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Seismic Safety in California Hospitals: Assessing an Attempt to Accelerate the Replacement or Seismic Retrofit of Older Hospital Facilities

by

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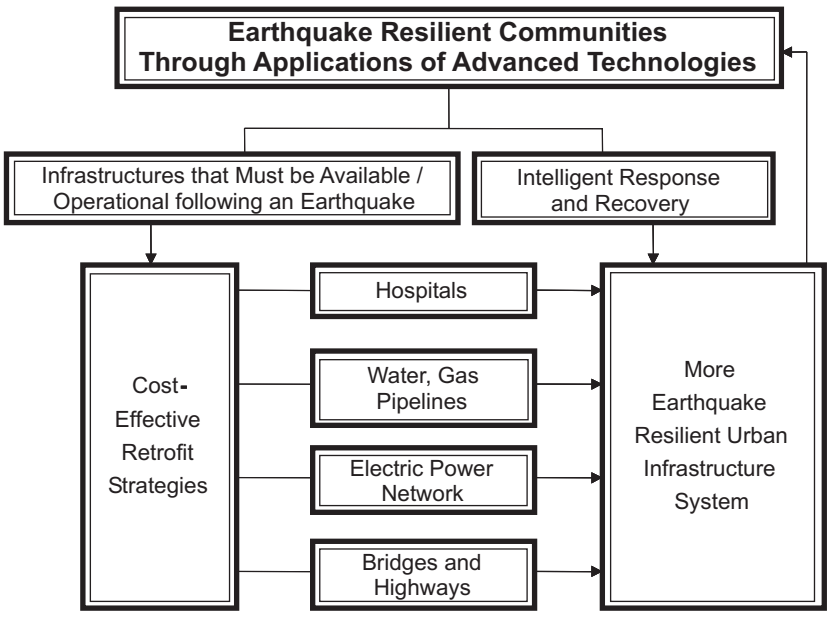
Preface

The Multidisciplinary Center for Earthquake Engineering Research (MCEER) is a national center of excellence in advanced technology applications that is dedicated to the reduction of earthquake losses nationwide. Headquartered at the University at Buffalo, State University of New York, the Center was originally established by the National Science Foundation in 1986, as the National Center for Earthquake Engineering Research (NCEER).

Comprising a consortium of researchers from numerous disciplines and institutions throughout the United States, the Center's mission is to reduce earthquake losses through research and the application of advanced technologies that improve engineering, pre-earthquake planning and post-earthquake recovery strategies. Toward this end, the Center coordinates a nationwide program of multidisciplinary team research, education and outreach activities.

MCEER's research is conducted under the sponsorship of two major federal agencies: the National Science Foundation (NSF) and the Federal Highway Administration (FHWA), and the State of New York. Significant support is derived from the Federal Emergency Management Agency (FEMA), other state governments, academic institutions, foreign governments and private industry.

MCEER's NSF-sponsored research objectives are twofold: to increase resilience by developing seismic evaluation and rehabilitation strategies for the post-disaster facilities and systems (hospitals, electrical and water lifelines, and bridges and highways) that society expects to be operational following an earthquake; and to further enhance resilience by developing improved emergency management capabilities to ensure an effective response and recovery following the earthquake (see the figure below).



A cross-program activity focuses on the establishment of an effective experimental and analytical network to facilitate the exchange of information between researchers located in various institutions across the country. These are complemented by, and integrated with, other MCEER activities in education, outreach, technology transfer, and industry partnerships.

This is the second of three reports to be published resulting from a project on overcoming obstacles to implementing hazard mitigation policies against extreme events. This report focuses on the development and implementation of a California law requiring enhanced seismic safety in acute care hospitals built before 1973, known as SB 1953. It traces the history of California's efforts to enhance seismic safety by retrofitting buildings through legislation, leading up to the passage of SB 1953. It then outlines the development of the provisions of SB 1953, and describes their impact on the healthcare industry. Finally, the various responses of the healthcare industry are discussed. This case study will help to identify important insights into the implications of how public regulatory policy is designed, the importance of how programs intended to implement policy are designed, the importance of context to implementation, the unanticipated consequences of policy implementation, and how organizations that are impacted by the policies respond to them.

ABSTRACT

This report focuses on the development and implementation of a California law requiring enhanced seismic safety in acute care hospitals built before 1973, known as SB 1953. This legislation, which became law in 1994, requires that acute care hospital buildings built before 1973 (at which time new construction standards for new hospital buildings came into effect) be upgraded to meet higher standards or be withdrawn from acute care use. SB 1953 requires that acute care hospital buildings built before 1973 meet or exceed specified seismic safety standards by 2008 and higher standards by 2030, or be withdrawn from service as acute care facilities. The report is a case study of the first decade of the law.

The creation of the California Legislature's Joint Committee on Seismic Safety (JCSS) was an important event because it set the stage for direct input into the legislative process on issues of hospital safety by seismic professionals, including structural engineers, who advocated hospital seismic safety. The Seismic Safety Commission's report, *California at Risk: Reducing Earthquake Hazards 1987 to 1992. California at Risk* included the first formal statement about the threat posed by the continued use of hospitals built before the Hospital Facilities Seismic Safety Act of 1973 imposed new and higher construction standards. The report maintained that "Hospitals must be able to function following an earthquake to provide emergency medical care. The present law governing hospital seismic safety, enacted following the 1971 San Fernando earthquake, did not apply to facilities already in existence." The effects of the Northridge Earthquake on hospitals provided all the additional incentives needed to enact legislation addressing the concern about hospital buildings built before 1973. Almost 40 percent of California's acute care hospitals were subsequently classified as inadequate in terms of seismic safety, requiring that each be retrofitted or taken from use as an acute care facility. A tight time table was put in place for staged improvements to structural and nonstructural components. Now, a decade after the law's administrative rules were promulgated, relatively little retrofit has taken place. The reasons are many. By the late 1990's, 85 percent of California hospitals were experiencing operating losses as a consequence of massive changes in the healthcare industry. Estimates of the costs of compliance with the law range from $20 to $40 billion dollars. Retrofitting old hospitals turns out not to make good economic sense in most cases; healthcare organizations do not want to spend large sums to retrofit buildings that do not fit contemporary medical practice. Long delays in getting plan approval have been alleged. Many hospitals have closed their doors since the legislation was enacted, reflecting difficult financial conditions for healthcare organizations, changes in healthcare delivery, and, to some extent, the prospective burden of retrofit or replacement. Efforts are made annually in the California Legislature to alleviate the situation.

ACKNOWLEDGEMENTS

This is the second of a planned series of three reports addressing issues associated with designing policy and implementing programs aimed at reducing the consequences of extreme events on individuals, organizations, and communities. The first focused on overcoming the obstacles to implementing earthquake hazard mitigation policies. This one focuses on the development and implementation of a California law requiring enhanced seismic safety in acute care hospitals built before 1973, known as SB 1953. The third will focus on decision processes made by organizations expected to implement and pay for actions to enhance seismic safety.

We extend our sincere thanks to the many people who helped us with our research and who reviewed our work. Professors Ray Burby, University of North Carolina, and Peter May, University of Washington, reviewed drafts and provided many useful comments. William Holmes, who participated in writing the Milestone 4 report, Tom Tobin, who formerly headed the California Seismic Safety Commission, and Robert Olson all provided extensive comments on drafts, providing valuable insights gained from their personal involvement in SB 1953 and the events leading up to it. Jay Love and Allan Porush, structural engineers working with hospitals on SB 1953 compliance contributed greatly to our work by providing the professional engineer's perspective. We are also grateful to Richard McCarthy and Fred Turner of California's Seismic Safety Commission and to Kurt Schaefer, John Gillengarten, and Chris Tokas of the California Office of Statewide Health Planning and Development for the many hours they spent with us to provide information, clarification, and understanding about the history and operations of SB 1953.

Many others contributed their valuable time, talking candidly with us with the guarantee that they would remain anonymous. These include healthcare administrators, staff from various associations, representatives of labor organizations, legislators and legislative staff, local government officials, and design professionals. We want to thank all those many people who spent significant time meeting with us to discuss the issues, consequences, decision processes, and so on.

We want also to acknowledge the help and support of our colleagues in the Multidisciplinary Center for Earthquake Engineering research at the University at Buffalo and in other participating institutions across the country. Finally, we are grateful to the National Science Foundation for its support in our work.

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CHAPTER 1.
FOCUSING ON PUBLIC REGULATION TO REDUCE THE ADVERSE EFFECTS OF EXTREME EVENTS

For more than seven decades, advocates of increased safety against potential losses from extreme events have sought to have legislative policy enacted requiring others to take steps to reduce the adverse consequences of those events. These advocates have met with mixed success. In a few states, like California, where earthquakes are frequent and unwelcome events, advocates have managed to ensure that building codes are periodically updated to require that new buildings are designed and built to be more resistant to earthquake forces. In some states subject to frequent floods or hurricanes, advocates have managed either to limit the amount of new construction in the most vulnerable areas or to require that buildings in the most dangerous areas be built to resist those forces. So far, safety advocates have focused primarily on natural hazard events. Little has been done in the United States to enact codes intended to reduce the vulnerability of new structures to willful acts of destruction. One exception is represented in the work of the U.S. General Services Administration (GSA), which after the Oklahoma City bombing took steps to create design criteria that incorporate blast requirements and other security measures. Still, despite some progress in the new construction arena, advocates have been largely unsuccessful in requiring that existing buildings be brought up to contemporary safety standards.

1.1 THE PROBLEM

The extent to which a society regulates certain behaviors and practices varies with how much it values avoiding the adverse consequences stemming from those behaviors and practices and with the extent to which it believes such consequences can be avoided. It also varies with each society's relative wealth. Rich societies can afford to turn their attention to achieving higher levels of safety in a broader array of arenas. The United States can afford to focus considerable attention and resources on reducing the adverse consequences of extreme events, including natural hazard events, willful or mindless acts of destruction, and large accidents.

Consequently, an enormous amount of political energy in the United States is focused on determining whether, how, and to what extent public policy should be employed to regulate private activities that affect public safety. Efforts to regulate behavior to achieve greater public safety date to colonial times when various communities specified where and how caches of gunpowder were to be stored, presumably in response to accidents that had killed people and damaged property. Every historical period is marked by zealous efforts on the part of a few reformers and advocates trying to convince government to use its powers to reduce the threat to the public well being from practices that have proved harmful or that might be harmful. The list is almost endless: tainted meat and adulterated foods, unhealthy and dangerous tenements, monopolistic price gouging, industrial pollution, persistent and bio-accumulative agricultural pesticides, auto accidents, and so forth.

During the past seven decades – a single lifetime – safety advocates have worked diligently to see that regulations are enacted and enforced requiring individuals and organizations to take action to reduce the loss of life and property by reducing the exposure or vulnerability of structures to natural hazard events. They have had mixed success. It seems that creating technology-based risk mitigations is often significantly easier than ensuring that they are actually implemented by individuals and organizations faced with making hard choices in complex situations.

The most rapid growth in the United States tends to be in the most dangerous places – those subject to earthquakes, floods, and hurricanes (U.S. Census Bureau, 2004). However, the area in which advocates have had perhaps the most success has been in regulating the design and construction of new structures so they are more resistant to the forces of earthquakes, water, and high winds. So, even though people continue to build near known earthquake faults, in the likely path of hurricanes, and in areas that experience frequent floods, individual structures are less likely to be lost when they experience a relatively modest event.

