Organizational Decision Making with Respect to Extreme Events: Healthcare Organizations Respond to California's SB 1953

by William J. Petak and Daniel J. Alesch

Research Objectives

Decisions about enhancing seismic safety in critical facilities require more than engineering choices about which technology is most appropriate. Such decisions are made in the context of organizational goals and strategy, financial capacity, choices about how safe is safe enough, and driving forces in the social, economic and political environment. This project is aimed at devising integrated decision-assisting models to help executives and engineers make informed choices about alternative approaches to improving seismic safety. The platforms integrate state of the art understanding of structural response, alternative means for mitigating the risk, normative decision-assisting models, and behavioral models of organizational choice and decision processes.

The Thrust Two research program of the Multidisciplinary Center for Earthquake Engineering Research aims at learning how to ensure the implementation, where appropriate, of technical means for reducing the effects of earthquakes on buildings and their contents. To achieve this end, three interrelated research projects are focused on two goals. The first goal is to learn how healthcare organizations make choices about whether and how to take precautions against extreme events, such as earthquakes, which vary in terms of size and where and when they occur. The writers have been working to understand that process. The second goal is to devise decision-assisting tools for healthcare organization leaders and for those who advise them so they might make appropriate choices.

Gary Dargush and Detlof von Winterfeldt are developing normative decision-assisting models to that end, each using a different approach, but both focused on generated and/or evaluating options for enhanced seismic safety at the level of the building and its components. Petak and Alesch (the writers) are developing a behavioral model of decision making at the level where organizational officers must make tradeoffs between mission, business objectives, and complying with regulations, often within the context of owning multiple facilities located in a variety of places.

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Previous Summaries

2001-2003:
Alesch et al.,
http://mceer.buffalo.edu/publications/resaccom/0103/07alesch.pdf

2000-2001:
Alesch and Petak,
http://mceer.buffalo.edu/publications/resaccom/0001/rpa_pdfs/02Alesch_final.pdf

The two research efforts are complementary. For those of us concerned with improving decision processes and choices, empirically-based behavioral models provide an appropriate starting point. Normative models must embrace the multi-variate rationality employed by real decision makers making real choices. The researchers worked to learn the extent to which their respective efforts can contribute to one another. They concluded that their approaches are more than complementary. It looks as though they can be linked to create a powerful set of decision-assisting tools for organizations faced with making choices about what, if anything, to do to protect themselves against low-probability/high-consequence events.

Linking the several models will not be a simple matter. Dargush and von Winterfeldt are building models that generate and evaluate alternative courses of action with respect to building, rebuilding, or retrofitting individual structures. We (Alesch and Petak) are working to understand how organizations frame the problem, visualize constraints, and devise alternatives within the organization's internal and external environments and, then, how they go about selecting from among alternative courses of action, given multiple objectives.

Together, we concluded that the Alesch and Petak model can provide important information about the range of alternatives healthcare organizations can realistically consider, given their circumstances at any given time, and the multiple goals they seek. That information would inform the von Winterfeldt models directly, but not by simply adding a line or two of equations to his models. Instead, the behavioral model will provide constraints and parameters.

Dargush is building two kinds of models. The first are based on simulating evolutionary processes. With those models, Dargush is able to test any number of engineering modifications to a set of equations representing a structure and subject that "structure" to a large array of seismic forces, representing many earthquakes of varying intensity located in many places in the structure's vicinity. These models nest within the Petak and Alesch model because of the way they generate and evaluate alter-

The decision-assisting platforms are intended to help illuminate the consequences of choice for both engineering consultants and their clients. Since clients must consider a wider range of variables than their engineers when making choices about seismic safety, the models are intended to couple organizational and engineering concerns into one or more models to help create recommendations for seismic safety that meet the needs of all the critical stakeholders. Stakeholders may include companies interested in developing markets for new technologies, critical care facility owners required to meet legislated levels of seismic performance, local communities faced with prioritizing rehabilitation projects and/or federal agencies responsible for resource allocation.

native solutions. Coupling these modeling approaches is intended to provide an input to the strategic and capital planning process at the individual building/structure level to help select the optimal approach to the structural problem.

Dargush's second model links with both the Petak-Alesch model and the von Winterfeldt model. The model employs dynamic programming to simulate changes in stocks and flows of resources and other critical phenomena in a hospital. The Alesch-Petak work shows how hospitals are unable to pursue some desirable alternatives, for example, when resources are low or credit unavailable. Simulating changes in stocks and flows through time can enable decision makers to better understand the conditions under which various alternatives might be feasible.

It became clear while working with von Winterfeldt and Dargush that we (Alesch and Petak) would have to specify a descriptive model of healthcare organization decision making. This paper reports on our first attempt at such a model. At this point, the model consists of a process flowchart with accompanying text.

The three teams will attempt to operationalize their respective models and integrate those models in a West Coast Demonstration Hospital during MCEER's Year 7 (which corresponds, roughly, with 2004). In that effort, we continue to assess and elaborate our model and to generate values for its several variables. Those values will be the primary linkages with the von Winterfeldt and Dargush models.

Research Strategy

In our efforts to devise both a greater understanding of organizational decision making about extreme events, we focused on organizational response to a single phenomenon that applies to a large number of diverse California hospitals and healthcare organizations. In 1994, California enacted legislation requiring hospital facilities built before 1973 (at which time tougher standards were enacted for hospitals yet to be built) to be brought up to contemporary standards of earthquake resistance or to be withdrawn from service as an acute care facility. That law affected 1,023 individual buildings, about 38 percent of the hospital buildings in the State. Consequently, the statute has a broad impact across the State. The legislation, known as SB 1953, affords an excellent opportunity to identify and examine healthcare organization decision making on a specific set of seismic safety issues at essentially the same time and across a broad spectrum of healthcare organizations varying in size, financial viability, organizational structure, and location.

