responses but also because of how the legal environment changes upon the declaration of a state of emergency.¹ Largely based on federal and state legal reforms after the terrorism events of September 11, 2001, and Hurricane Katrina, public health emergency declarations trigger distinct legal and ethical norms to facilitate response efforts through the public and private sectors. Public health emergency laws offer government and the private sector flexible powers to protect the public's health, allow government to suspend legal regulations that impede emergency responses, encourage volunteers' or others' efforts by limiting liability,^{2,3} facilitate transitions to a crisis standard of care,⁴ and authorize alterations in professional licensing standards or scopes of practice.⁵

These and other shifts in public health powers vary depending on the type of emergency declared. Federal and state (and select local) governments⁶ may declare states of emergency or disaster (coordinated largely through

emergency management agencies) to address exigencies affecting the public's health. In addition, the US Department of Health and Human Services, more than half of the US states, and some tribal and local governments may declare states of public health emergency, coordinated predominantly by public health agencies.⁷ These declarations empower public and private entities to address the public health aspects of emergencies through enhanced and expedited powers to implement social distancing measures (eg, set curfews, order quarantine or isolation) and conduct testing, screening, treatment, and vaccination programs. States of emergency may even overlap. For example, in response to the 2009-2010 H1N1 influenza pandemic, the federal government and the State of Maryland declared states of emergency⁸ and public health emergency.⁹ Dual states of emergency can obfuscate responses as divergent government agencies and actors attempt to respond simultaneously pursuant to different legal authorities.

Emergency laws ideally should help direct emergency responses in key circumstances. In reality, these laws are not constructed to provide exact legal guidance. Framed in broad, and sometimes vague, statutory or regulatory language, emergency laws tend to offer public health practitioners and emergency managers a menu of legal powers and options rather than a definitive legal manual for how to respond.¹ Lacking affirmative legal direction, these actors may act outside legal boundaries. Worse yet, they may fail to act to protect the public's health because of erroneous legal advice, liability fears, fiscal concerns, or other perceived legal ramifications. Through what is known as *legal triage*, public health practitioners, emergency managers, and their legal counsel must prioritize legal issues and solutions in real time to facilitate legitimate public health responses that balance communal and individual interests in declared states of emergencies.¹ Legal triage requires responders to make critical legal decisions in emergencies in which facts may be unclear, resources are scarce, and communal well-being is at serious risk.¹ The nature of these legal decisions in real time is complicated and understudied. Our primary objective was to build a construct for assessing these decisions.

SCIENCE OF LEGAL DECISION MAKING IN REAL-TIME EMERGENCIES

Scientific Methodology Underlying Evidence-Based Decision Making

The present model of evidence-based decision making in public health suggests that rational decisions are made through fact-based risk assessments based on epidemiologic data and research.¹⁰⁻¹² This may not be the case because of exigencies, uncertainties, and tradeoffs during actual decision-making situations in public health emergencies.^{13,14} Well-known difficulties in implementing risk assessment decision results, summarized by Davis and colleagues, include (1) the physical "human activity-natural process" interaction, which is often complex, nonlinear, and affected by significant uncertainties, and (2) the social context in which decisions are made and implemented,

which is characterized by multiple subjects bringing different values, knowledge, and interests to bear.¹⁵

One goal of decision science analysis is to identify specific decisions that lead to preferred outcomes within a given situation. This is identified typically as "rational" decision making.¹⁶ In the context of real-time decision making with inherent risk and uncertainty, however, it is difficult, if not impossible, to assume that the "best" decisions may be identified consistently. Legal triage, as with all decision making, requires tradeoffs and interpretation in a context of limited information, legal and ethical constructs, scarce resources, and other interdependent and unpredictable outcomes. This exemplifies dynamic decision making, in which situations require a series of interdependent decisions, and outcomes of decision makers' actions feed back into decision making.¹⁷⁻¹⁹