Safety advocates have had success affecting the design and construction of new buildings, but they have been generally ineffective in getting legislation or ordinances enacted that require old buildings to be upgraded. Following the 1933 Long Beach Earthquake, for example, it became clear that unreinforced brick buildings were extraordinarily susceptible to collapse from earthquake forces. Californians were quick to take action to ensure that no new unreinforced masonry buildings were built, but it took much longer to reduce the threat from existing unreinforced masonry buildings, including schools and police and fire buildings. It took Los Angeles half a century after 1933 to adopt and implement regulations requiring existing buildings to be removed or retrofitted. It took San Francisco another decade beyond that to enact even watered-down requirements. Generally, advocates have had difficulty getting laws enacted that affect existing buildings and keeping subsequent legislative action from watering them down or repealing them.

Advocates continue to press at all levels of government to have policies enacted and implemented that are intended to reduce the adverse consequences of extreme events when they occur. Most people, we think, would agree that we should work to ensure that public buildings, for example, should be safe against earthquakes, hurricanes, floods, and other extreme events. And, now, since attacks by foreign and domestic terrorists are more salient, there has been more thought about regulations that might reduce the consequences of those kinds of extreme events.

Overall, our research focuses on why advocates for greater safety against the terrible consequences of natural hazard events, willful or mindless acts of destruction, and large accidents continue to meet with only limited success. For example, what are the primary obstacles to enacting and implementing regulations intended to enhance public safety? Why do those who are the objects of regulation often resist expending resources on activities that are intended to make them and those who are near them safer? What, if anything, might be done or should be done to help ensure adoption and effective implementation of regulations intended to enhance public safety against extreme events?

1.2 ATTEMPTING TO LEARN WHY AND HOW

Our fundamental interest is in gaining a greater understanding of public and private decision making about enhancing protection against extreme events in the United States. We are concerned with the obstacles to enhancing safety against extreme events and with various strategies for overcoming those obstacles. To help us learn the answers, we have focused on the efforts of seismic safety advocates to use public policy to require retroactive enhancement of old acute care hospital buildings in California to enhance their resistance to earthquakes. In turn, we have studied the reactions of California healthcare organizations to that policy. More generally, we hope to better understand the policy development process for reducing the hazards posed by extreme events, even though we suspect that the process changes through time. We would like to better understand, too, the barriers to implementing policy that is developed and enacted and the adoption of implementing regulations.

Specifically, this research takes as a case study the California law widely known as SB 1953[1]. This legislation, which became law in 1994, requires that acute care hospital buildings built before 1973 (at which time new construction standards for new hospital buildings came into effect) be upgraded to meet higher standards or be withdrawn from acute care use. SB 1953 requires that acute care hospital buildings built before 1973 meet or exceed specified seismic safety standards by 2008 and higher standards by 2030, or be withdrawn from service as acute care facilities. Failure to comply would result in the hospital losing its license. We track the development of SB 1953 and its implementation through early 2005, and examine the responses of healthcare organizations to SB 1953.

Previously, Alesch and Petak (2001) developed an extensive review of the policy implementation literature and a lengthy series of propositions concerning obstacles to implementation. That Stage 1 work is reported elsewhere.

Here, we trace the history of California's SB 1953 to develop an understanding of why implementing the policy has proven to be troublesome for both the regulators and the regulated. As with SB 1953, many public policies depend on individual organizations or local governments to actually take the steps necessary to bring about the desired policy outcomes; that is, the state or federal agency's implementation of a program actually consists of getting others to change behaviors, make investments, or do whatever else is necessary to actually effect the desired changes. Here, we examine the response of hospitals to specific features of the regulations from the perspective of those organizations in a dynamic social, financial, and political context.

This case provides an excellent opportunity to gain additional understanding into two critically important aspects of what it takes to enhance seismic safety. The first is that it may be easier or more difficult for individual organizations to implement governmental mandates, depending on their collective decision-making environment and their

[1] While it is the case that the California legislature re-uses its numbering system such that the same numbers may reappear every other year, "SB 1953" is widely understood to refer to the bill that was signed into law by the governor of the State of California as an amendment to the Hospital Facilities Seismic Safety Act of 1983.

respective situations. The second is that, given the effects of context on organizational response, there is a need for a public policy to be sensitive to the systems context within which it is to be implemented by lower levels of government or by individual organizations, thus suggesting important implications for the design of policy itself.

Organizations do not respond to mandates, challenges, incentives, or impassioned pleas by government uniformly, either at a single time or through time in different contexts. Their responses vary, often considerably, depending on characteristics of the individual organizations and the environment within which they make the choice about how to respond. Too often, policy makers and seismic safety advocates simply assume that the targeted organizations will respond the way the advocate hopes or expects them to. Failure to understand the forces that determine the response of individual organizations or organizations in similar circumstances is itself a key obstacle to developing effective policy and to having that policy implemented.

One would be hard-pressed to find someone who does not support seismic safety in hospitals. Patients and staff should be safe from injury or death caused by the effects on temblors on hospitals. Following an earthquake, hospital facilities should be available and capable of providing treatment to those injured. Since the nominal purpose of SB 1953 is to improve safety of hospital patients and staff, one must ask why relatively few public, private for-profit, and private not-for-profit hospitals have proceeded quickly to implement the policies embedded in the legislation. This case study is aimed at trying to understand why so many hospitals that were targeted to implement the seismic safety improvements mandated by law did not rush to implement those provisions. As will be shown, the answers are not simple, and certainly go beyond "not enough money" and "insufficient will."

We want to understand why there has been so much variance in the way hospital owners have responded to the mandates of SB 1953. Specifically, we want to understand the variety of responses in terms of our collective understanding of organizational behavior and decision making. Such understanding should shed light on how to overcome obstacles to implementation of seismic safety measures. We believe it is important to learn whether strategies might be devised that could have increased the likelihood that the objectives of SB 1953 as designed would have been met. We are attempting to generalize from this case study to the broader issue of overcoming barriers to safety for extreme events. We want to be able to characterize how the regulatory adoption process interfaces with organizational decision making processes in those cases where organizations other than the one that made the policy are expected to carry it out. We want to understand how organizations make choices about implementing regulatory mandates in the context of their own strategic planning.

We have two basic goals for our overall research. The first is to develop an understanding of the obstacles to implementing policies intended to enhance public safety against extreme events and to identify a means for overcoming those obstacles. The second is to develop a generalized model of how individual organizations make choices in connection with allocating resources to reduce potential losses from possible extreme events. This report moves us closer to accomplishing these goals.

1.3 APPROACH

We did not set out to test specific hypotheses about the difficulties associated with implementing public policies and programs wherein individual organizations take action to reduce the consequences of an extreme event. Instead, we focused on trying to gain a greater understanding of the broad dimensions and critical issues associated with the phenomenon. The effort was, in essence, a prelude to hypothesis-building – an attempt to gain enough understanding to describe organizational behavior in response to a particular set of challenges, to construct useful propositions about that behavior, and to begin to construct an explanatory model representing that behavior.

We employed soft systems methods (Checkland, 1999) coupled with a grounded theory approach (Strauss & Corbin, 1998) to develop and document an initial understanding of variables that might be critical to the choices about SB 1953 made by various healthcare organizations. Approximately 50 knowledgeable persons in northern and southern California were interviewed, face to face, to learn about hospital responses to SB 1953. Many of those were interviewed two or more times over a period of almost three years. The interviews were focused, but did not employ structured survey instruments. The respondents included hospital administrators, structural engineers working with hospitals on SB 1953, state officials involved with policy implementation, staff from professional and organizational associations, legislative staff, and persons who were involved historically in the design and adoption of the policy. The sample was not intended to be statistically representative of decision makers in all healthcare organizations, but was intended to provide insights about how organizations of different sizes, locations, and sophistication make choices.

The intent was to get as complete an understanding of the issues, the processes, the actors, and the dynamics from as many perspectives as we could. Those who spoke with us provided extensive information about the responses to SB 1953 of a diverse set of healthcare organizations. Interviewing actors in the process who held different kinds of positions and different views about the same subject matter enabled us to develop what we think is an accurate portrayal of how SB 1953 was drafted, enacted, and implemented, as well as how it is being viewed and addressed by healthcare organizations.

One of the perennial difficulties in this kind of research is the need to obtain frank opinions and proprietary information from individuals and organizations and, then, to use that information without violating confidences or compromising individuals and organizations. We have worked to protect the anonymity of those who provided us with confidential information. We have masked the identity of individuals by paraphrasing what they said and by discussing responses in terms of several similar organizations rather than individual organizations. We did not encounter any indication of illegal or unethical behavior in any of our interviews. We did learn, however, information from various organizations that might jeopardize the effectiveness of legitimate corporate strategies if known to competitors. For that reason, confidentiality is essential.

1.4 ORGANIZATION

Nothing is as simple as it first appears. As appealing as it might be to simplify telling the story, a simple chronology of SB 1953 would not do justice to the complexity of the process. Nor would it add much to our collective understanding. Our challenge is how to tell an interesting and important story that is, at the time of this writing, still being played out, with the end of the story still in doubt. We have chosen to tell the story in a straightforward manner, while still incorporating the complexities introduced by the dynamic environment within which healthcare organizations make decisions, and because of the diversity of healthcare organizations in California.

First, we briefly review the history of California efforts at enhancing seismic safety by retrofitting buildings through legislation, leading up to passage of SB 1953. In the review, we draw heavily from the work by Geschwind (2001) who, as well as anyone who has written on the subject, organized and summarized that legislative history.

Second, we outline the process leading to the development of the provisions of SB 1953. Third, we describe the extent of the challenge posed by SB 1953 to the healthcare industry in terms of the sheer number of buildings requiring retrofit, the cost of the effort, and the nature of the timetable.

Finally, we focus on the responses by healthcare organizations. Specifically, we sketch the conditions that we believe account for the varying responses by individual organizations at given points, and as they have changed over time.

This Stage 2 report is a precursor to our developing a set of propositions and generalized model of hospital organization decision making in response to perceived threats and challenges from outside the organization. Whereas the Stage 1 report (Alesch & Petak, 2001) reviewed the policy implementation literature and outlined a lengthy series of propositions concerning obstacles to policy implementation, this Stage 2 report takes as its focus the specific case of hospital organizations implementing SB 1953 in California. Drawing on these two reports, the anticipated Stage 3 report will put forth and describe a set of propositions and a generalized model of organizational decision making around external threats in the form of warnings about the possible effects of natural hazard events or willful acts of destruction or about regulatory sanctions to be imposed if the organization does not take one or another action.

Ultimately, this social science research will be integrated with other MCEER-supported research, yielding truly interdisciplinary outputs. Our role as social scientists is twofold: (1) to develop a valid and reliable understanding of the specific variables affecting hospital decision making and the hazard mitigation investment decision, and (2) to create a set of propositions and a generalized model of the decision making process. Others involved in the larger MCEER hospital research project are expected to take as their inputs our outputs, and to integrate what we have learned into a number of decision-support systems currently under development.

CHAPTER 2.
ORIGINS AND ENACTMENT OF RETROFIT ORDINANCES

2.1 IN THE BEGINNING . . .

California has a long history of enacting legislation with provisions similar to those in SB 1953, usually at the behest of science and engineering advocates and in direct response to earthquake events. The first seismic building code in the United States was enacted December 17, 1925 by the Santa Barbara City Council six months after the Santa Barbara Earthquake of June 1925. Four months later, in April 1926, 20 years after the Great San Francisco Earthquake of 1906, the City of Palo Alto, California followed suit by adopting an amendment to its building code requiring earthquake resistant construction. These codes formalized seismic design practice at the time. The earthquake of 1925 brought focus to the problem of building construction in earthquake country and led to the adoption of the new codes by these two communities. It also helped keep the matter of seismic safety alive in the years following the 1906 earthquake, especially through the activism of a few people in the scientific and engineering community.