We have built on the research of others in public policy implementation and in organizational decision making.

Previously, we reviewed the policy development and implementation literature (Alesch and Petak, 2001). Much of that literature focuses on explaining why public program implementation was ineffective in one or another setting. This is valuable, but few of those who contributed to the policy implementation literature go beyond looking at governmental agency

The decision support systems under development in this effort will incorporate the seismic retrofit technologies and response modification methods developed in a parallel effort being carried out by Bruneau, Reinhorn and others in Thrust Area 2.

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efforts to implement programs. In some instances, public agencies do actually take the steps necessary to result in the desired changes to the target system. In others, however, public agencies implement programs by attempting to induce or coerce private organizations to take the steps needed to effect the desired outcomes. Such is the case with SB 1953. Implementation for California's Office of Statewide Health Planning and Development (OSHPD) consists mainly of getting individual organizations to actually take the steps necessary to comply with the regulations. Those organizations may be investor-owned, not-for-profit, or governmental; what they have in common, for our purposes, is that they are called upon by state level public policy to take actions or to change their behavior so as to cause that public policy to have the desired community outcomes. Consequently, it is important to understand the decision making process in which organizations choose whether and how to implement risk reduction measures.

Those scholars who focus on program implementation rarely look at decision making by the multitude of organizations actually charged with taking the steps necessary to bring about the desired outcomes. At the same time, researchers concerned with organizational decision making seldom take cognizance of programs designed by others and intended to induce various behaviors in those organizations. To a somewhat greater extent, decision theorists have taken cognizance of the contextual environment within which organizational decision makers frame problems and make choices.

We think that understanding public policy implementation requires understanding the processes by which policy is enacted and the fundamental design of policy sanctions and incentives, as well as understanding the decision processes and criteria employed by organizations that are intended to actually produce the desired outcomes. Only then can one understand how to increase the probability that implementation will follow enactment. However, at the same time one identifies impediments to implementation, it is appropriate to focus on the other side of the equation; that is, under what conditions will organizations choose to implement earthquake hazard risk reduction measures?

Kingdon (1984) argues that it is necessary to improve the policy process. We recognize the need for better public policy that takes into consideration the larger picture and are conducting research on that as a parallel activity, but this part of our work focuses on organizational decision making in response to a mandate. For the larger question, several important questions have to be addressed. First, one must ask the extent to which "community outcomes" were considered in terms of delivery of health care needs to the people. Did the State consider this, or was it driven by a narrower objective of simply reducing seismic risk at the building level? Policy is silent on how many hospitals in which regions would be needed to provide the desired level of care following an earthquake. Further, the process does not appear to have taken into consideration all

stakeholders' views, nor, apparently did lawmakers consider the impact on the overall health care system. The policy and legislative history seems to be silent on the need for protecting patients, staff, and capacity for other than acute care facilities, including psychiatric care, transition care, nursing home care, and elderly/senior citizen care facilities. They are all considered hospitals and under OSHPD oversight and licensing. Organizations could choose to remove an acute care facility from the inventory rather than fixing or replacing it, thus reducing the service available to the community.

For the current effort, it became clear that it would be necessary for us to devise a process model of how healthcare decision makers make choices about making investments to mitigate extreme events. The model must reflect actual behavior, as ascertained through field research, but it must also be grounded in theory drawn from both organizational decision making and public policy implementation. Our strategy became one of, first, documenting and generalizing processes and criteria employed by hospitals and, second, working to place the preliminary model into a more theoretical and more generalizable model. That way, the model would have application to a broader set of organizations faced with making choices about what to do when faced with extreme events – those events characterized by a low probability of occurrence and high consequences should they occur.

We conducted an extensive inquiry into SB 1953. We set out to learn how it came to be enacted as well as the regulatory requirements derived from the law. We then sought, with individual healthcare organizations, to learn what they decided to do in response to the legislation and program regulations and how they made that decision.

We employed soft systems methods (Checkland,1999) coupled with a grounded theory approach (Strauss and Corbin,1998) to develop and document our understanding of the processes and choices made by various healthcare organizations. We talked with more than 40 knowledgeable persons in northern and southern California, face to face, in open-ended discussions to learn about hospital responses to SB 1953. We talked with many of these people several times over a period of almost three years. These include hospital administrators, structural engineers, state-level policy implementors, staff from professional and organizational associations, and persons who were involved historically in the drafting and enacting SB 1953 process to try to get as complete an understanding from as many perspectives as we could. These people were able to provide specific information about the responses of a diverse set of healthcare organizations to SB 1953. Interviewing actors in the process who held different kinds of positions and different views about the same subject matter enabled the researchers to develop what they think is an accurate portrayal of how SB 1953 has been viewed and addressed.

Prerequisites to Action as a Fundamental Element of the Model

Prerequisites to Action: March and Olsen's Garbage Can

March and Olsen's Garbage Can Model of organizational decision making (March and Olsen, 1973) was useful when we attempted to understand why it took California municipalities so long to adopt retrofit ordinances for unreinforced masonry buildings (Alesch and Petak, 1986). The model posits that decisions are not made, nor is action taken, unless four independent streams come together simultaneously. The streams consist of a problem (about which there is a critical mass of agreement within the organization), a solution to the problem (which is credible for a critical mass of actors within the organization), space on the organizational agenda, and one or more persistent advocates pressing the issue. An important premise is that each of the four streams is independent of the others. That is, problems exist quite separately from whether solutions to them exist. Conversely, solutions abound quite independently from problems. Many people have a favorite solution that they try to impose on any number of problems, regardless of the quality of the match. It is important, too, to understand that even if a problem exists in the minds of organizational decision makers and a technical solution exists that most agree would address the problem effectively, nothing will happen unless the issue makes it to the top of the organization's agenda.