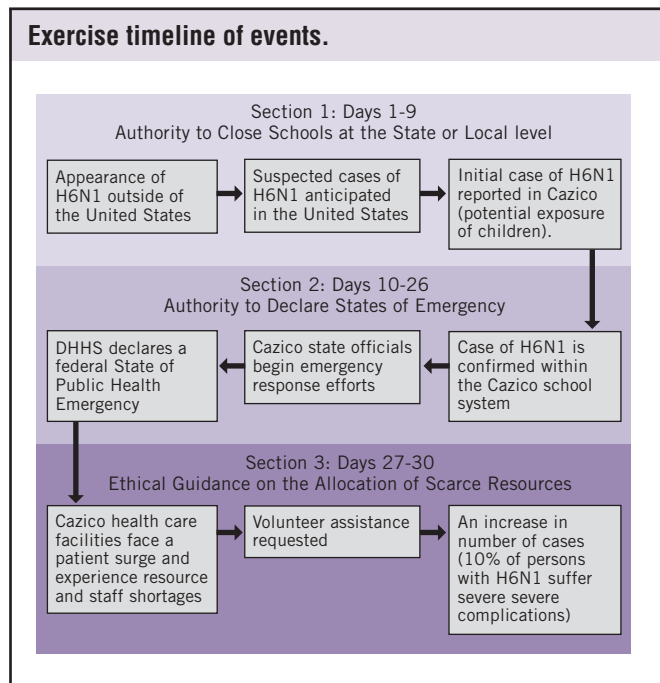
Decision-making aids or tools, particularly those using quantitative methods, tend to rely on models and simulations that provide value through their predictive capability.²⁰ These analytic tools are attempts to study, understand, and predict reactions of individuals in real-world environments.²⁰ Based on these models, exercises are designed to create an environment for decision making that emulates risk, including uncertainties and context, and requires participants to work through a series of decisions in real time. Theories of rational decision making (ie, a systematic linear approach for evaluating alternatives) are limited. Many of the factors that confront public health decision makers during emergencies, including factual, ethical, and legal uncertainties, practical tradeoffs, cognitive limitations and bias, and lack of predictive tools to support decision making, typically are not captured or documented. As a consequence, exercises offer an experiential basis for decision making that is recognized as a critical component of risk assessment.¹⁶ Tabletop exercises that allow participants to role-play in an experiential practice environment are important educational and training tools that improve response capability.²¹

Understanding the science behind legal decision making in exigent settings is pivotal to predicting how legal and public health actors may respond during emergencies. Applying decision-making sciences in the context of legal triage may not only clarify how critical decisions are made in declared public health emergencies but it also may increase the evidence base for decision making during crises.

Legal Triage Research

Our research and study were organized around the development of an innovative legal triage tabletop exercise that combines legal and ethical theory and practice with decision-making science to explore how decision makers use law in public health emergencies to further critical public health objectives. We designed and conducted a unique tabletop exercise with an expert group of public health lawyers and ethicists focusing on legal and ethical issues arising during a pandemic influenza scenario. ASU's Decision Theater is a collaborative

FIGURE 1



research laboratory that includes a 260° multiscreen, interactive environment with simulation technology that allows participants to explore the complexities of fictitious scenarios through realistic and interactive visualization. Led by a moderator, participants analyzed and discerned video and audio data to make critical decisions. Coextensively, the bases for participants’ decisions were evaluated using a pre- and post-survey instrument and text analysis of the exercise transcript using 9 codes of a novel decision-making model for legal triage.

Participants

The legal triage tabletop exercise was conducted on May 25, 2010. Because of space limitations in the Decision Theater, 12 participants were selected from multiple disciplines (eg, law, ethics, medicine, public health), backgrounds (eg, academia, federal, state, and local public health agencies, emergency management agencies), geographic areas (in addition to federal representation, participants hailed from Arizona, Arkansas, Illinois, Indiana, Maryland, Michigan, North Carolina, New Mexico, New York, Texas, and Washington), and varying experience and knowledge in law, medicine, and ethics pertaining to emergency preparedness. Participants provided their advanced informed consent for human subjects research approved by ASU’s human subjects committee, and each was assured that their identities would not be publicly revealed.

Tabletop Exercise Design

The tabletop exercise revolved around an emerging global outbreak of a virulent strain of influenza, identified as H6N1, or “novel flu,” which caused severe complications, including death,

in up to 10% of those infected. Condensed factual presentations were depicted through mock national and local media clips, press releases, select interviews with state officials and national experts, and purported public health data in “Cazico,” a fictitious state within the United States. Cazico’s nearly 4 million residents were dispersed among 26 counties and 41 cities, including 1 large, centrally located metropolitan area with a population of just over 1 million. Scripted facts and presentations were designed to escalate the risk of spread of “novel flu” among citizens of Cazico for approximately 30 days, as illustrated in Figure 1. Before commencement of the exercise, each participant was assigned to serve the role of “legal and ethical counsel” for the Cazico Department of Health. Participants collectively addressed and resolved issues relating to legal authority in Cazico to respond to the spread of “novel flu.”