Following the San Francisco earthquake, promoters convinced many that the real problem was fire. Others, building on the lack of significant knowledge in the field of seismology and the associated uncertainty, and in collaboration with the Building Owners and Managers Association, were able to convince the City of Los Angeles Chamber of Commerce and others that there had been an overreaction to the earthquake threat. With support from the Building Owners and Managers Association, a 1928 book, *Southern California Geology and Los Angeles Earthquakes*, was authored by a petroleum geologist. This book frustrated the efforts of seismic safety advocates and led to the belief that the Southern California area was "not-only free from a probability of severe seismic disturbances, but has the least to fear from 'Acts of God' of any city under the American flag" (Geschwind, 2001: 79-94).

The 1933 Long Beach earthquake, which occurred early in the morning and which was later estimated to be magnitude 6.2 on the Richter Scale, helped to overcome the belief that California was safe from earthquakes and reactivated concern for seismic safety. The earthquake caused 120 deaths and extensive property damage (about $400 million in 2001 dollars) (Geschwind, 2001). Further, the temblor destroyed 70 schools and damaged 120 other school buildings, of which 41 were rendered unsafe for occupancy and remained closed. Since school was not in session at that time of day, no children were injured while attending school. However, the possibility of many casualties among school children caused great concern. The concern manifested itself in the California legislature adopting the Field Act, which gives the State the power to approve public school construction plans, inspect ongoing construction, and inspect existing school buildings.

2.1.1 The Field Act of 1933

C. Don Field, a California assemblyman from Los Angeles County, proposed his draft legislation on March 22, 1933. It was adopted shortly thereafter on April 10, 1933. The impetus for the Field Act was from "parents outraged over the widespread collapse of school buildings during the Long Beach earthquake" (Geschwind, 2001: 113). The Field Act (Sections 39140, et seq. of the California Education Code) was intended to assure that all public schools in the state were safe in earthquakes. It established minimum seismic design criteria for schools, required that structural design of school buildings be done by structural engineers knowledgeable in earthquake engineering, and called for strict checking of plans by the State with thorough inspection of construction. In many ways, the Field Act was patterned after the State's Dam Safety Act (California Water Code, Sections 6000-6501), which was passed after the 1928 collapse of the St. Francis Dam that caused extensive property damage and 420 deaths. Most notable about that legislation was the shift to State oversight of all non-federal dams. In brief, the State assumed responsibility for reviewing all dam design and construction elements in order to ensure safety. With respect to the Field Act, all new schools were subject to the new controls, but importantly, there were no retroactive provisions to force reinforcement or replacement of the existing inventory of schools, many of which were built of unreinforced masonry. This new act became the "major government bulwark for the establishment of seismic safety in California" (Geschwind, 2001: 114).

2.1.2 Riley Act of 1933

There continued to be concern about the safety of other buildings in California, which led the Structural Engineers Association of Northern California to draft a bill that was a modified version of the Field Act to require all buildings in the State to incorporate seismic resistant construction. The legislation that followed came to be known as the Riley Act of 1933. It was essentially submitted to the California Legislature as early as March 1933 (Geschwind, 2001: 114). Assemblyman Riley of Long Beach submitted a revised version to the legislature on April 25, 1933, which was adopted May 27, 1933. The Riley Act was supported by structural engineers and architects across California and by State Chambers of Commerce. However, as early as 1935 there were attempts by elected officials and business interests to weaken the Field and Riley Acts because, they maintained, earthquake hazards were exaggerated and the legislation created personal liability concerns among school board members (Geschwind, 2001: 117). Further, since "enforcement of the act was left to local building inspection departments, which were generally understaffed" (Geschwind, 2001: 114), the act was often left unenforced. Despite these issues, the Riley Act was credited with compelling "official acknowledgement that earthquakes do happen in California" (Geschwind, 2001: 114).

2.1.3 Garrison Act of 1939

The Garrison Act was an attempt to address the hazardous conditions that existed following the Field Act because that Act did not address seismic safety in *existing* school buildings. The Garrison Act required that seismic evaluations on all school buildings built before 1933 be completed by 1970. Those buildings were to be retrofitted to meet

Field Act standards or abandoned by June 30, 1975. Due to limited resources and the absence of an effective enforcement mechanism, there was, in fact, only limited progress toward accomplishing the stated goal of removing hazardous buildings from the inventory of facilities used for schools.

The Garrison Act removed personal liability for damage or injury caused by an earthquake for school board members if their good faith efforts to raise funds for strengthening existing schools were defeated in school bond referenda. In essence, Geschwind (2001: 117) argues, it "removed the incentive driving strengthening of existing schools." Advocates and individuals in the Office of State Division of Architecture were vigilant in maintaining core provisions of the Field and Garrison Acts. Nonetheless, in 1963, the legislature quietly removed the waiver of liability from school board members (via the California Government Tort Claims Act of 1963). Most school boards avoided the whole issue, including the issue of liability, by not ordering school inspections and by constructing new schools to meet the demand of baby boomers.

In 1966, however, California's Attorney General ruled that failure to request a structural inspection constituted negligence and exposed school board members to personal liability. School boards again started to pressure the legislature for relief from liability (Geschwind, 2001: 186). The 1967 legislature obliged, via Assembly Bill 450 (sponsored by Assemblyman Leroy Greene), and re-instituted the waiver of liability originally provided by the Garrison Act (Geschwind, 2001: 186). The waiver applied, however, only if school boards required inspection of all old building by 1970 and sought bond or tax increases to finance retrofit at least once every five years until approved (Geschwind, 2001: 186).

2.1.4 The Greene Act of 1968

The Greene Act of 1968 (Assembly Bill 420) required California school districts to comply with the Garrison Act of 1939 (Geschwind, 2001: 186). School buildings not retrofitted or meeting Field Act standards were to be abandoned by 1975. This put pressure on school boards to find money. If they failed to find money to retrofit or rebuild the facilities, they had to put students into temporary buildings or in double sessions in adequate buildings once the 1975 deadline passed.

2.1.5 Growing Complexities and the Old Buildings Problem

In the mid-1960s, State officials estimated that between 15 and 20 percent of the school building inventory needed seismic retrofit (Geschwind, 2001: 186-189). In 1966, the estimated cost to retrofit the old school buildings was estimated as low as $1.2 billion and as high as $3 billion. Many architects, engineers, contractors, and labor unions endorsed efforts to raise money, but, then, they stood to gain from retrofitting. In brief, any legislation compelling retrofits of existing buildings was likely to be perceived, at least by some, as a "full employment act" for these professionals.

The California Property Tax Revolt of the 1960's was another obstacle to replacing or strengthening the old schools still in the inventory. In response to large

property tax increases, the revolt was a political movement aimed at limiting property tax increases. Voters did not pass bonds or tax increases to provide money for retrofitting. The job of raising the necessary money was made even tougher with a 1971 State Supreme Court ruling that affirmed that a 2/3 majority vote set forth in the California constitution was required for local bond issues to pass. In 1972, State Senator George Moscone introduced a bill for a state referendum (Proposition 9, November 7, 1972) to reduce the required vote to a simple majority for money to retrofit schools. The proposition won 54.5 percent of the votes, and passed (Geschwind, 2001: 189). The change increased the success rate for bond measures and accelerated retrofitting. However, 1,593 pre-Field Act buildings were still being used in California in 1972 (Geschwind, 2001: 189). Tax protesters argued that the concern about seismic effects on school buildings was a ploy by schools to get money for other purposes, not for retrofit. In fact, many school districts did add money for other measures to bring schools up to more modern educational standards.

In 1974, the California legislature passed Assembly Bill 2615 (sponsored again by Assemblyman Greene), which extended the deadline to 1977 for replacing school buildings that did not comply with Field Act standards for districts with extenuating circumstances. By 1977, only 19 school buildings located in rural areas remained to be retrofitted (Geschwind, 2001: 189). The process of removing unsafe schools from the California inventory required extraordinary efforts by seismic safety advocates for half a century. They needed State mandated retrofitting, State changes in the rules for bond issues, and, ultimately, State funding.

2.1.6 Threats to the Field Act Program and Primary Barriers to Success

Historically, according to Dennis Bellet, Chief Structural Engineer, California Division of the State Architect, there have been two principal barriers to the success of the Field Act. “First, funding for school construction is unstable and the quantity of work often exceeds staff capacity, and schedule pressures can lead to less aggressive inspection and less rigorous plan review. Second, the 1933 Field Act does not adequately address the risk posed by nonstructural elements, which often come loose and fall during moderate earthquakes” (Bellet, 2004: 153).

Attempts continue today to adopt legislation to remove the requirements of the Field Act for certain types of buildings (e.g., California community colleges), in part because at least some stakeholders believe that “aggressive plan review and construction inspection is too costly or time consuming” (Bellet, 2004: 153). Specifically, because of what was perceived as the limited requirements of the Uniform Building Code and the variability of the code’s enforcement by local governments, the Field Act requires that the design and construction of K-12 school and community college buildings be regulated by the California State Architect. In general, buildings constructed to the UBC standards are designed to withstand an earthquake in order to allow the occupants to exit safely. Buildings constructed to Field Act standards are designed to withstand an earthquake in order allow the occupants to exit safely and for the building to remain usable.

The differences in building construction standards between the Field Act and the UBC have diminished because of increases in the requirements of the UBC. There are, however, significant differences in the enforcement of the standards (Seismic Safety Commission, 2004). Under the Field Act, a qualified professional licensed in California (i.e., structural engineers at the Division of the State Architect (DSA)) must review and approve construction plans. The Field Act also requires, during the construction phase of a project, that a DSA-certified inspector continuously inspect the project to ensure compliance with the plans and structural safety standards. Enforcement is by the on-site Inspector-of-Record (certified by the DSA, yet retained and accountable to the local school district), while the UBC is enforced solely by the local government's building code department. According to a 1992 DSA study, it is estimated that the requirements of the Field Act increase total project costs by less than four percent (Bellet, 2004), and most of the difference in cost is seen as a function of increased design review time and concomitant construction time.

Nonetheless, the California Community Colleges have continued to argue that it is too expensive for them to build facilities in compliance with the Field Act. A number of bills have been introduced over the past several years to the State Legislature to address the concerns of the Community Colleges. Table 2-1 summarizes the most recent bills and their disposition.

Arguments in support are of the various bills are best summarized by State Senator Denham, the author of Senate Bill 1175 (2004), who stated,

> "Community College Boards need the flexibility to cut costs outside the classroom. This legislation allows districts to choose whether they will build facilities to the standards required of K-12 schools (Field Act) or the University of California and California State University (California Building Standards Code – CBC)" (California State Assembly Hearing Record, 2004).

Likewise, arguments in opposition have been expressed by the California Seismic Safety Commission:

> "The Commission believes that the Field Act is critical to preserving the safety of students, faculty and staff that use school facilities every day. . . . California's experience with earthquakes indisputably demonstrates that buildings constructed in accordance with the Field Act have *superior* performance during and after earthquakes" (California State Assembly Hearing Record, 2004) (emphasis added by the authors).

In looking at this last statement from the Commission, a reasonable question is: *superior* to what? Certainly, many people would agree that buildings constructed in accordance with the Field Act are likely to perform better than buildings constructed using general practices. Fewer people, however, would likely agree that buildings constructed in accordance with the Field Act are likely to perform better than buildings constructed using the California Building Standards Code, especially since University of

Table 2-1. Summary of Recent Legislative Actions to Remove California Community Colleges from the Requirements of the Field Act.