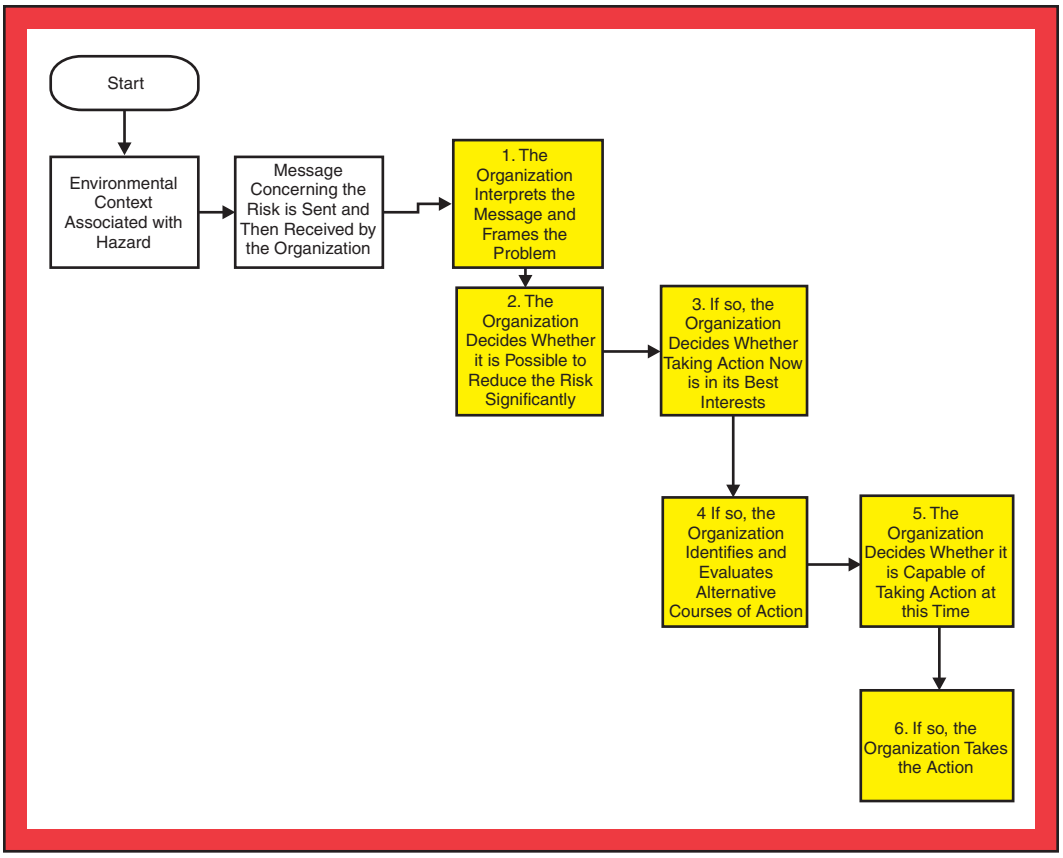
Although a policy may make its way onto an agenda and ultimately be adopted by a public policy making body, there is no certainty that implementation will occur. Those stakeholders required to implement the policy must also accept the definition of a problem and agree that the solution embodied in the policy is appropriate in their context. They must be in agreement with the policy as a solution to the problem as they understand it. Thus, in addition to the convergence of the four independent "streams," it is important to gain acceptance of the policy by the individuals and organizational decision makers critical to implementation. Addressing the issue associated with the need to gain acceptance by decision makers in multiple organizations, Lober (1997), building on the work by Kingdon (1984), suggested that the complexity created by the need to address multiple organizations or stakeholders requires an approach that allows for their collaboration in the agenda setting process. In the context of the "garbage can" model, this means adding and facilitating an "organizational stream" to facilitate collaboration necessary to increase organizations and stakeholders understanding of the problem, thereby helping to increase their willingness to accept the selected policy solution option and develop acceptable implementation approaches.

Moving Beyond March and Olsen: Five Prerequisites to Organizational Action

March and Olsen's prerequisites led us to consider whether there were other prerequisites to organizational action, particularly in the context of making choices about what to do about reducing potential losses from low-probability/high-consequence phenomena (Alesch and Petak, 2001).

Our analysis of decision making in response to SB 1953 suggested five fundamental organizational prerequisites for adoption and implementation of risk reduction measures (see Figure 1). These prerequisites are not inconsistent with those of March and Olsen, but we think they build on their construct. Our prerequisites are sequentially cumulative.

Awareness of the Issue. First, the organization must be aware of a threat, opportunity, or challenge from its relevant environment and believe it to be salient to the organization. This is similar to March and Olsen's problem prerequisite. We have expanded the notion to encompass both problems and opportunities. We also add the notion that an organization may become aware of the threat in any of several ways. It may detect a signal from its environment and interpret it as a threat. Or, it might have a sophisticated monitoring program that detects signals or patterns in the environment and translates those as either a problem or an opportunity. Alternatively,



■ Figure 1. Oversimplified Model of the Healthcare Organization Seismic Safety Investment Decision

as in the case of SB 1953, a message might be sent directly to the organization by a regulator.

Internal Locus of Control and Belief in its Own Efficacy. Second, a critical mass of decision makers in the organization must believe that it is theoretically possible for the organization to take action to reduce adverse effects should the threat occur. The organization must feel that, at least in the abstract, it is possible to mitigate potential consequences of the threat. This requires that the organization have an internal locus of control and a sense of efficacy with respect to the threat; the "problem" cannot be perceived as either intractable or as existing outside the organization's locus of control. March and Olsen do not explicitly acknowledge the need for an internal locus of control and a sense of organizational efficacy with respect to the problem or opportunity. This is a crucial prerequisite and an addition to their model.