To guide their decisions, participants referred to constitutional norms, relevant Cazico and federal laws, and ethical guidance contained in a briefing book distributed to participants approximately 10 days in advance of the formal exercise. Table 1 lists the statutory, regulatory, and other materials included in the briefing book, many of which were modeled after provisions of the Model State Emergency Health Powers Act²² and existing state and federal laws and legal guidance in several US jurisdictions. Participants were instructed to study the briefing book in advance, but were unaware of the specific emergency events that would unfold during the exercise.

During the course of approximately 3 hours, the exercise was divided into 3 major sections designed to identify criteria of legal and ethical decision making on the authority to (1) close schools at the local or state levels, (2) declare states of emergency or public health emergency at the state level, and (3) incorporate ethical guidance on the allocation of scarce resources in the implementation of a crisis standard of care.

Decision Model for Legal Triage Decision Making

Decision theory constructs are useful for linking a real-time, developing situation to specific decisions made by public health or other officials. A decision is defined as an action an individual takes to alter the outcome of a situation. Decisions may be collective either through consensus, group collaboration, hierarchy, influence, or autonomy. They are formed within specific contexts to achieve goals that accurately reflect tradeoffs in systems of values, beliefs, and perceptions. An outcome is any observable metric, indication, state, or condition that one can confirm and/or measure. As illustrated in Figure 2, 4 constructs were identified and developed to identify and measure the specific sources of information and considerations during legal triage decision making. Participants used these constructs, described below, to make decisions or evaluate potential outcomes:

1. Decision-making environments are defined as the specific situations, participants, hierarchies, authorities, and decision pathways comprised within structural and situational elements over time. Structural elements of a decision-making

environment include the legal framework, actors, jurisdictional chain of command, and interjurisdictional coordination. Situational elements include the nature of the event, current threat level, risk communications, and public opinion. Although decision-making environments provide context, they do not necessarily help individuals choose between alternative decisions.

2. Decision-making frameworks are the values, beliefs, and norms—both individual and collective—that decision makers use in their deliberative processes. Occasionally these are tacit and straightforward goals (eg, save lives); more often, they include intangible and competing values implicating tradeoffs (eg, save the most lives with the smallest economic conse-

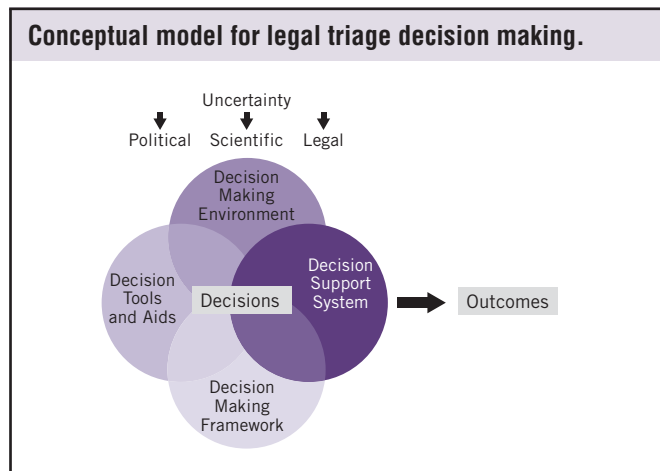
quences). Decision-making frameworks include ethics, individual and community rights, adherence to law, access to resources, safety, health, and institutional missions or roles. In theory, these frameworks allow individuals and institutions to prioritize values to help them make rational decisions. In practice, inherent complexities and embedded uncertainties in turn can lead to decision-making biases.

3. Decision-support systems are the sociotechnical systems that attempt to use facts and information to align frameworks with environments to eliminate decision biases and thus render rational decisions. Decision-support systems identify specific actions that can be taken and link them to possible outcomes. Decision-support systems are agnostic about values