Bill	Disposition
SB 1175 (2004)	Authorize certain school buildings constructed after 1/1/05 on a community college campus and designed by the community college district as buildings that potentially will be used to house classes of California State University (CSU) or the University of California (UC) in addition to housing community college classes, to be built according to the provisions of the Field Act or the California Building Standards Commission's California Building Standards Code (CBSC). Passed in Senate, but not in Assembly.
AB 3010 (2004)	The Assembly Higher Education Committee passed AB 3010 on April 20, 2004, on a 7-0 vote. Required the State Architect to review plans for community college facilities at the design stage. Would have given the State Architect responsibility for engaging the designers of community college buildings in the design process, rather than only at the end of design. Overall costs expected to be lower because early plan review should catch needed plan changes earlier in the design process when they are easier and less costly to correct. However, buildings must still be built in accordance with the greater protections of the Field Act. Vetoed by the Governor on September 18, 2004.
SB 242 (2003)	Would have allowed a community college building to be built in accordance with either the Field Act or the Uniform Building Code, if the building is used to house classes offered by a community college and either the UC or the CSU, and if the building is constructed after January 1, 2004. Vetoed by the Governor citing support for the Field Act.
AB 484 (2002)	Authorized community college facilities designed for joint-use with the CSU or the UC, to be built in accordance with either the Field Act or the CBSC. Vetoed by the Governor citing support for the Field Act.
AB 2007 (2000)	Would have exempted a specific joint-use facility at Antelope Valley College from the provisions of the Field Act. Vetoed by the Governor citing support for the Field Act.
AB 80 (1999)	Would have exempted the construction and renovation of community college facilities from the requirements of the Field Act and instead required these facilities to conform to the UBC. AB 80 passed the Assembly but the author chose not to have it heard in the Senate.

Source: California Legislature Web Site of Bill Information (http://www.leginfo.ca.gov/bilinfo.html)

California and California State University facilities use both the CBC and expert peer review.

A review of the issues associated with implementing post-earthquake legislation to retrofit and replace unreinforced masonry school buildings in California demonstrates the historical difficulty with implementing earthquake mitigation legislation in California,

even when it is strongly supported by advocates. This historical perspective provides an understanding of the political and socio-economic issues involved with implementing past post-earthquake legislation requiring retrofit and replacement of certain types of buildings, and provides insight into the issues that may influence the implementation SB 1953. A basic question that remains unanswered is whether society has learned from experience or whether it is faced with traveling, yet again, the troubled road to devising and implementing program after program to remove critical, yet unsafe, buildings from the inventory. This case study of SB 1953 is intended to take interested stakeholders closer to answering this question.

2.2 THE ROAD TO SB 1953

2.2.1 Waypoint 1. Formation of the Joint Committee on Seismic Safety

The difficulties experienced in achieving legislative goals of the Field and Garrison Acts led to the establishment of the Joint Committee on Seismic Safety on August 25, 1969 (Senate Concurrent Resolution 128, State of California Senate, 1969). The creation of the California Legislature's Joint Committee on Seismic Safety (JCSS) was an important event because it set the stage for direct input into the legislative process on issues of hospital safety by professional stakeholders, including structural engineers who became active advocates for hospital seismic safety.

The Committee was directed to prepare a detailed report on seismic safety in California to be completed no later than June 30, 1974. The Resolution creating the Joint Committee called for establishing several advisory groups to assist in preparing the report for submission from the JCSS to the Legislature. The combined advisory groups were chaired by Karl V. Steinbrugge, a noted civil and structural engineer and Professor of Structural Design at the University of California at Berkeley until his retirement in 1978. At the time of his chair appointment, Steinbrugge was president of the Earthquake Engineering Research Institute (1968-70). He would later serve as the first chairman of the California State Seismic Safety Commission (1975-80). The individual advisory groups and their chairs were as follows:

- **Advisory Group on Engineering Considerations and Earthquake Sciences**. This group of 14 members was directed to review available scientific and engineering knowledge relative to the reduction of the risks and damage due to earthquake and related geologic hazards. Gordon B. Oakeshott, Chair.

- **Advisory Group on Disaster Preparedness.** This 17 member group was responsible for reviewing the adequacy of existing disaster plans as far as they related to earthquakes. Robert A. Olson, Chair.

- **Advisory Group on Post-Earthquake Recovery and Redevelopment.** This group of 15 members was responsible for recommending general contingency plans to guide the long-term work of recovery, reconstruction, and redevelopment following an earthquake. Will H. Perry, Jr., Chair.

- **Advisory Group on Land Use Planning**. This group of 15 members was to determine limitations that should be placed on land development in seismically active areas and restrictions appropriate for inclusion into city, county and state governed land use plans. George G. Mader, Chair.

- **Advisory Group on Government Organization and Performance**. This group of 15 members was charged with assessing how various governmental organizations were to be involved in implementation of the plans formulated by the advisory groups. Marcella Jacobson, Chair.

The Joint Committee languished for two years without sufficient funding, having received only $40,000 from the legislature. However, shortly following the San Fernando (Sylmar) Earthquake in 1971, it was appropriated $150,000.

2.2.2 Waypoint 2. The February 9, 1971 San Fernando (Sylmar) Earthquake

The Sylmar earthquake (magnitude 6.6) was a significant temblor. It jolted not only residents, but policy makers as well. The Olive View Hospital in the San Fernando Valley was a new structure, having been dedicated just a month before the earthquake. Nonetheless, substantial structural and nonstructural damage occurred. Three exterior stairwells and a portico structure over the ambulance parking area collapsed. The first floor design did not have sufficient shear strength or toughness to withstand lateral forces caused by the earthquake. The main structure design involved a "soft story" first floor architectural design, such that the tall first floor of the building consisted of a large open space frame with a high ceiling supporting all the upper floors. Although the building did not collapse, it suffered significant damage and required total replacement.

The San Fernando Veterans Administration Hospital, built of unreinforced masonry in 1925 and never retrofitted to contemporary standards, did collapse during the earthquake with the loss of 49 lives. In addition, there was significant damage to other hospitals, including Holy Cross Hospital and Pacoima Memorial Lutheran Hospital. The damage to hospitals and the number of lives lost in the veterans' hospital raised concerns over future potential loss of life, treatment facilities, and capacity to meet healthcare needs following a subsequent earthquake. Steinbrugge and his colleagues, writing the report for the Pacific Fire Rating Bureau on the San Fernando Earthquake, stated that,

> "Surely public interest is much better served if hospital structures are designed with sufficient damage control features so as to remain functional after an event. This means not only placing severe limits on permissible structural damage, but also severe limits on permissible elevator damage, telephone and other communications damage, standby power damage and the like" (Steinbrugge, et al., 1971: 56).

On August 27, 1971, the Joint Rules Committee of the California Legislature adopted Resolution Seven, charging the Joint Committee on Seismic Safety with

establishing a Special Sub-Committee to study the San Fernando Earthquake of February 9, 1971. As noted above, the resolution allocated $150,000 from the contingent funds of the Senate and Assembly to be used in the investigation. This Special Sub-Committee called upon the Advisory Groups of the JCSS to assist by providing technical information on the San Fernando Earthquake, including suggestions for legislation that could mitigate the damage caused by a similar earthquake in the future. The Sub-Committee provided the Legislature with a preliminary report on July 31, 1971 and a final report in December 1972.

The Joint Committee's detailed report on seismic safety in California, *Meeting the Earthquake Challenge: Final Report to the Legislature***,** was completed in January of 1974. The major emphasis of the Joint Committee on Seismic Safety's work shifted at that time to drafting and proposing legislation based on the suggestions made in the Joint Committee's report on how to mitigate the earthquake risk in California. The shift in focus led to the development of activist groups of technical professionals concerned with reducing earthquake risk through improved building standards and codes. Twenty-three ad hoc groups were formed to facilitate the legislative drafting and lobbying process. The groups drew their membership largely from the JCSS's Advisory Groups. The groups were autonomous, but were called on to report to the Joint Committee on Seismic Safety.

2.2.3 Waypoint 3. The Hospital Facilities Seismic Safety Act of 1973 (Senate Bill 519)

The 1973 Act was not enacted in the immediate aftermath of the February 1971 San Fernando earthquake. Experience has shown that the evolution of hazard mitigation is not a simple story of immediate response to natural disasters, but "new measures trickled out over a course of years" (Geschwind, 2001: 228). Also important is the "degree to which mitigation advocates have been organized and have had the resources necessary to mobilize public opinion or the political process in pursuit of their goals" (Geschwind, 2001: 229).

Initial impetus for the Hospital Facilities Seismic Safety Act of 1973 came from J. Meehan, the chief structural engineer for the Schoolhouse Section, State Office of Architecture and Construction, which was responsible for enforcing the Field Act. Meehan proposed to the Joint Committee in January 1971 that the Field Act provisions be extended to hospitals. Senator Alquist moved to introduce a bill incorporating Meehan's suggestions (Geschwind, 2001: 176).

The California State Department of Public Health objected to the bill because it already had power to approve and supervise hospital construction and did not want to cede control over structural matters to the Schoolhouse Section of the State Office of Architecture and Construction. The agency argued that doing so would fragment the process of approving hospital plans. Alquist consulted with the Joint Committee where engineers argued that public health officials did not have sufficient expertise in structural engineering enabling them to enforce seismic design requirements. Finally, Alquist amended his bill to provide Public Health with ultimate plan approval but required Public

Health to subcontract to the Schoolhouse Section of State Office of Architecture for seismic review (Geschwind, 2001: 176).

Public Health objected to that provision and, with help from the California Hospital Association (and the City of San Francisco which argued it would cost too much), got the Senate Finance Committee to kill the bill. Alquist reintroduced the bill in the 1972 legislative session, amended to meet the Public Health Department's objection by creating a Hospital Building Safety Board under the control of the Public Health Department's director and with a hospital administrator as a member of the Board. These changes led to passage and adoption. In approving the Hospital Facilities Seismic Safety Act (HFSSA), the Legislature noted that,

> "Hospitals that house patients who have less than the capacity of normally healthy persons to protect themselves, and that must be *reasonably capable of providing services to the public after a disaster,* shall be designed and constructed to resist, insofar as practical, the forces generated by earthquakes, gravity and winds" (California Health and Safety Code, Section 129680) (*emphasis added by authors*).

It took two attempts for the HFSSA to be adopted. A major issue was the initial call for "immediate strengthening or replacement of all health care facilities that did not meet modern standards" (Poland, 1994: 114). Recognizing the economic difficulty associated with retrofitting all health care facilities, the bill was changed to require retrofit of only those facilities that were to undergo significant remodeling. Following the experience gained from the Field Act, it was determined that the best approach was to require a single set of statewide standards to be administered by the State rather than have local officials responsible for such structures within their jurisdictions.

The establishment of a common code and administrative process was intended to eliminate jurisdictional differences in codes and their enforcement. Independent plan checking and construction inspection processes were established as key elements in quality control (Lagorio, Olson, & Reitherman, 1995: 7). The Hospital Facilities Seismic Safety Act (HFSSA) was to be administered by the Office of the State Architect, Office of the State Fire Marshall, and the Office of Statewide Health Planning and Development (OSHPD). Included in the HFSSA was a significant, new, and explicit policy goal: that hospitals be designed such that they would control damage and "remain functional following an earthquake." This statement mirrored the one offered by Steinbrugge and his colleagues in their report following the earthquake in 1971 (Steinbrugge, et al., 1971). This overall goal led to concern by professional engineers that "damage control" would be interpreted as "earthquake proof," which led to the insertion of the words to design "insofar as practical" to remain functional.