In the Organization's Best Interests to Act Now. Third, the organization must believe that it is in its best interests to act now rather than later or not at all. This is an agenda issue: how does this problem measure up to other concerns and priorities? Where should it be placed in the stack of things the organization has to deal with? We added a temporal dimension and proactive solution-seeking element to the March and Olsen model.

An Acceptable Solution Must Exist. Fourth, the organization must find or create a means for addressing the problem or opportunity that is congruent with the organization's values, mission and goals, fundamental strategy, and constraints. This is comparable to March and Olsen's solution.

Must Have the Capacity to Act. Fifth, the organization must believe that it has the capacity to act at this time. Even with an agreed upon problem, an agreed upon solution, and a desire to act, an organization without requisite resources at a specific time and place will be unable to bring everything together to take the desired action. In that case, the organization must recycle its process to articulate, perhaps devise, a new set of options.

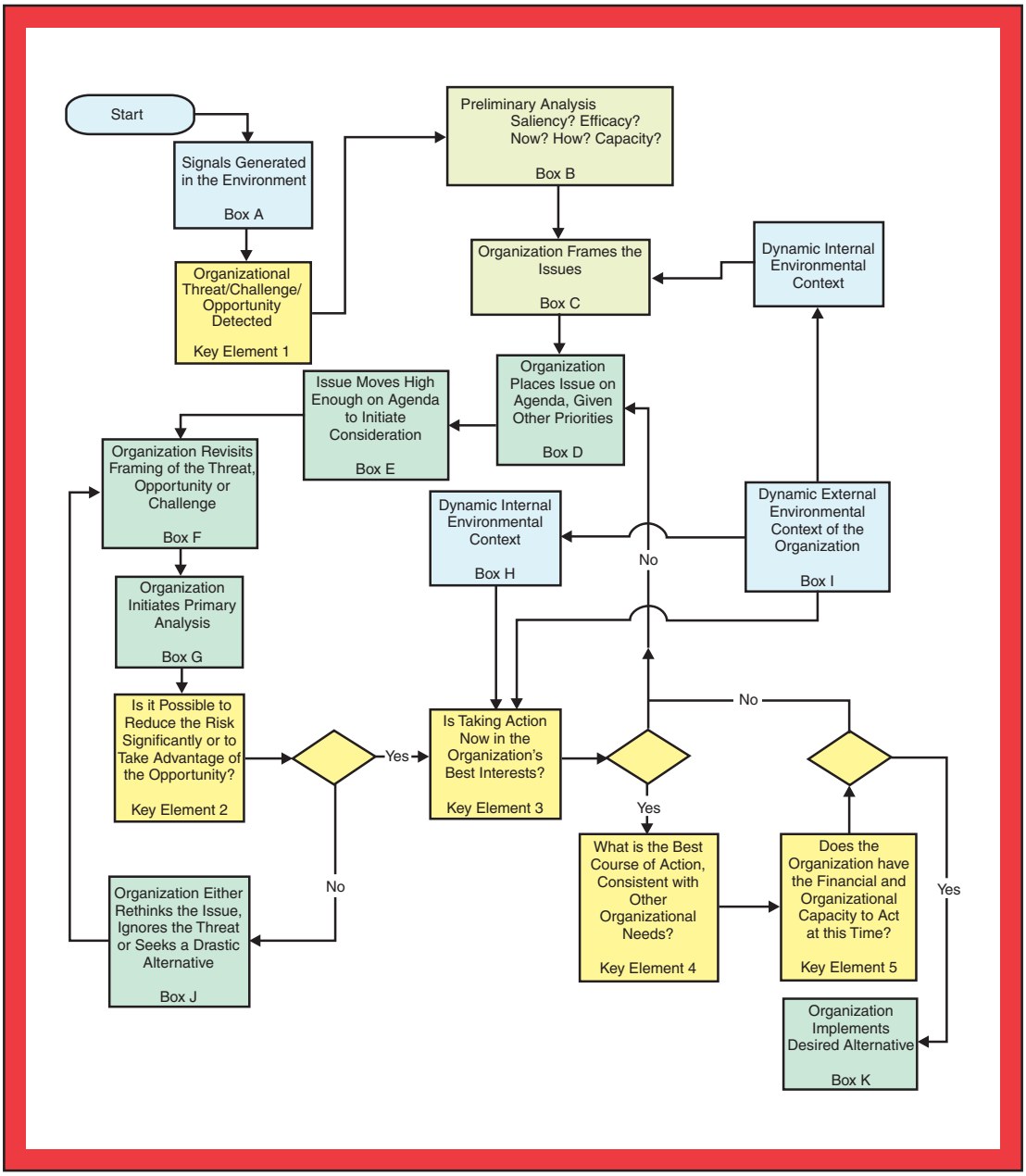
Elaborating and Applying the Model: Organizational Choice in Response to SB 1953

From our discussions with system actors, we created a flow diagram to represent the approach most healthcare organizations employed to decide how to respond to SB 1953. We framed it in terms of our list of prerequisites to organizational action to make it easier to generalize the model. We encountered some difficulty in developing the model, primarily because, while all the organizations we studied engaged in the same general process, individual processes varied in detail and emphasis. Moreover, virtually none of the organizations engaged in a strictly linear approach to solving the problem. Most organizations addressed it iteratively, circling back to earlier assumptions, building in new information and

new perceptions, and rethinking options, discarding some, fleshing others out, and searching for new ones.

Another complicating factor is that most hospitals or healthcare campuses do not get to make the mitigation investment decision by themselves. When SB 1953 was enacted, there were many stand-alone facilities able to make those decisions. Today, most hospitals are part of larger corporations; individual facilities submit budget requests to the home office for final decisions. The model does not yet do a particularly effective job of integrating the multiple layers of corporate decision making. That will have to be added.