TABLE 1

Briefing Book Table of Contents	
Cazico State Fact Sheet	Demographic Information Regarding Cazico
	State Statutory Laws
Chapter 2. Administration. Article I. General Provisions § 2-101. Definitions	Key definitions relevant to the Cazico Revised Statutes Annotated
Chapter 23. Public Health. Article I. Public Health Agencies § 23-101. Prevention and Control of Conditions of Public Health Importance §23-102. Reporting	Authorizes the Department of Public Health to take actions necessary to protect the public's health Establishes reporting requirements to be met by the Department of Public Health
§ 23-109. Public Health Inspection of School Property	Authorizes the Department of Public Health to close schools during an epidemic or threatened epidemic
Chapter 37. Public Health. Article I. State of Emergencies § 37-101. Emergency Declaration and Powers	Provides for a declaration of a state of emergency by the governor, as well as the governor's powers during a declared emergency
Chapter 37. Public Health. Article II. Public Health Emergencies § 37-201. Declaring a State of Public Health Emergency § 37-202. Content of Declaration § 37-203. Effect of Declaration § 37-204. Access to and Control of Facilities and Property § 37-205. Reporting to Detect and Track a Public Health Emergency	Authorizes the governor to declare a state of public health emergency Establishes requirements for an executive order declaring a state of public health emergency Sets forth government's authorities and responsibilities during a declared state of public health emergency Authorizes the Department of Health to use certain materials and facilities during a declared state of public health emergency Requires health care providers and other professionals to report possible cases and indicators of a public health emergency
Chapter 54. Education. Article VI. Protection of School Safety § 54-608. School Safety Plans	Requires school districts to develop a disaster management plan.
	State Judicial and Administrative Opinions
Memorandum: Judicial Decisions Regarding Schools Closures and Declaration of Public Health Emergencies	Analyzes applicable case law in Cazico on the legality of school closures during emergencies and declarations of public health emergencies
Cazico Attorney General Opinions	Offers guidance on reimbursements of expenses for school districts during a school closure and potential governmental liability for a failure to close schools during a public health threat
	Federal Statutory Laws
US Code Annotated. Title 42. The Public Health and Welfare Chapter 6A. Public Health Services § 247d. Public Health Emergencies § 247d-6d. Targeted liability protections for pandemic and epidemic products and security countermeasures	Grants the Secretary of Health and Human Services powers and responsibilities during public health emergencies Authorizes the Secretary of Health and Human Services to issue a declaration of a public health emergency
	Federal Guidance
Federal Guidance for State and Local Public Health Officials and School Administrators Concerning School (kindergarten-12) Responses to Influenza Principles of Ethics for State and Local Actors Regarding Allocation of Resources During a Public Health Emergency	Guidance on recommended responses to reduce the spread of influenza among students and school staff Series of ethical principles regarding allocation of scarce resources during public health emergencies

FIGURE 2



(frameworks) and must be capable of supporting multiple decision-making scenarios (environments) to be useful.

4. Decision aids, or tools, are facts and definitions that are useful during decision-making processes. Decision aids include factual scientific information, legal definitions, and other information that are indisputable, although may be incomplete or subject to multiple interpretations.

Inherent in any discussion of legal triage is the presence of legal, scientific, and political uncertainties. Our definition of uncertainty is any statement that identifies information that is not known regardless of the reason why information is unavailable. Uncertainty includes the inability to predict future outcomes from specific decisions, in addition to a lack of specific information about present events. For the purpose of the present analysis, we categorized uncertainties as scientific, political, or legal. Scientific uncertainty is characterized by the inability to perfectly measure and define medical, biological, and epidemiological systems and render reliable/accurate predictions. Political uncertainty may be the result of unknown, future events tied to local, state, or federal government agencies or other stakeholders (eg, school boards) and/or their leaders that influence the political or legal aspects of decision making. Legal uncertainty includes any unknown effects that laws or legal systems may have on decision making.

Many models propose that decision making can be understood as a linear process beginning with data and information gathering, analyzing alternatives, and choosing a desired option among alternatives. Alternatively, we present a conceptual model for legal triage decision making as a complex, adaptive, and iterative process consistent with the characteristics of dynamic decision making (Figure 2). The legal triage model we propose suggests that each of the 4 functional constructs (decision-making environments, decision-making frameworks, decision-support systems, and decision aids) are used during legal triage to align decisions and outcomes in the presence of legal, scientific, and political uncertainties. The main assumption in the model is that

each construct is an important contributing factor in reaching agreement about decisions, and that they are used concurrently to align outcomes with decisions. None of the constructs are sufficient alone, nor is there a linear progression in their use. This decision-making model was used in both the design of the exercise (eg, embedded uncertainties in the scenario, design of the decision-making environment) and the analysis of the exercise described in detail below.

Data Collection, Coding, and Analysis

To validate the proposed model, we conducted a text analysis of the participants' arguments and considerations during the exercise. The discussion was designed to use principles of law and ethics to provide effective legal or ethical guidance in a real-time public health emergency. Participants were asked to justify their positions based on scientific information presented and supporting legal materials. The discussion was recorded and a professional firm transcribed the discussion for text analysis. We developed code definitions and coding principles across 3 categories: the 4 decision-making constructs identified above; 3 constructs for uncertainty (scientific, legal, and political); and decisions and outcomes. Using data from the 9 codes, variables were created that captured the total number of comments made about each of the individual codes for each of the participants. Once the code definitions were finalized through an iterative process, 2 researchers coded the entire transcript consisting of 142 pages of text to establish interrater reliability using Cohen's kappa coefficient.²³ Kappa is a measure of agreement between 2 coders corrected for chance. Of the 9 codes tested, all had scores >.60 (good) and were consequently used in the analysis. We examined the trends in the frequency of coding for each category as the exercise progressed. We also used the coded texts as the basis for the qualitative analyses presented in the discussion.