Based largely on the success and experience with the Field Act and J. Meehan's influence, the 1973 Hospital Facilities Seismic Safety Act (HFSSA) was generally patterned after the Field Act by specifying the State Division of Architecture as being

responsible for implementation (i.e., the same State review agency as for schools), and further stipulating that buildings are to be designed by experienced and approved structural engineers. The HFSSA included four main components:

1. Geologic hazard studies for sites,

2. Use of structural design standards against forces in excess of those used for "normal" buildings,

3. Specific design requirements for nonstructural elements, and,

4. Strict review of design and inspection of construction.

In order to address concerns by the Office of Health Planning and Development (OSHPD), the Hospital Facilities Seismic Safety Act established a Hospital Building Safety Board for the purpose of advising "the Director of OSHPD on the administration of the Hospital Facilities Seismic Safety Act, and acting as a board of appeals with regard to seismic safety and fire and life safety issues relating to hospital facilities, particularly in matters relating to the administration and enforcement of building standards relating to hospitals during construction or alteration of projects submitted to OSHPD" (Appeal Procedures of the Hospital Building Safety Board, 2003: 1).

Currently, the Board's thirteen members are appointed by the Director of OSHPD from nominations submitted by professional associations, as specified in the Health and Safety Code, with three more individuals appointed as public members. Six statutory *ex officio* members representing state agencies whose programs interface with the hospital design and construction program also sit on the Board. The Director has the authority to appoint three additional *ex officio* members as desired. Board members are expected to maintain close contact with professional groups and important industry organizations in order to bring attention to changes and emerging issues occurring in the design and construction of health facilities in California.

2.2.4 Waypoint 4. Seismic Safety Commission Established in May 1975

The Joint Committee on Seismic Safety (JCSS) was officially terminated on December 31, 1974, as provided for in the 1969 Joint Resolution creating it. In its final report, the JCSS made what it said was its most significant recommendation by proposing a watchdog commission on seismic safety. It proposed that the role of such a commission would be "to develop seismic safety goals and programs, help evaluate and integrate the work of state and local agencies concerned with earthquake safety, and see that the programs are carried out effectively and the objectives are accomplished."

On February 14, 1974, State Senator Alquist introduced legislation to establish such a commission based on a draft written by Steinbrugge. Much compromise was required for enactment, as the bill proposed a strong commission. Its members would be

appointed by the governor, but it would act independently. It would have the power to review state agency budgets for seismic attention, develop criteria and standards for hazard mitigation, require all agencies to comply with the standards, and it would transfer all boards established earlier (e.g., the Hospital Building Safety Board) to the Commission.

Not surprisingly, state agencies objected strongly. Engineering associations also objected because of concern for infringement on the code writing process. Senator Alquist amended the proposed legislation to allow the Hospital Building Safety Board to remain separate and to change the Commission from a rule-making to an advisory body. Subsequently, the bill was adopted in September 1974 and the California Seismic Safety Commission (*Stats.* 1974, Chap. 1413: 3112) was formally inaugurated in May 1975 with the swearing in of 12 members.

2.2.5 Waypoint 5. The Palmdale Bulge

In 1976, the U.S. Geological Service (USGS) developed data suggesting that a bulge or uplift had occurred along the San Andreas Fault. Caltech scientist, James Whitcomb, predicted that the bulge was a precursor to an earthquake in that location. Consequently, a first act of the California Seismic Safety Commission (SSC) was to recommend a survey to evaluate the anticipated seismic performance of hospitals in six counties of Southern California located near the Palmdale Bulge.

The SSC requested that the California Office of Statewide Health Planning and Development (OSHPD) survey hospital buildings in the region to ascertain the survivability of the hospital building stock should a major earthquake occur. OSHPD completed its inventory of the five-county Los Angeles area in 1982 under contract with the Office of the State Architect. The inventory consisted of a "walk-through" of hospitals and a review of available drawings. The inventory (coupled with work being done by the USGS on the Palmdale Bulge, e.g., Castle, Alt, Savage, & Balazs, 1974; Castle, Church, & Elliot, 1976; Real & Bennett, 1976) indicated that many hospital buildings might not be capable of continuing operations following a major earthquake.

2.2.6 Waypoint 6. The Alfred E. Alquist Hospital Facilities Seismic Safety Act of 1983

Senator Alquist, continuing his active involvement in seismic safety issues, authored legislation in 1983 to amend the 1973 Act. The amendments were intended to solve some problems that had become apparent as agencies worked to administer the requirements set forth in the 1973 Act. Specifically, the amendments preempted local government building inspections for code enforcement of building standards published in the California Building Standards Code relating to the regulation of hospital projects. This was intended to end double inspections and fee charges, as well as eliminate conflicts between jurisdictions due to conflicting interpretations of the building code. The amendments were also intended to strengthen administrative procedures and to help facilitate fund management, personnel management, and contracting.

Importantly, the amendments designated OSHPD as "responsible for establishing, maintaining, and operating separate, but coordinated, plan review and field inspection units within the statewide office." Finally, the amendments authorized OSHPD, "with the advice of the Building Safety Board, to enter into contracts for research regarding the reduction or elimination of seismic or other safety hazards in hospital buildings or research regarding hospital building standards" (Health and Safety Code Division 12.5, Buildings Used By The Public, Chapter 1. Hospitals, Article 1. General provisions, 15001. Legislative Intent, dated January 13, 1994).

Complaints about costs associated with plan review and approval delays, complicated regulations, extensive inspections, and other factors declined during the five-year period following the 1983 Amendments to the 1973 Act. Still, as we will see, similar complaints would accompany future legislation.

2.2.7 Waypoint 7. The California Earthquake Hazards Reduction Act of 1986 and *California at Risk*

The timing of the California Earthquake Hazards Reduction (CEHR) Act of 1986 may suggest that it was in response to the disastrous earthquake in Mexico City on September 19, 1985. Instead, work began on the actual bill, SB 548, and its language in February 1985. The CEHR Act required the Seismic Safety Commission (SSC) to develop a series of five-year programs designed to significantly reduce statewide earthquake hazards by the end of the 20th Century. Conveying urgency, the law required completion of the first five year plan before the end of 1986, the same year it was enacted. The first five-year program is outlined in Seismic Safety Commission's report, *California at Risk: Reducing Earthquake Hazards 1987 to 1992* (Seismic Safety Commission, 1986).

California at Risk included the first formal statement about the threat posed by the continued use of hospitals built before the Hospital Facilities Seismic Safety Act of 1973 imposed new and higher construction standards. At the time the 1973 Alquist legislation was enacted, it was expected that pre-1973 hospital buildings would be gradually withdrawn from use; however, they were being withdrawn at a very slow rate. It was becoming clear that many would continue functioning as acute care hospital buildings for some time to come, barring a major earthquake. Thus, *California at Risk* addressed the problems associated with older, nonconforming hospital buildings. *California at Risk,* Initiative 1.2, states the following:

> "Operators of hospitals constructed prior to the effective date for the Hospital Facilities Seismic Safety Act, regardless of ownership, should be required to strengthen and improve their ability to function following earthquake in accordance with a plan developed by the Office of Statewide Health Planning and Development (OSHPD). In undertaking these measures, OSHPD should work with organizations such as the California Hospital Association, the College of Emergency Physicians, and the Hospital Councils of Northern and Southern California to promote the concepts of functionality of hospitals following a damaging earthquake" (Seismic Safety Commission, 1986).

And, then,

> "Hospitals must be able to function following an earthquake to provide emergency medical care. Hospital damage poses a special threat to public safety because of the high occupancy and special needs of many patients. Investments in reducing structural and nonstructural hazards are justifiable in view of the very large investments in equipment and inventory that could be irreparably damaged in a strong earthquake. The present law governing hospital seismic safety, enacted following the 1971 San Fernando earthquake, did not apply to facilities already in existence. Earthquake damage reports developed by the U.S. Geological Survey estimate that substantial losses of function would occur for hospitals in Los Angeles and Orange counties (up to one third) and the San Francisco Area (up to one half). In view of the public's expectation that health care facilities be accessible at all times, especially after an earthquake, this program is needed" (Seismic Safety Commission, 1986).

William T. Holmes (1996: 2) elaborated on the intent and requirements of the California Hazards Reduction Act of 1986, which led to the drafting of Milestone 4 under Initiative 1.2.

> "The California Hazards Reduction Act of 1986 required the Seismic Safety Commission to develop a five-year program designed to significantly reduce statewide earthquake hazards by the end of the century. The Commission's document, *California at Risk ...1987 to 1992*, contained several initiatives, including one which addressed pre-Act hospital structures. Milestone 4 under this initiative recalled the Building Safety Board's 1983 recommendation for a program that would have all hospital buildings in compliance with the Act by the year 2020. This would require vacating, replacing or upgrading an existing facility."

2.2.8 Waypoint 8. In December 1990, OSHPD Issues a Response to Milestone 4

In response to Milestone 4, in 1987 OSHPD contracted with the Applied Technology Council (ATC), a California-based not-for-profit research organization, to complete a statewide inventory of hospitals. The purpose of the inventory as presented in the report, ATC- 23, was to provide OSHPD and other state agencies, including the Seismic Safety Commission, with an assessment of the survivability of the hospitals surveyed should earthquake-induced high intensity ground motions, geotechnical failures, or failure of utility services occur (ATC, 1990).

The survey was based on a cursory inspection of hospitals to determine the design date and primary type of structural system for each hospital building. It was completed with voluntary cooperation of the acute care hospitals in the State. The inventory was completed in 1989 and published in 1990. Data from the survey were merged with the data from an earlier "Uplift Study" inventory (updated by ATC in 1989). The survey included all general acute care hospital buildings in California. The ATC found that more

than half the acute care hospital buildings in use in 1990 were built before the 1973 legislation increased seismic design and construction standards. Of these, 413 were built in the 1950s, 626 in the 1960s, and 348 between 1970 and 1973. ATC further concluded that normal replacement of the older buildings was occurring at a very slow pace.

The ATC report also concluded that many of the buildings were potentially hazardous to their occupants in a major earthquake. The survey provided extensive data on the seismic condition of nonstructural systems, as well as information about the likelihood that hospital buildings could be self-sustaining during the first days following a major earthquake.

Though the data base represented a fairly accurate picture of the earthquake survivability of existing acute care hospitals, the information for specific hospital buildings was not based on in-depth engineering analysis and, consequently, was not intended as a basis for requiring specific corrective actions or setting priorities among actual buildings. In fact, the data was not identified with individual facilities or buildings, since confidentiality had been promised in exchange for industry cooperation. Maintaining confidentiality in this regard also helped to alleviate concerns that the information could be misinterpreted or used inappropriately.

In December 1990, OSHPD issued its response to Milestone 4, *A Recommended Program to Seismically Strengthen Pre-Hospital Act Hospital Facilities*. It was sent to the Seismic Safety Commission near the end of 1990 (Holmes, 1996). The report stated that upgrading pre-Hospital Act buildings (those built before 1973) could be accomplished by (1) emptying the buildings of all "essential" functions, (2) demolishing and/or replacing the buildings, or (3) seismically strengthening the buildings. The process would require cooperation, funding, and time to bring these pre-existing hospital buildings into compliance. The report went on to say that legislation would be necessary to put a plan into action and begin the orderly repair, reconstruction or replacement of hospital buildings not in conformance with the Hospital Facilities Seismic Safety Act. As described, OSHPD's program was intended to emphasize the importance of hospitals remaining operational after an earthquake by establishing a deadline for all California hospitals to comply with the Hospital Facilities Seismic Safety Act. OSHPD's report outlined the provisions that would subsequently, and for the most part, be incorporated into SB 1953.