The process flowchart depicted in Figure 2 represents our concep-



■ Figure 2. Preliminary Model of the Healthcare Organization Seismic Safety Investment Decision

tion of the behavioral decision process employed by healthcare organizations when making the mitigation investment decision. It is a preliminary model that the writers plan to test and elaborate, using an MCEER Demonstration Hospital as a test case.

Believing a Threat Exists: The Organization Picks up the Signal, Interprets it, and Frames the Problem

Our model requires that the organization receive a signal that there is a threat to its well-being or that an opportunity exists. For the sake of brevity, from now on we will refer to the signals only as threats. The signal is generated within the organization's relevant environment (Box A, Figure 2). The organization detects the signal, interprets it, confirms its authenticity, and conducts a preliminary analysis before it begins to frame the issues or problems implicit or explicit in the signal (Key Element 1 and Box B, Figure 2).

Message Transformation: Replacing the Initial, Ineffective Threat Message with a New One

We began with the assumption that the message sent to California healthcare organizations was that they were in danger of an earthquake that was likely to damage their facilities and reduce their capacity to carry out their missions. That message had been sent to Californians and to hospital administrators many times before by structural engineers, the California Seismic Safety Commission, reports of damage to hospitals in previous earthquakes, and from seemingly endless warnings from geologists and seismologists. A strong message was sent directly to hospitals in the form of the 1973 legislation requiring hospitals built after that date to meet high structural and nonstructural standards.

We found that hospital owners and administrators were aware of earthquakes, but that awareness failed to generate sufficient concern among most of them to alter their pre-1973 acute care facilities. Some hospital decision makers did not believe that their pre-1973 structures would collapse from earthquakes. Others had higher priorities, including how to provide service to the rapidly growing California population. It would have been extremely difficult to withdraw acute care facilities from the inventory and keep pace with providing high levels of demand for service.

Sometimes, when one message fails to have the desired effect, those sending the message replace it with a different one in hopes of stimulating action. With SB 1953, the State of California changed the message from "there is a potential for losses from earthquakes if you do not alter those old buildings" to "you will lose your hospital license if you do not repair or replace old buildings being used for acute care." The new message contained a far more plausible risk in the minds of administrators, making it much more salient and led to immediate responses, although not all the responses were those desired or expected by regulators.

The Contextual Setting of the New Message

SB 1953 was neither drafted nor enacted in a vacuum. Nor was it legislation hastily drafted and enacted in the immediate aftermath of an earthquake. It emerged from a context in which hospital regulators and structural engineers were genuinely concerned about the potential effects of seismic events on hospital patients, staff, and capacity.

Earthquake safety advocates were moved into action following the 1971 Sylmar earthquake in which hospitals failed, lives were lost, and post-event emergency health care capacity was diminished. This event led to enactment of legislation in California in 1973 requiring that all new hospitals be built to higher standards. Existing hospitals were excluded. Those who helped draft the 1973 Act expected that the stock of existing hospitals would be replaced over time. After all, many of them were quite old. The 1994 Northridge earthquake resulted in significant damage to several pre-1973 hospitals, thus stimulating earthquake safety advocates, mostly structural engineers, to be concerned that the stock of pre-1973 hospitals was not being taken out from service quickly enough and to believe that additional regulation was necessary to speed the process.

Healthcare organizations learned about SB 1953 as it was being developed and considered. For the most part, they appear to have supported the enactment of SB 1953, but they did so within a context in which other bills being considered were seen as Draconian. For many healthcare organizations, SB 1953 was the lesser of two evils.

First Iteration: A Preliminary Assessment

Once a message comes to the attention of an organization, we believe that organizations first undertake a quick and dirty analysis (Box B, Figure 2.). This preliminary analysis answers several questions that affect how the organization subsequently frames the problem and a response to it:

- Is the message legitimate and credible?
- If legitimate and credible, how salient is the message content for the organization?
- If legitimate, salient, and credible, what are the implications for the organization?
- What is the quality or appropriateness of the solution and the cost and disruption?
- Would acting on the message be congruent with organizational values, goals, and strategy?
- Are there higher priority issues on the agenda that preclude responding to the message at this time?

Organizations framed the challenges posed to them by SB 1953 based on those preliminary scans (Box C, Figure 2). How the individual organization framed the problem conditioned its posture with respect to it and initially limited or focused its choice about how to respond.

In the case of SB 1953, the organizations appear to us to have made a quick assessment of the likely burdens associated with

complying and of any benefits that might realistically derive from complying. The analysis proceeds with the organization drawing alternative means for complying being from its repertoire of invented, recalled, or uncovered solutions and, then, comparing that with the organization's available resources.

If no satisfactory solution is immediately apparent from the evoked set, then we believe that organizations consider the consequences of not complying. We call this a "consequence analysis." A consequence analysis may be formal or informal, extensive or done on the back of an envelope. It is, essentially, an exercise in which the organization asks several key questions: How likely is it that the sanctions implicit or explicit in the mandate will be employed if the organization does not comply? If the sanctions are likely, how long before they are imposed? What might be the consequences of not addressing this issue now for organizational viability in terms of its mission? Decision makers think about the likely consequences of inaction for both the organization and its leaders. What are the possible consequences for the administrators and the responsible governing body? Would there be political consequences? How much hassle will complying or not complying generate?

Only rarely does this initial assessment proceed linearly or according to an orderly protocol. Instead, the process seems to move sporadically and iteratively as new ideas occur, as communication takes place with other organizations, and as decision makers struggle to learn what is possible in the environment within which they are operating.

The healthcare organization is faced, continually, with setting priorities. Creating priorities necessitates making tradeoffs between focusing on issues that are both urgent and important and those that are important but not as urgent. Tradeoffs are made between dissimilar goals. California hospitals seek an "optimized" outcome by trading off return on investment in dollar return with return in social (mission) terms and return in regulatory compliance terms. Each organization trades off within its context.