RESULTS

As new facts were introduced throughout the exercise, participants were asked to respond to predetermined questions by a moderator who acted as a liaison between the Cazico Department of Health and the participants. After posing questions and facilitating discussion, the moderator requested resolution of each question via anonymous, nonmandatory votes by participants. These votes were tallied electronically and results were projected instantly on screens for participants' review. Table 2 lists the specific questions, results of each vote, and brief statements of select legal and ethical criteria proffered by participants in making key decisions during the exercise. Demands made of the participants to reach resolutions on key questions attempted to simulate real-time, dynamic decision-making requirements in public health emergencies.

Key Findings From the Text Analysis

Overall, participants made 191 statements that satisfied the definition of at least 1 of the 9 constructs of the decision model. Many statements included multiple constructs because participants often attempted to link them together. Of this total, 66 (25%) state-

ments were coded as decision aids, 52 (27%) were coded as decision support, 61 (32%) were coded as decision-making environments, and 52 (27%) were coded as decision-making frameworks. Furthermore, 47 (25%) statements were coded as decisions, 60 (31%) were coded as outcomes, 39 (20%) statements were coded as scientific uncertainty, 36 (19%) were coded as legal uncertainty, and 26 (14%) were coded as political uncertainty.

Participants often used these constructs to align decisions with outcomes through a process of identifying, reducing, and man-

aging uncertainty in context and outcomes. One participant stated:

I think she [the Director of the Cazico Department of Public Health] is asking two things [by asking if she has the authority to close public schools.] One is, "If the situation existed where it was reasonable to [close public schools], would she have the authority?" The other is, "Does the situation exist where I have the authority [to close public schools?]" And that is actually a bit of a false dichotomy because it looks to me like the legal authority rests on whether the facts meet

TABLE 2

Real-Time Legal Decisions During Exercise		
Legal Decision	Vote	Critical Legal and Other Criteria
1. Is there sufficient legal authority to close schools in a state in response to the global emergence of a communicable disease before a declaration of emergency or any documented cases of the disease within the state?	Yes (9-2)	<ul style="list-style-type: none"> • Relevance of factual circumstances in determining legal authority • Imminent threat of harm to individuals within the state • Status of declaration of emergency or disaster, including declarations by other states • Consequences of action or inaction (eg, potential liability) • Effectiveness of potential school closure • Definition of the term "dangerous communicable disease"
2. Does the state Department of Health have the legal authority to close schools before approval from the state Board of Education?	No (11-0)	<ul style="list-style-type: none"> • Whether approval by state Board of Education must be sought or received • Assumption of liability for school closure (including financial liability) • Potential political consequences for decision makers • Authority of state and local school boards to address emergencies/disasters • Percentage of sick children needed to justify closure • Conflicting statutory assignments of power between state agencies
3. Can the state Department of Health close schools despite countervailing political and social issues?	No (6-5)	<ul style="list-style-type: none"> • Necessity and effectiveness of school closure under the circumstances • Availability of less restrictive measures to mitigate harm • Indirect effects of closure on families and liability for public officials • Transparency of decisions and potential discriminatory effect
4. Upon documented cases of the communicable disease in a state, is there sufficient legal authority to declare a state of emergency?	Yes (9-2)	<ul style="list-style-type: none"> • Imminence of spread of contagious disease and potential harm • Potential benefits of a declaration, including sending signals to federal partners, accessing resources, and state authority during an emergency • Declarations of emergency in other jurisdictions and nearby populations • Impact of a potential federal declaration
5. Is there sufficient legal authority to declare a state of public health emergency in response to an outbreak of a communicable disease?	Yes (9-1)	<ul style="list-style-type: none"> • Analysis of statutory and case law to determine whether circumstances fulfill legal criteria to declare a state of public health emergency • Potential impact of contagious disease and future substantial harm • Declarations of public health emergency in other jurisdictions • Consideration of a state's authority in a public health emergency • Analogies to prior historical contagious disease outbreaks • Liability of state actors for action or inaction
6. Should the state declare either a state of emergency (E) or a state of public health emergency (PHE) in response to widespread effects of a communicable disease?	E: No (8-4) PHE: Yes (9-2)	<ul style="list-style-type: none"> • Distinctions between legal authority to declare a state of emergency or public health emergency pursuant to factual circumstances • Public officials' authority during a declared state of emergency vs public health emergency • Availability and value of potential federal resources • Relevance of medical and public health opinions • Potential threat of state officials to overreach their powers relating to civil liberties
7. Does the declaration of public health emergency facilitate the provision of health care services to the residents in the state specifically concerning the standard of care?	Yes (11-0)	<ul style="list-style-type: none"> • Waiver of legally required medical protocols (eg, licensure) • Liability protection for volunteers (eg, crisis standard of care) • Volunteer classifications and requirements • Impact of declaration on medical supplies and personnel • Treatment of nonemergency-related conditions
8. Do state-prescribed ethical principles comport with legal norms related to the allocation of resources?	Yes (9-3)	<ul style="list-style-type: none"> • Transparency in decision making • Incorporation of ethical principles into emergency guidelines • Prioritizing saving the most lives during an emergency • Discriminatory impact and potential legal actions