The recommended program consisted of an Evaluation and Planning Phase lasting five years, and an Implementation Phase lasting 30 years. During the Evaluation and Planning Phase, all buildings and all portions of hospital buildings constructed before March 7, 1973, would be examined by a licensed structural engineer to determine if the building, including nonstructural elements, was capable of meeting the intent of Section 15000 of the Health and Safety Code. The evaluation would be based on a standardized procedure. Each hospital facility with pre-1973 buildings would be required to file a comprehensive plan for compliance. The compliance plan was to indicate the steps by which the hospital intended to bring its facility into compliance and identify the phasing out or reconstruction of non-complying structures and utility systems, or outline steps for

relocation of essential services to facilities that comply with current standards. The plan for compliance would need to be reviewed and approved by OSHPD.

The Implementation Phase would begin at the end of the five-year Evaluation and Planning Phase. OSHPD would monitor implementation progress at each facility in accordance with the approved compliance plan. The report stated that the system for establishing compliance must be straightforward, consistently applied, and offer options for uses of buildings within the 30 year implementation phase.

A numerical rating system was suggested for application to each building to determine its compliance deadline. It was suggested that the numerical rating system be based on site seismicity, estimated seismic performance characteristics of the structure, and the extent of hospital essential functions and/or hospital beds contained in the building. It was argued that the primary factor for determining compliance deadlines should be the structural category, with the lowest rated buildings being assigned a deadline of about ten years from the start of the program. It was suggested that the compliance deadline should be variable, determined at any time by the current values of the determinant factors. Thus, an owner could extend the compliance deadline of a building by removing essential functions or by improving projected seismic performance.

Finally, OSHPD recognized the importance of securing means for funding projects under the program. It suggested in the report that financial incentives and support would be necessary for some facilities if they were to realistically fulfill the steps outlined in their compliance plans.

2.2.9 Waypoint 9. More Earthquakes

The Whittier Earthquake (1987) and Loma Prieta Earthquake (1989) each provided an opportunity to compare the seismic performance of hospital buildings built before and after the 1973 legislation. Very few hospitals were structurally damaged by the Loma Prieta Earthquake, perhaps because the location of the epicenter in the Santa Cruz mountains did not “test” as many hospitals as an epicenter on the Hayward fault might have done. Still, nonstructural damage was widespread. The Building Safety Board collected damage reports from hospital owners and design professionals and found that certain hospital components exhibited a high incidence of damage. These included emergency generators, elevators, communications systems, bulk oxygen tanks, and furniture, fixtures, and supplies (contents). The Building Safety Board developed a seismic checklist of nonstructural elements judged “exceptionally vulnerable” to seismic damage that OSHPD sent to all hospitals in the State.

The January 1994 Northridge Earthquake resulted in severely damaged acute care hospital facilities. Eight of the 91 acute care hospitals (9 percent) were evacuated. Six of the eight hospitals evacuated patients immediately, within 24 hours. Five of these six hospitals cited nonstructural damage (e.g., loss of electrical power; water damage from burst pipes, fire sprinklers, and ruptured rooftop water tanks) as the main reason for

evacuation; the sixth hospital cited both structural and nonstructural damage. The seventh hospital evacuated patients three days after the event, and the eighth hospital evacuated patients two weeks after the earthquake. These last two hospitals also sustained nonstructural damage, but since it was not as extensive as that of the other six hospitals, they did not immediately evacuate patients. In the end, the decision to evacuate these two hospitals was based on delayed identification of structural damage, despite initial inspections by in-house personnel and local structural engineers who had found no damage. Nearly 1100 patients were evacuated from the eight hospitals. Four of the eight hospitals that evacuated patients, including the two that did not evacuate immediately, were subsequently demolished (Schultz, Koenig, & Lewis, 2003). More than 3 billion dollars in hospital-related damages were attributed to the Northridge earthquake.

Shortly after the Northridge earthquake, OSHPD sent structural engineers, fire marshals, and construction advisors to assess the approximately 750 state-licensed facilities in the affected area. Within a week, approximately 400 facilities, including all significantly damaged sites, had been inspected. Nearly 95 percent of these were free of significant structural damage, although damage to nonstructural items such as storage shelving and equipment was widespread. There were no structural collapses. Older structures, ranging in age from 24 to 68 years, were damaged most severely. In seven of the eight most damaged structures, failure occurred in nonductile concrete shear walls, characterized by severe diagonal cracking. In addition, there was significant damage to penthouse structures (walls and bracing) and roof-mounted equipment (Aurelius, 1994).

CHAPTER 3.
ENACTING SB 1953

It had become painfully evident to seismic safety advocates that pre-1973 hospital buildings were not being withdrawn from use nearly quickly enough. The effects of the Northridge Earthquake on hospitals provided all the additional incentives needed to enact legislation addressing the concern about hospital buildings built before 1973. Within two weeks of the earthquake, State Assemblyman Margolin sent a memorandum to members of the legislature requesting co-authors of a bill he was authoring to require retrofit of existing hospitals, to toughen seismic safety standards, and to require the Department of Health Services to produce a report within 90 days on the causes of failure and the emergency preparedness of hospitals in the Los Angeles area.

On February 25, 1994, State Senator Alquist introduced the bill that when enacted became known as SB 1953. SB 1953 was introduced into the California Senate only five weeks after the Northridge Earthquake. It was amended half a dozen times through the spring and summer and passed the Assembly on August 29, 1994 and the Senate on August 30, 1994. The bill was signed into law in September by the governor as an amendment to the Hospital Facilities Seismic Safety Act of 1983.

3.1 MANY ACTORS INVOLVED IN A COMPLEX PROCESS SHAPING THE LEGISLATION

The preceding discussion may suggest a rational, orderly, and sequential process for the development and enactment of SB 1953. That, however, is not the case. Figure 3-1 is a visual representation of the dynamic environment with its many actors, interests, and institutional arrangements, all of which affected the development of SB 1953 and the development of administrative regulations intended to implement SB 1953.

Damaging earthquakes in California led advocates of seismic safety to press for legislation to effect enhanced safety and for the creation of organizations in State government that would continue to focus on earthquake issues. SB 1953 was the direct result of the California Seismic Safety Commission's advocacy and the professional earthquake engineering community's efforts to gain legislation requiring retrofit of pre-1973 hospital buildings. Proposals from seismic safety advocates were not considered, however, in a political vacuum. During the eight month period between the introduction of the bill leading to SB 1953 and its enactment into law, the healthcare organizations that would have to pay for the improvements were actively involved in trying to shape the legislation and later development of the regulations. Some worked primarily through the California Healthcare Association (CHA), an association in Sacramento that represents the interests of healthcare organizations. In addition to the CHA efforts, Kaiser-Permanente, the large, vertically integrated HMO, was viewed by some as having significant influence on the outcome of SB 1953 because they were considered a model of how hospitals could be upgraded or replaced. Indeed, one element of a bill (SB 842) to provide relief to hospitals in compliance by 2008 while maintaining the spirit of SB 1953 was dubbed the "Kaiser plan" (California Seismic Safety Commission, 2001b). Kaiser is

perhaps unique among West Coast healthcare organizations in that the millions of subscribers to its health insurance provide ongoing cash flow through payment of premiums, allowing for corporate strategic planning and an ability to invest in new or upgraded healthcare facilities. In another case, the Service Employees International Union (SEIU) supported SB 1953 as a workplace safety issue, pressing for an early timetable for reducing the likelihood of personal injury from structural and nonstructural failures in healthcare buildings.

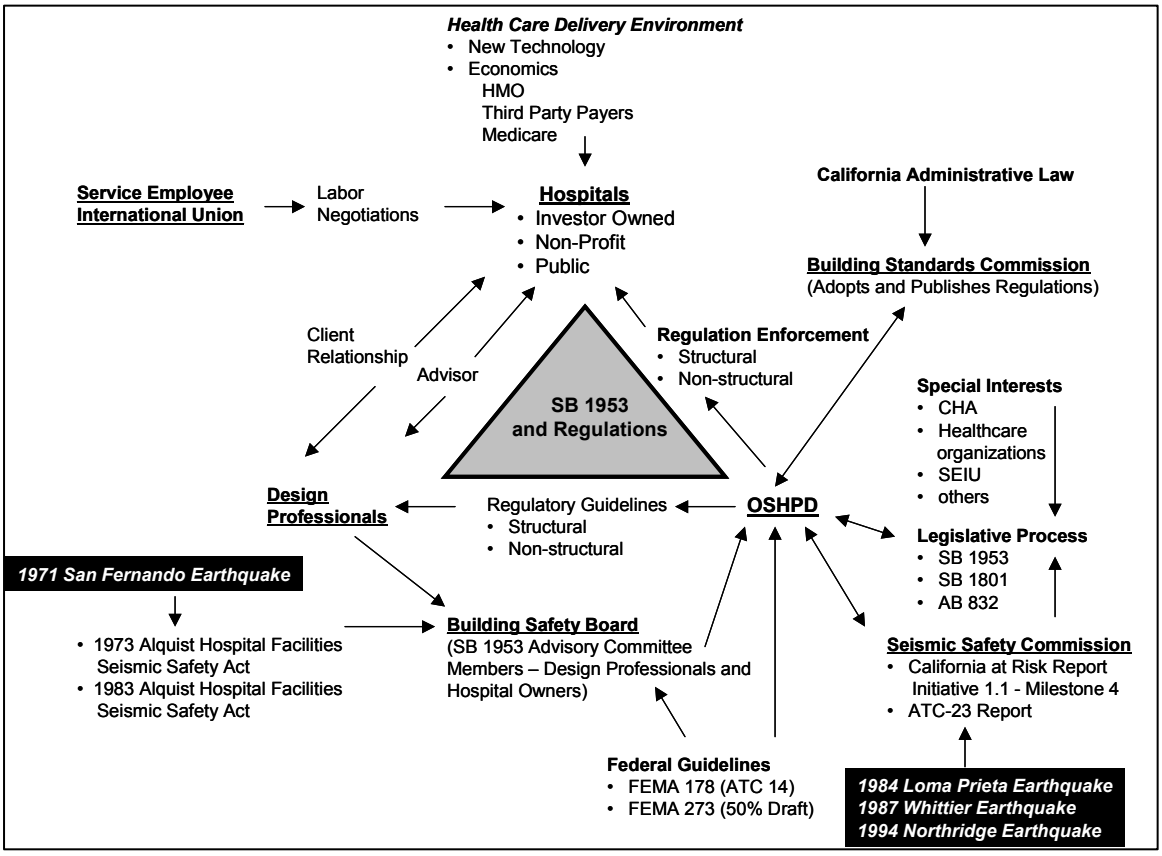

Figure 3-1. Forces influencing the adoption and content of SB 1953 and its regulations.

All of the stakeholders worked to affect the content of SB 1953, subsequent administrative regulations implementing the legislation, and modifications to the regulations in the years following their adoption. Once the SB 1953 regulations were adopted, any changes had to be made within the processes established by the California Building Standards Law, which requires state agencies to submit any proposals for changing building standards to the State Building Standards Commission for adoption consideration during its annual code adoption cycle. Thus, amending the regulations to reflect the emerging retrofit design issues and problems is a time-consuming process, as the State Building Standards Commission can take as long as 24 months to approve any proposed changes.