The priority attached to various issues depends on characteristics of the organization itself, including the extent to which decision makers believe they can anticipate what will happen as a consequence of changes in the external environment, cash flows and demands made on those resources, unrelated internal issues, and organizational mission. The context within which priorities and agendas are set changes continually and, sometimes, quickly. Consequently, what might seem like a great idea at one time might be seen as wholly inappropriate at another.

In the case of SB 1953, almost all hospitals with pre-1973 buildings responded to the initial requirement of the regulations: they submitted certifications to the State as to whether specific buildings were subject to SB 1953 provisions. Subsequent action, however, depended on where the organization placed the matter on its agenda (Box D, Figure 2).

Interpreting the Message and Framing the Issues: The Crucial Importance of Organizational Environment

SB 1953 caused most organizations to ascertain the extent to which it was technically possible to retrofit the affected buildings to the required standards. Some buildings could be retrofitted relatively simply and inexpensively, but retrofitting others posed almost intractable problems for engineers and hospital operators alike, especially given the need for the hospital to continue operations during retrofit. Second, the healthcare organizations had to determine whether they had sufficient resources to make the changes. Because 85 percent of California hospitals entered a string of very difficult financial years as SB 1953's clock began to tick, even if it were technically feasible to comply, many, if not most, hospitals simply could not because they did not have enough money, credit, and financial assistance from the federal and state governments.

Within a few years of 1994, when SB 1953 was enacted, the healthcare industry underwent extraordinary structural and financial changes. Rapid changes in healthcare economics and the increasingly bewildering structure of the industry created incredible instability and uncertainty as healthcare decision makers tried to make reasonable business decisions across a broad spectrum of problems and issues.

When SB 1953 was enacted, most California healthcare organizations were generating profits or, in the case of not-for-profits, surpluses. By the late 1990's, however, more than 80 percent of them were losing money (Shattuck Hammond, 2001). What happened and what were the implications for implementing SB 1953?

Two basic changes affected the industry's financial situation. First, managed medical care increased dramatically during the second half of the 1990s, largely as a response to rapidly escalating health insurance premiums. From 1995 to 2005, participation in managed care programs was expected to increase from 12.2 million Californians to 20.1 million (Shattuck Hammond, 2001). Traditionally, hospitals had charged patients for services received on a cost-plus basis. In the managed care environment, they are usually paid a fixed price for a service, regardless of their costs. Competition among HMOs for customers led them to cut payments to hospitals for treatment, often to less than the hospital's cost of providing the service.

At the same time HMOs were experiencing explosive growth, the Federal Medicare program was experiencing explosive cost increases. In 1999, more than 40 percent of California's Medicare population was enrolled in Medicare HMOs. Medical hospital expenses per beneficiary more than doubled from 1970 to 1975 and then doubled again by 1980 (Shattuck Hammond, 2001). The financial problems for hospitals were compounded by the 1997 Federal Balanced Budget Act which called for reducing Medicare expenditures by $215 billion over five years. The number of Medicare patients continued to increase, however, so, to meet

that goal, the Medicare program cut reimbursements to hospitals and healthcare professionals for procedures, usually to below the cost of providing the services. While this was happening, hospital costs were escalating. The cost of new medical equipment was skyrocketing and the cost of supplies was increasing much faster than the Consumer Price Index.

Some hospitals, unable to staff themselves with the required number of nurses, had to reduce the number of beds available for acute care. Administrators found themselves with declining revenues per patient, higher direct costs per patient, and allocating fixed overhead costs across fewer patients.

Hospitals responses to this situation were generally rapid and rational. Hospitals and physicians reorganized themselves to gain efficiencies. Hospitals tried to develop integrated delivery systems by aligning themselves with groups of physicians. This way, they thought, they could reduce costs and cope with "capitation," a form of payment to healthcare organizations from insurers that pays a set amount of money per enrolled member per year, regardless of the number or types of treatment required.

Stand-alone hospitals merged with others in hopes of realizing economies of scale. Bigger, stronger corporations with more assets could presumably benefit from integrated management and operations. Hospital mergers swept the nation, peaking between1995 and 1997, during which time there were 680 hospital mergers.

Despite their efforts, most California hospitals could not achieve efficiencies fast enough to make up for the reduction in revenue and the increases in the costs. By 1999, more than half of California's hospitals were losing money.

The financial distress in the second half of the 1990s was not shared equally. Hospitals most likely to have operating losses were small, owned by a local government (municipality, county, or special district), rural, not part of a corporate healthcare organization, and/or serving mostly poor patients. Those hospitals most likely to have positive operating margins were larger, investor-owned, urban, part of a large healthcare organization and not serving a large proportion of poor patients (Shattuck Hammond, 2001).

In 1995, the median operating margin for California hospitals was 1.65% compared with 2.8% nationally. By 1999, the median California hospital operating margin had dropped to negative numbers, 0.33% while the national median operating margin had dropped to 0.4%. In 1999, the top quartile of California hospital corporations experienced positive operating margins of about 5.72%, but the lowest quartile was experiencing a 7.76% operating margin. California's most profitable 25%, almost all of them investor-owned hospitals, were outperforming the top 25% nationally (Shattuck Hammond, 2001).

In the midst of the financial crisis, the California legislature decided that requiring one nurse for every six patients in acute care facilities was insufficient, and, in 2001, it enacted a revised requirement for one nurse for every four patients. It is unlikely that there are enough nurses in California to meet the new requirements. Consequently,

healthcare organizations are faced with having to pay nurses enough to attract them from other states and foreign countries or closing portions of their facilities so they can meet standards. Whatever the medical merits of the new nursing requirement, the financial burden will further depress net operating revenues and some facilities will become insolvent.