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the criteria for being able to [close schools]. So you can't separate those questions.

This statement encompasses constructs for scientific and legal uncertainty in addition to decision-making environment (because of the question of authority) and a specific decision (whether to close schools). In another instance, a participant's statement highlighted the decision-making framework and the need for decision support to identify specific decisions, tradeoffs, and outcomes:

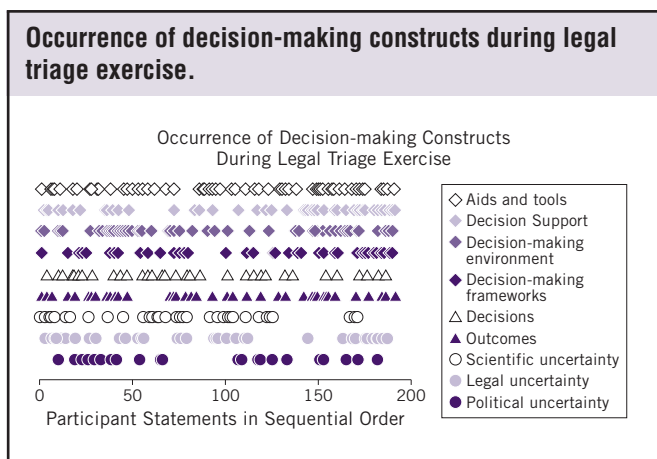
If we start making decisions for things that we can't demonstrate a countervailing health impact, compared to the possibility of needing to set up financial mechanisms, I think we are setting ourselves up for future problems.

Another participant's statement demonstrated the dynamic and iterative decision-making environment of legal triage:

Each of these decisions is a one-time thing. The situation changes after we make the decision, which makes it pretty challenging, but at the same time you can go back and evaluate what you are doing. . . to make up for [previous] mistakes.

To capture the decision-making process, we created time-series data for each of the participants' statements during the exercise. Figure 3 shows the occurrence of each decision-making construct as the exercise progressed. Each construct occurs continually throughout the exercise. This suggests that rather than moving linearly through the decision-making process to end with decisions, participants considered decisions against each of the constructs in an iterative process. The data are consistent with the decision-making model, which hypothesizes that all of the considerations are important and that legal decision making is an alignment process that seeks to reduce and manage uncertainty, rather than solve specific decision problems.

FIGURE 3



Evaluating Legal Knowledge and Abilities to Respond in Emergencies

To assess their competencies in legal preparedness, participants were asked before the commencement of the exercise to complete a questionnaire to help measure the impact of their participation on their perceived ability to respond legally during public health emergencies. The questionnaire included perceived preparedness factors for responding to public health legal competencies, participant characteristics (eg, professional affiliation, history of participation in tabletop exercises, years

TABLE 3

Pre- and Postexercise Comparison of Participants' Perceived Legal Preparedness⁷

Legal Readiness Capability	Preexercise Prepared, %	Postexercise Prepared, %
1. I am prepared to provide legal guidance to identify the authority for declaring a public health emergency.	83	100
2. I am prepared to provide legal guidance to describe the scope of statutory and regulatory provisions for emergency powers.	92	92
3. I am prepared to provide legal guidance to distinguish public health agency powers and responsibilities from those of other governmental agencies, executive offices, police, legislatures, and courts.	58	92
4. I am prepared to provide legal guidance to describe the limits of authority for legally closing schools.	50	92
5. I am prepared to provide legal guidance regarding compelling medical treatment or instituting mandatory screening programs.	75	67
6. I am prepared to provide legal guidance regarding imposing quarantine, isolation, or other restrictions on the movement or placement of people.	83	83
7. I am prepared to provide legal guidance to identify provisions for the issuance, revocation, or suspension of health care provider licenses.	58	67
8. I am prepared to provide legal guidance to public health officials regarding confidentiality laws in the collection, maintenance, and release of data.	67	83
9. I am prepared to provide legal guidance to public health officials regarding prominent constitutional rights implicated through the practice of public health.	75	92
10. I am prepared to provide legal guidance to public health officials regarding potential civil and criminal liability of public health workers during an emergency.	75	75