SB 1953, its initial regulations, and subsequent legislation and regulatory changes were developed within a complex web of actors, institutions, and interests. The process would have been complex by virtue of the numerous interests involved. It was made more complex, however, because healthcare finances themselves were in turmoil during the process, changing rapidly in hard-to-predict directions. Moreover, because California had adopted term limits for legislators, none of those who had created and debated the initial legislation was there later to help fix the problems that arose during early stages of implementation. Those who were in the legislature when adjustments were called for did not "own" the issue or the legislation and were understandably reluctant to tackle a complex issue fraught with conflict. After all, they had only a few years in office, had items on their own agenda, and would not be around when compliance was scheduled to be completed. In short, the entire process was complex, took place in a dynamic environment, and was interlaced with conflict. It is within this context and with this background that we precede with examination of the substantive assessment of SB 1953 and its regulations.

3.2 THE SUBSTANTIVE CONTENT OF SB 1953

The purposes for SB 1953 were made clear in the legislative findings and declaration that introduced the bill. First, the bill states that Californians were reminded of the vulnerability of hospitals in the Northridge Earthquake of January 17, 1994. Several hospitals built before the Alfred E. Alquist Hospital Facilities Seismic Safety Act of 1973 suffered major damage and had to be evacuated, but hospitals built to the 1973 standards suffered very little structural damage, thus demonstrating the effectiveness of the Act. However, both pre and post-Act hospital facilities suffered nonstructural damage that "prevented hospitals from being operational, caused the loss of one life, triggered evacuations, unacceptable property losses, and added additional concerns on emergency medical response."

The legislative declaration (SB 1953, 1994) cited the 1989 survey conducted by ATC for OSHPD, saying that it indicated "over 83 percent of the state's hospital beds were in buildings that did not comply with the Alfred E. Alquist Hospital Facilities Seismic Safety Act because they were issued permits prior to the effective date of the Act. Furthermore, 26 percent of the beds are in buildings posing significant risks of collapse since they were built before modern earthquake codes. The older hospitals pose significant threats of collapse in major earthquakes and loss of functions in small or more distant earthquakes" (§15097.100 (6)). The report is quoted as saying that "of the 490 hospitals surveyed, nine are in Alquist-Priolo Earthquake Fault Rupture Zones, 31 are in areas subject to soil liquefaction, 14 in areas with landslide potential, 33 in flood zones, and 29 have a possible loss or disruption of access" (§15097.100 (7)).

The bill goes on to state how it will remedy the situation with respect to hospitals built before the State imposed tougher building standards in 1973 and still tougher standards in 1983. In so doing, it specified several critical dates. The first critical date was June 30, 1996. By that time, OSHPD was to have developed definitions of earthquake performance categories for earthquake ground motions for both new and

existing hospitals. The bill indicates three levels of performance (§15097.101(a)(3)). These buildings are:

1. "Reasonably capable of providing services to the public after a disaster, designed and constructed to resist, insofar as practical, the forces generated by earthquakes . . ."

2. "In substantial compliance with the pre-1973 California Building Standards Codes, but not in substantial compliance with the regulations and standards developed by (OSHPD) pursuant to the Alfred E. Alquist Hospital Facilities Seismic Safety Act of 1983. These buildings may not be repairable or functional but will not significantly jeopardize life."

3. "Potentially at significant risk of collapse and that represent a danger to the public."

The second critical date was January 1, 2008. By that date, "any general acute care hospital building that is determined to be a potential risk of collapse or pose significant loss of life shall only be used for nonacute care hospital purposes" (§15097.127). This implies that the buildings judged to be within the "most dangerous" classification would have to be taken out of service, retrofitted, or replaced by that date. The law provided, however, that "a delay in this deadline may be granted by (OSHPD) upon a demonstration by the owner that compliance will result in a loss of health care capacity that may not be provided by other general acute care hospitals within a reasonable proximity" (§15097.127).

The third critical date was January 1, 2030. By that date, all hospital buildings used for inpatient acute care would have to be brought into compliance with the Alfred E. Alquist Hospital Facilities Seismic Safety Act of 1983. SB 1953 gives hospital owners two fundamental options. "In accordance with the compliance schedule approved by (OSHPD), but in any case no later than January 1, 2030, owners of all acute care inpatient hospitals shall either: (a) Demolish, replace, or change to non-acute care use all hospital buildings not in substantial compliance with the regulations and standards developed by (OSHPD) pursuant to the Alfred E. Alquist Hospital Facilities Seismic Safety Act and this act" or "(b) seismically retrofit all acute care inpatient hospital buildings so that they are in substantial compliance with the regulations and standards developed by (OSHPD) pursuant to the Alfred E. Alquist Hospital Facilities Seismic Safety Act and this act" (§15097.128).

With respect to consequences, hospital owners who received a written notice of violation of provisions of the new law and who failed to comply would have their hospital licenses suspended or the State would refuse to renew their hospital licenses. SB 1953 also made noncompliance a criminal offense for hospital owners, consistent with the language included in all California bills involving local government (e.g., county- and district-owned hospitals).

SB 1953 was introduced quickly following the Northridge Earthquake, but its basic elements were developed over more than a decade before the earthquake. The legislature did not act in haste and apart from technical experts, the private sector and State agencies. SB 1953 is, essentially, a minor rewrite of OSHPD's response to the Milestone 4, Initiative 1.2 in the California Seismic Safety Commission's report entitled *A Recommended Program to Seismically Strengthen Pre-Hospital Act Hospital Facilities*. There is one noteworthy difference. Whereas both the Seismic Safety Commission and OSHPD indicated the need for some kind of financial assistance for hospitals to meet the compliance deadlines, SB 1953 provided neither financial assistance nor financial incentives for hospitals to help them comply.

3.3 OSPHD'S SB 1953 ADMINISTRATIVE REGULATIONS

Implementation of a law to improve seismic safety through retrofit of existing structures required definitions and categorization of earthquake performance for the various types of structures, rapid seismic evaluation procedures, and regulations regarding seismic standards and other procedures. SB 1953 required OSHPD to submit such proposed regulations and procedures to the California Building Standards Commission in time to be adopted by March 18, 1998. Doing so was a multi-step process that involved a high number of stakeholders with varying values, priorities, and goals.

The Facilities Development Division (FDD) of OSHPD was and is the unit responsible for implementation of the law. Its responsibilities included the development of the implementing building regulations (i.e., for all geotechnical, structural, mechanical, electrical, and fire-life safety considerations). The FDD had limited staff and experience required to develop the building design retrofit regulations within the short time period required (i.e., about 2 years) to meet the 1996 date for submission of proposed code changes to the Building Standard Commission. Since the State Hospital Building Safety Board (HBSB) serves in an advisory capacity, the FDD looked to the HBSB for assistance. Representatives from the California Association of Hospitals and Health Systems (CAHHS) and the California Society for Hospital Engineering (CSHE) served as members of the HBSB. The CAHHS Health Facilities Task Force and the CSHE Codes Committee members served as a resource to the hospital representatives on the HBSB.

The HBSB appointed a Special Committee to work on the engineering aspects associated with retrofit of existing hospital structures and the requirements for the regulations necessary to implement the law. The Special Committee, on behalf of the HBSB, was to advise OSHPD on the requirements for the regulations. William T. Holmes, a prominent structural engineer and active member of the earthquake engineering community and Chair of the HBSB was a key Special Committee member. He played a significant role in facilitating the development of the SB 1953 regulations and coordination among the major stakeholders, specifically the Seismic Safety Commission, OSHPD, and the California Association of Hospitals and Health Systems.

The requirement in the law that specified life safety as a primary measure of performance caused much difficulty in the development of the regulations. There was no

life safety standard in terms of structural performance that could easily be followed. Thus, structural collapse prevention became the surrogate for life safety resulting in very restrictive regulations and the primary basis for the structural performance categories used in the assessment of the pre-1973 hospital buildings, as well as the determination of what would be required to meet the requirements of SB 1953.

OSHPD required that, where possible, the regulations follow model codes and national guidelines as the basis for developing the structural performance levels and the SB 1953 regulations. National guidelines were considered important because they were considered consensus documents developed by the professions, and the earthquake engineering profession actively supported utilizing the national guidelines as the basis for the regulations. This required the Special Committee to utilize the federal government's 1992 NEHRP guidelines for *The Seismic Evaluation of Existing Structures* (FEMA Publication 178 which was based on the 1987 ATC 14 Report) and the NEHRP *Guidelines for Seismic Rehabilitation of Buildings* (FEMA Publication 273 which was only 50 percent complete at the time). FEMA 178 was used as the guideline in the development of the structural performance category and rating system. It was believed that using FEMA 178 as the basic guideline for the SB 1953 regulations would result in a conservative approach, since there were no specific criteria or rules on how to determine risk of collapse. This led to a simplification of the regulations with an evaluation approach that equated life safety with collapse prevention. Whether this approach limited flexibility remains an unresolved issue. While collapse prevention was a performance measure that could be assessed objectively using professional engineering knowledge, life safety could be construed as an ambiguous requirement.

FEMA 178 included both a structural performance classification system and a special chapter on nonstructural elements. The nonstructural elements of Chapter 10 were removed from the regulations by OSHPD, resulting in separate structural and nonstructural retrofit requirements. The Special Committee wanted "life safety" to be the major criterion for establishing nonstructural performance by 2008, but failed to get it accepted. While the nonstructural performance categories and ratings were not considered necessary for meeting the collapse prevention-life safety performance goal, in the end they did get tied to the goal of life safety because of their relationship to several specific elements related to life safety, such as fire communications safety. The fire alarm "system" became a significant matter of concern and OSHPD took a strict position on compliance. On the basis that the "system" was necessary to ensure "life safety," the term system was interpreted to include all individual elements such as wiring, switches, exit lighting, and other components.

In general, the guidelines were the result of evaluations of various weaknesses in buildings based on their performance in past earthquakes. Overall, the evaluations were based on elastic analysis procedures with associated acceptance criteria. Based on the evaluation results, buildings were to be assigned a Seismic Performance Category with SPC-1 rated buildings posing the most significant risk of collapse and to life safety.

Based on discussions with many of the individuals engaged in developing the regulations, it was noted that the major stakeholders involved in the development of the regulations did not anticipate fully the many issues that would result. Also, the specific performance period set forth in the law created a relatively small window in which to prepare the regulations, thereby limiting time to fully evaluate the impact of the proposed regulations and to gain the necessary consensus for retrofit guidelines for hospitals. It was assumed that the consensus approach used in the development of the federal guidelines would be sufficient. Thus, the regulations were developed somewhat hastily under the constraint of limited knowledge and experience in the retrofit of complex structures and systems, and under a significant degree of ambiguity due to the lack of a specific standard on life safety. Further, according to some stakeholders, it appeared that the process of developing the regulations was conditioned somewhat by the lawyers from the regulatory agency (OSHPD), which eventually resulted in the regulations becoming very conservative.

Having drafted the regulations, one last step remained before they could begin to be implemented. In the State of California, it is the Building Standards Commission, governed by the Administrative Procedure Act of the State of California – Section 18930, that bears responsibility for the adoption and publication of all State building regulations. The Commission includes 11 members, most with technical backgrounds (e.g., architects, engineers, fire officials). The Commission has five committees, one of which is for handling the adoption of hospital building regulations. As a part of the adoption process, the Commission holds public hearings to review proposed new requirements and amendments to building regulations. While final regulations must be published within 180 days after adoption, an emergency process requires publication within 30 days of filing.