In this milieu, investor-owned healthcare organizations with many facilities had more flexibility and options than not-for-profit and publicly-owned hospitals. Some readers will leap to the assumption that investor-owned is always more efficient than not-for-profit or public facilities. That is not necessarily the case. Hospitals that trade off meeting shareholder objectives with organizational objectives of service in poor areas or to disadvantaged populations usually find that "efficiency" has more than one meaning. They see themselves as serving society's needs rather than the needs of shareholders, making the question of efficiency more complex. Investor-owned organizations can pick and choose where, how, and to whom to provide service. They are usually in a better position to locate in upscale markets and to provide services with favorable reimbursements from insurance and Medicare. Public hospitals, and many not-for-profit hospitals, rarely have that option. Indeed, they are often located in areas where the population is least able to pay. Local governments, suffering their own fiscal problems, have been parsimonious in providing sufficient funds for capital infrastructure. Not-for-profit hospitals typically have missions to serve particular neighborhoods or communities. They can benefit from some of the same practices used by investor-owned hospitals, but not all of them.

The financial and structural changes in the healthcare industry have much to do with the differing responses of healthcare organizations to SB 1953. Hospitals experiencing financial hemorrhaging can rarely justify spending money on seismic retrofitting. At the same time, healthcare organizations that have been able to remain profitable may be in a position to benefit from the mandated seismic improvements. The costs of retrofits provide legitimate reasons to eliminate unprofitable facilities, either by selling or closing them. Since so many healthcare organizations are in difficult financial straits, this presents well-heeled investor-owned healthcare organizations with the opportunity to strengthen their market position by acquiring desirable facilities and locations from those financially-strapped organizations. The largest and most profitable investor-owned organizations might greatly expand their market share. Unfortunately, one can also expect those organizations to expand their market share by building on the profitable areas of healthcare, leaving those procedures and services with low or below cost reimbursements to public and not-for-profit hospitals.

The upshot is that, depending on their fiscal position and their primary organizational objectives, it makes sense for some healthcare organizations to support SB 1953 and to move forward to comply with its provisions on schedule.

"The financial and structural changes in the healthcare industry have much to do with the differing responses of healthcare organizations to SB 1953."

Compliance is easier for them because they have a variety of options for dealing with inadequate facilities. Other organizations might barely be able to comply and some simply cannot.

Outcomes of the First Iteration

Almost all healthcare organizations complied with SB 1953's first requirement, specifying to OSHPD the classification into which their individual acute care structures fell. Buildings not meeting specified standards were classified as most likely to collapse in an earthquake. A few healthcare organizations moved promptly to comply with the next set of requirements in the OSHPD SB 1953 timetable. Most, however, put SB 1953 on their agenda for later action.

Second Iteration

Issues May or May Not Move up the Agenda

Issues move up the agenda because their priority changes relative to that of other issues. This occurs because the organization has worked its way through other, higher priorities or because internal or external conditions change, making considering the issue more appropriate.

Organizational leaders frequently revisit the ordering of items on their agenda to determine whether they are still placed appropriately (Box E, Figure 2). As an agenda item moves closer to consideration, the organization may also revisit its initial framing of the issue. The reframed issue may have a significantly different priority than it did in its previous configuration (Box F, Figure 2).

Initiating the Primary Analysis

As an item moves up the agenda toward focused consideration, the organization goes through a more careful and detailed analysis of how it relates to the prerequisites for organizational action (Box G, Figure 2).

Initially, the organization revisits the question of whether anything can be done to preclude the adverse event from happening and the expected consequences from occurring (Key Element 2, Figure 2). This decision is often made subconsciously, given that the answer to the question is based primarily on the organization's sense of corporate efficacy and on its sense of locus of control. Some organizations in some cultures might think there is nothing they can do to prevent an event or how a regulator may decide; they believe the matter is out of their hands. Others may perceive the problem as intractable and throw up their hands in resignation. We think that one's belief about whether anything can be done to protect against the likelihood of an extreme event varies by culture and by individual psychological makeup. We visualize a continuum of individuals and organizations ranging from those that believe they can do almost anything to those who believe they are simply pawns in some great game over which they have no influence.

In our model, if the organization believes it cannot do anything to address SB 1953 regulation and

avoid the sanctions, the organization cycles back to revisiting the threat (Boxes J and F, Figure 2) and to reframing the issue. The organization would then, we think, seek a fairly radical solution to its dilemma, such as ignoring the legislation and regulations, hoping they will go away, closing the facility, or initiating political action to change the law.

Should the Organization Take Action at This Time?

Assuming the organization believes it can take action to reduce or defer the threatened sanctions, the third element in our prerequisites construct is that the organization has to make a decision as to whether it is in its best interests to take action now (Key Element 3, Figure 2).

As discussed above, many hospital organizations had serious financial problems in the late 1990's and gave those concerns a much higher place on the agenda than they gave to SB 1953. They recycled dealing with SB 1953 back to the agenda, where it was assigned a priority that the organization deemed appropriate (Box D, Figure 2).

By tracking individual organizations through time, we found that how specific organizations attempted to deal with SB 1953 changed through time as financial conditions and the organizational environment changed. SB 1953 moved up the agenda in numerous healthcare organizations simply because they became financially viable. By 2004, about half of California's healthcare organizations had begun to reestablish financial viability in a turbulent environment; they found ways to cope with parsimonious reimbursements from insurance firms, HMOs, and Medicare. Some reorganized so their corporate structure would enable them to get more reimbursements. Some chose to focus on high reimbursement medical procedures and uninsured procedures for private patients instead of procedures for which reimbursements were inadequate to meet costs. Some merged with organizations operating in several states; profits from those other states subsidized the higher costs of doing business in California, but still permitted the not-for-profit to pursue the non-monetary elements of its mission.