⁷Twelve participants were asked to indicate their level of legal preparedness for decision making during a public health emergency before and after the tabletop exercise on a 4-point Likert scale: 1=unprepared, 2=somewhat unprepared, 3=somewhat prepared, 4=prepared, NA=not applicable. Categories of "somewhat prepared" and "prepared" were combined.

in practice), and participants' perceptions of tabletop exercises for identifying, testing, and improving legal preparedness. For each legal competency, participants were asked to rate their level of perceived preparedness using a Likert scale ranging from 1 (unprepared) to 4 (prepared). An identical follow-up questionnaire was completed at the conclusion of the exercise. Pre- and postexercise questionnaires were paired through unique identifiers to allow for anonymous responses as approved by ASU's human subjects committee.

All 12 of the participants (100% response rate) completed pre- and postexercise questionnaires. Fifty percent of respondents indicated that they had not previously participated in a tabletop exercise. The majority of participants reported that they routinely provide legal advice to emergency preparedness organizations: 50% to government health agencies, 8% to non-governmental organizations, and 8% to private businesses. As documented in Table 3, after the exercise, participants were more likely to report an increase in perceived legal preparedness for 7 of 10 capabilities (specifically, 1, 3, 4, 5, 7, 8, and 9). The largest improvement was measured regarding the provision (capability No. 4) of legal guidance authorizing school closure (34% increase in perceived preparedness) in public health emergencies, with less significant improvements in 6 additional areas. Participants' level of preparedness knowledge did not increase in 3 areas: compelling medical treatment or instituting mandatory screening programs; imposing quarantine, isolation, or other restrictions on the movement or placement of people; and confidentiality laws in the collection, maintenance, and release of data. None of these 3 areas, however, were specific foci of legal issues during the exercise.

Postexercise Participant "Hot Wash"

After the exercise, participants self-assessed their exercise performance during a "hot wash" session, in which they could ask questions about the exercise design and highlight sources of confusion or clarification that helped or hindered their confidence in legal and ethical decision making. A facilitator identified specific items from the 4 functional constructs participants used as the basis for their decisions. Participants confirmed that using these constructs to study decision making during crisis situations may lead to greater understanding of decision-making processes in real-time events.

DISCUSSION

Although legal preparedness competencies among an already expert group of participants clearly increased after the exercise, drawing definitive "lessons learned" about legal decisions in similar, future public health emergencies is difficult. No matter how well designed and executed, a single trial of any preparedness exercise cannot provide predictable answers to how future legal decisions in emergencies may be made. We can, however, offer a series of key points based on observational data obtained through the exercise and postreview of its transcript that may guide future iterations of the exercise itself and legal triage decisions.

Foremost among these observations is the potential for this or other experiential exercises to characterize legal decision making in emergencies as an adaptive, deliberative process requiring multiple perspectives and expertise. Public health emergency laws present multiple options for legal resolution. Meaningful real-time decisions may be made only with knowledge of emerging public health facts, with significant input from nonlegal actors, and through innovative interpretations of constitutional, statutory, regulatory, or judicial laws. Just as in non-emergencies, the application of interpretive legal principles that reflect the relative weight and value of existing sources of law is an essential skill. Real-time legal interpretation in public health emergencies requires an ability to infuse rapidly developing epidemiologic and other facts with changing legal norms and potential political opinions to generate guidance that furthers public health objectives.

A telling observation from the exercise is the recognition that what may be legally authorized is not always what is, or should be, decided. When participants were asked whether Cazico government officials were legally authorized to declare a state of emergency or a state of public health emergency with cases of "novel flu" recently confirmed in the state, they responded affirmatively in both instances (Table 2, questions 4 and 5). When asked whether government officials should make either declaration (question 6), they opined overwhelmingly against declaring a state of emergency, but were in favor of a state of public health emergency. Among their expressed bases for these decisions, participants noted specific concerns about government's overreaching during a general state of emergency, which included broad provisions of legal authority (as per the briefing book) that may infringe on civil liberties. Participants' alignment of their decisions to declare a state of public health emergency (and not a state of emergency) is also interesting because relevant provisions of law and facts were designed to raise uncertainty about the legality of each emergency declaration. Declaring a state of emergency or public health emergency was in no way considered a simple matter of course as part of the exercise design. This suggests but does not prove that legal and ethical actors may seek interpretive consistency to further a common objective in an environment of competing choices and real-time demands.