What happened during the decade since 1994 is that healthcare organizations learned to be businesses. Some private and not-for-profit healthcare organizations survived because they were in the right place at the right time. Some that didn't survive were simply in the wrong place at the wrong time. Generally, however, the organizations that survived were those that learned to use sophisticated business practices. Even if they did not adopt sophisticated analysis, public hospitals survived because there was no other option; in many cases, they were the hospital of last resort for people in rural areas and inner cities and for the poor and uninsured.

Scanning for Solutions and Selecting a Course of Action

In the preliminary scan of the implications of SB 1953, most healthcare organizations looked at individual buildings that were not in compliance to see what it would take to retrofit them. A ret-

"...decision makers had to find a solution that was congruent with immediate affordability, long term financial viability of the organization, serving the organizational mission, complying with regulations, and fundamental corporate strategy."

rofit strategy was virtually implicit in the legislation, but, on further analysis, retrofitting did not make much sense to most healthcare decision makers. Most hospital buildings built before 1973 are not convenient for current medical practice. Moreover, the estimated cost of retrofit was typically high, particularly when one factored indirect costs into the equation. Substantial retrofit would open the doors to having to meet current specialty code provisions for people with disabilities, asbestos, and so forth. Then, after the initial structural retrofit was completed, the hospital would have to do nonstructural retrofit to meet the next deadline, which was likely to require reopening walls and ceilings. Moreover, the costs of shuffling patients from space to space and operating in constant turmoil led hospital decision makers to consider different alternatives.

Individual healthcare organizations considered an array of solutions. First, they could change occupancy of the structure from acute care to something else. If the structure was not used for acute care, it was no longer subject to the Act. It could be used for administration, dorms, chronically ill patients, or out-patient services. Second, the healthcare organization could build a new facility. Third, it could dispose of the structure or structures. Fourth, it could close the facility. This option, of course, appeared more desirable to organizations with many facilities than to those with only one or two. Finally, the organization could choose to not comply with the regulations, choosing instead to seek other ways to ensure that the State would not revoke its license.

Those with resources and numerous facilities decided which facilities to close, which to sell, which to retrofit, and which to convert to non-acute care uses.

Healthcare organizations without the financial wherewithal to emulate their better-off counterparts faced tough problems. Fortunately for them, the SB 1953 compliance dates were several years off, providing them with some time to come up with a plan that was feasible for them individually. In some cases, the organization decided (or hoped fervently) that there really was no serious risk of losing their license because of not complying with SB 1953 and its time line: "If they shut us down, who will provide health care here?" or "They won't do it because the political pressure will be too great." Healthcare organizations that saw their technical, logistical, or financial problems as intractable, at least in the existing milieu, tended to be resentful of the regulation, denied the threat of adverse consequences to them from earthquakes, and sought changes in the law.

If the consequences of not complying with the legislation were deemed sufficiently severe to warrant action, the organization was faced with deciding what to do (Key Element 4, Figure 2). Our model indicates that the organization does additional analysis to learn whether a technical and financial solution to its problem exists.

Rarely did one option appear immediately as superior to all others for an individual organization.

There is not necessarily one best solution. Engineers will have a number of approaches – solutions – to the problem at varying costs and time and complexity and at varying levels of acceptability by the regulator. The regulation is not totally prescriptive as to how to accomplish the objectives. For most healthcare organizations, however, the question of how to respond to SB 1953 was rarely framed as a retrofit problem. Virtually all the organizations we talked with viewed the challenges posed by SB 1953 in the strategic context of their organizational objectives and longer term development, given the unsettled and rapidly-changing economic and financial context in which hospitals found themselves. Decision makers had multiple criteria against which alternatives were considered: an acceptable solution had to meet all of them. The criteria varied by organization, but, generally, decision makers had to find a solution that was congruent with immediate affordability, long term financial viability of the organization, serving the organizational mission, complying with regulations, and fundamental corporate strategy.

Yet another factor complicates the process. Whereas the single facility, stand-alone hospital was commonplace in the 1980s, it all but disappeared by the turn of the century. As a result, relatively few hospital administrators were able to make the final choice about whether and how his or her hospital would respond to SB 1953 or any other issue requiring substantial capital expense. In some instances, the local hospital is required to submit its proposal to the parent organization to compete for budgetary allocations with other hospitals. At the corporate level, officers decide where capital outlays will be made and base those decisions on the well-being of the collective enterprise. Consequently, there are usually two decision processes. The first is at the level of the individual facility, where administrators decide what to ask for and a second is at the corporate level where priorities are set and allocations are made among the individual facilities. This aspect of the decision process has yet to be modeled.

Does the Organization Have the Capacity to Act Now?

If the organization found an acceptable solution, it would then move on to determining whether it has sufficient financial resources, staff, talent, and attention capacity to act at this time (Key Element 5, Figure 2). Organizational capacity is often an issue now that so many organizations have downsized to reduce costs and, in so doing, reduced slack needed to address new issues. If the organization decides it does not have sufficient resources, it would typically add "get more resources" to its agenda and place that on the agenda (Box D, Figure 2). If the organization believes it has, or can obtain, sufficient resources, it moves forward to implementation (Box K, Figure 2).

Next Steps

The next step in the development of the integrated decision support system will take place in MCEER's Year 7 during 2004. Petak and Alesch will check the behavioral model's validity by applying

it to choices made in a West Coast demonstration hospital. They will attempt to rough out broad quantitative values for several parameters in the model and will attempt to actually couple the behavioral model with both the von Winterfeldt and Dargush models, again using the West Coast demonstration hospital as a test site. The exercises with the single facility will enable us to enhance and refine the behavioral model and to identify and, presumably, overcome difficulties in coupling the model with the normative models being tested by von Winterfeldt and Dargush.

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