In fact, despite their divergent backgrounds and emergency preparedness experience, participants largely voted together in substantial blocks for or against specific legal actions. The only major exception related to whether Cazico officials were legally authorized to close schools (Table 2, question 3) in which participants narrowly voted in favor (6-5). Their expressed bases for this collective decision denote disagreements about the scope of legal authority and potential effects of closure on communities, parents, and children. Some voted against school closure because their interpretation of relevant laws proscribed such action early in the emergence of the pandemic. Their divergent votes on this issue may also stem from the consideration of facts presented during the exercise highlighting disagree-

ments among departments of education and health about the utility of school closures and legal and practical arguments against closure raised by a national teachers' union representative. As a result, even though Centers for Disease Control and Prevention and other public health practitioners may espouse the need for social distancing measures such as school closures at the commencement of major influenza outbreaks, legal authorization may be tied more to the "black letter" interpretation of the law, external considerations, and economic or practical issues.

Limitations

As with any emergency preparedness exercise, replication with different participants and moderators under similar conditions may illuminate, strengthen, confirm, or refute initial findings. Replication of this exercise is technically possible because it relies on unchanging legal provisions, a precise recitation of facts, and corresponding questions designed to elicit specific responses; however, several limitations may hinder future replication. First, the training setting for this exercise is unique in its ability to engage participants and simultaneously study their decisions. ASU's Decision Theater is one of only a few venues in the United States with the capacity to simulate fully the events of this exercise. Comparable simulation in less technologically advanced facilities (eg, single-screen demonstrations lacking onsite evaluation tools) may affect outcomes. Second, selection of expert participants is pivotal. Our participants represented collectively a talented, seasoned group of public health legal and ethical actors. The selection of differing groups of participants (eg, emergency managers, non-legally trained public health practitioners, health care workers, students) may lead to variable results. Third, the timing for this exercise was proximately related to international and US responses to the 2009-2010 H1N1 influenza pandemic. Although our scenario involved a considerably more deadly and potentially disabling strain of influenza, participants may have tapped into their actual experiences stemming from response efforts to the H1N1 pandemic in making key decisions during the exercise. Future participants' abilities to draw on actual experiences may predictably diminish over time, challenging their abilities to recall and rely on familiar circumstances.

CONCLUSIONS

Our initial assessment illuminates the varying criteria and substantive skills used by legal and ethical practitioners to make difficult decisions of law, ethics, and policy in major emergencies. The pervasiveness of legal and ethical issues during public health emergencies requires enhanced skills in how legal counsel, public health practitioners, emergency managers, and others make these decisions. Combining theories of decision science within a real-time simulation exercise, we sought to understand better how legal and ethical actors absorb, address, and use information and principles of law and ethics to make real-time choices when facing political, epidemiological, and other obstacles. The initial findings of this exercise illustrate the multifarious legal, political, and epidemiological bases for key decisions (eg, closing a school, declaring a state of emergency);

support the value of legal and ethical training to enhance knowledge and skills in legal triage; offer lessons about how legal and ethical decisions may align despite distinct justifications underlying how they are made; and identify critical components of legal triage that should be available for sound decision making in simulated or real-world environments. Assessing these types of critical choices in simulation events may ultimately assist practitioners in their efforts to wield law and ethics effectively to prevent avoidable morbidity and mortality in future public health emergencies.

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Received for publication March 15, 2011; accepted June 28, 2011.

The project was supported by the Robert Wood Johnson Foundation through a grant awarded to the Decision Theater and Sandra Day O'Connor College of Law, Arizona State University.

Disclaimer: Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not represent the policy or position of the Robert Wood Johnson Foundation.

Author Disclosures: The authors report no conflicts of interest.

Acknowledgments: The authors gratefully acknowledge the contributions of Ron Ordell, JD, Alicia Corbett, JD, Marjorie Baldwin, PhD, David Bodney, JD, John Shufeldt, MD, JD, MBA, Chris Stringham, JD, Eric Robinson, JD, Sarah O'Keefe, Samantha Boatman, Maxine Parks, Gitzel Puente, Colleen Healy, Alexa Kissinger, and Chase Millea for their research, editing, and formatting assistance with this article and the exercise.

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