In summary, development of SB 1953-mandated building regulations began with the identification and selection of applicable model codes and national guidelines to be used as the principal source documents. The model codes and guidelines were applied as necessary to meet the legislative mandate. The regulations were developed in an open forum by OSHPD, and were reviewed by the Hospital Building Safety Board acting as an outside advisory group. In the case of SB 1953, due to the complexity of the issues, OSHPD used the resources of a special committee appointed by the Hospital Building Safety Board to aid in developing the regulations. When completed, the regulations went through the California Building Standards Commission adoption process, which included technical review and public comment. At the conclusion of this process, in 1998, the regulations were published as the official regulations governing the design and construction of hospitals (OSHPD b, 2005).

Since the regulations were prepared using incomplete documents and with limited actual experience in the retrofit of hospital buildings, in retrospect it seems apparent that as the design community gained experience with application of the regulations and the actual problems of seismic retrofit, the regulations would likely need to be amended to reflect the knowledge gained. Still, when modifications were submitted to the process of review and adoption, the up to two years required was viewed as unacceptable by the

hospitals given the stringent and short deadlines specified in SB 1953. An initiative by the California Hospital Association, supported by the Seismic Safety Commission and other stakeholders, resulted in a legislative change requiring that any amendments to the SB 1953 regulations submitted to the Building Standards Commission be considered "emergency regulations" requiring action in six months.

Even though the time between enactment of the law (January 1995) and the requirement of adoption of the regulations (March 1998) was considered by many of the stakeholders to be short for development of such a complex set of regulations and procedures, OSHPD staffers believed "a rational and realistic solution to the seismic mitigation problem for hospital buildings" including a prioritization of mitigation and replacement could be accomplished (Tokas & Schaefer, 1999: 4). The principal steps required for each noncompliant hospital were:

1. Determine the seismic deficiencies of each hospital building;

2. Mitigate nonstructural items that are required for a safe and orderly evacuation of the building as well as those required for maintaining *critical* functions of the hospital for patient care;

3. Determine a level of structural strengthening based on life safety concerns and the economic benefits, schedule the structural strengthening at a time that other collateral deficiencies can be corrected; and

4. Correct the deficiencies in the architectural systems and finishes to be upgraded within the normal remodel process (Tokas & Schaefer, 1999: 4).

3.3.1 Performance Categories

The published administrative regulations created two sets of seismic performance categories for acute care hospitals. The first of these was a set of Structural Performance Categories (SPC). All hospital buildings in the State were to be classified into one of five SPC ratings. Six categories were ultimately defined, with the first (SPC-0) being a default category for buildings for which no evaluation was submitted. Hospital owners were required to obtain sufficient professional assistance (typically a structural engineer) to classify their individual buildings and to report their evaluations to OSHPD by January 1, 2001. Descriptions of each category follow, along with the number of hospitals fitting each category as of 2002 (see Figure 3-2) (Schaefer, 2004).

SPC-0. Hospital buildings for which no seismic evaluation is submitted. Buildings in this category were assumed to be self-declared as non-complying. 73 buildings of 2,709 fit into this category.

SPC-1. These are buildings assumed to pose a significant risk of collapse and public danger because they were built before the 1973 standards were enacted. The regulations

required that they be retrofitted, removed from acute care use, or replaced by January 2008. About 38 percent of all hospital buildings, or 1,023, were classified as SPC-1. Many of these were self-declared SPC-1, meaning that the designation was not determined via engineering evaluation. Thus, it is difficult to say how many of these are truly life safety hazards.

SPC-2. These buildings were judged not to pose a significant risk of collapse, but they are potentially not repairable or functional after a major earthquake. They must be brought into compliance with the amended Alquist Act by January 1, 2030 or removed from acute care use. 193 hospital buildings were declared SPC-2.

SPC-3. These are hospital buildings in compliance with Alquist Act. They may be damaged in a major earthquake, but can be used beyond 2030, provided any damage is repaired to standards. 345 buildings were classified as SPC-3.

SPC-4. These, too, are buildings in compliance with Alquist Act. They may be damaged in a major earthquake and become temporarily unavailable, but they can be used beyond 2030. Of California's 2,709 hospital buildings, 739 were classified SPC-4.

SPC-5. These, too, are buildings in compliance with Alquist Act. They should be capable of providing service to the public after a major earthquake and can be used beyond 2030. Of California's 2,709 hospital buildings, 336 were classified SPC-5.

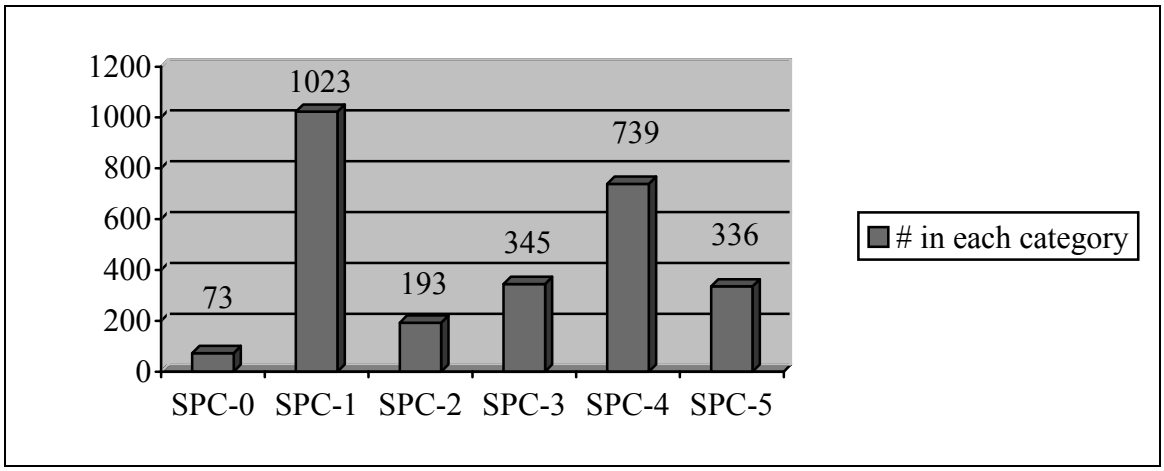

Figure 3-2. Number of hospital buildings in each of five Structural Performance Categories (SPC) [2002].

Source: Kurt Schaefer, Deputy Director, Facilities Development Division, California Office of Statewide Health Planning and Development. Presentation at MCEER Forum: Vision of Leaders (2004).

The second set of standards developed by OSHPD had to do with the performance of nonstructural elements of hospital buildings. Failure of nonstructural elements of hospital buildings during earthquakes was far more widespread than structural failure, and it created significant problems for providing continuing service immediately following an event. Five Nonstructural Performance Categories (NPC), in addition to the

default category, were defined. Descriptions of each category follow, along with the number of hospitals fitting each category as of 2002 (see Figure 3-3) (Schaefer, 2004).

NPC-0. Buildings for which evaluations were not received and that are presumed to fall into the NPC-1 category. 93 buildings of a possible 2,709 fit into this category.

NPC-1. Buildings with systems not adequately anchored and braced. About 74 percent of all hospital buildings, or 2,000, were classified as NPC-1.

NPC-2. Buildings with systems adequately anchored and braced for the safe evacuation of occupants, but not for continuous operation or even for speedy recovery. 412 hospital buildings were declared NPC-2.

NPC-3. Buildings that meet NPC -2 requirements, but that also have selected systems that are adequately anchored and braced. All acute care hospitals are to meet this standard by 2008. 50 hospital buildings were declared NPC-3.

NPC-4. Buildings that meet NPC -3 requirements, and, in addition, all systems and areas are adequately anchored and braced. All acute care hospitals are to meet this standard by 2030. In 2001, fewer than 6 percent (150) of California hospitals met the standard.

NPC-5. Buildings that meet NPC-4 requirements and on-site requirements for 72-hour operation after a major earthquake. All hospital campuses are to meet these requirements by 2030, but as of the 2001 evaluation, only about 0.1 percent (4) of the buildings met them.

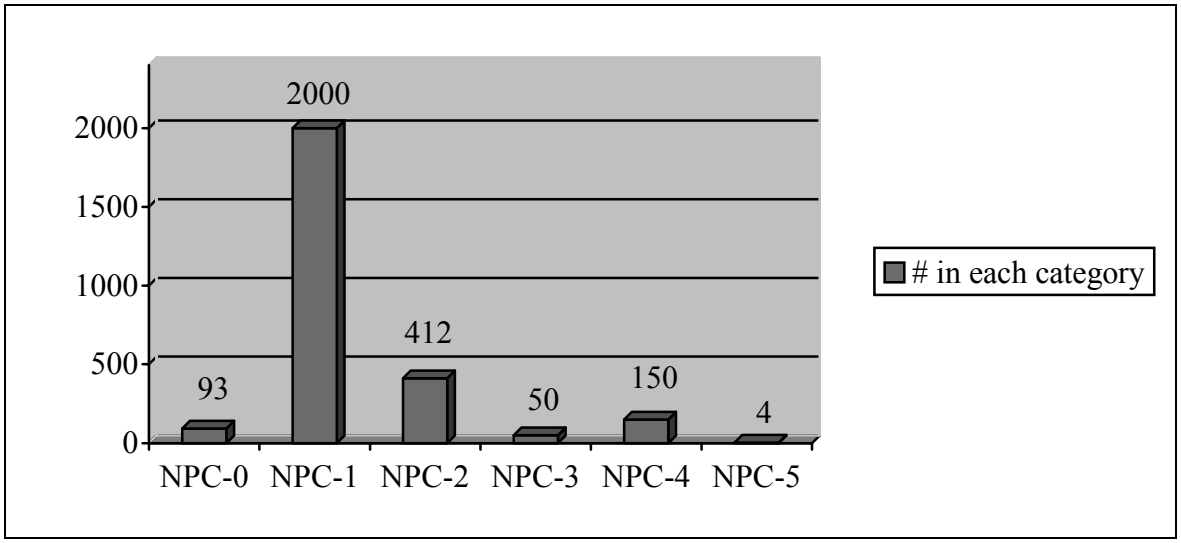

Figure 3-3. **Number of hospital buildings in each of five Nonstructural Performance Categories (NPC) [2002].**

Source: Kurt Schaefer, Deputy Director, Facilities Development Division, California Office of Statewide Health Planning and Development. Presentation at MCEER Forum: Vision of Leaders (2004).

3.3.2 Time Line

OSHPD's regulations established dates by which each hospital building had to comply with standards. The intent was to deal with the most critical threats to life safety and continued operations first and, then, by 2030, bring all hospital facilities up to contemporary standards.

January 1, 2001. This was the first critical date in the implementation schedule. By then, hospital owners were to have completed and submitted a seismic assessment of each building in which acute inpatient care was provided on that date. If the buildings did not meet current standards (did not comply with the Hospital Facilities Seismic Safety Act of 1973 as amended), the owner was to prepare and submit a plan for achieving compliance. This could be accomplished by removing the building from acute care inpatient service, performing seismic retrofit, or demolishing and rebuilding the structure.

January 1, 2002. All acute care inpatient hospitals were to have met minimum equipment anchorage standards for specified nonstructural systems.

January 1, 2008. All acute inpatient hospital buildings still classified as SPC-1 are to be taken out of service as acute care facilities.

January 1, 2030. All acute inpatient hospital buildings must meet the standards of the Hospital Facilities Seismic Safety Act of 1973 as amended. Failure to do so would result in loss of license.

CHAPTER 4.
IMPLEMENTING SB 1953

The Alquist Hospital Facilities Seismic Safety Act requiring new hospitals to meet high standards of seismic resistance was enacted in 1973. Twenty years later, at the time of the Northridge Earthquake in 1994, many acute care hospitals built before 1973 were still being used for that purpose. While these acute care buildings were being withdrawn from the inventory more slowly than seismic safety advocates had anticipated and hoped, newer buildings tended to serve diagnostic and treatment purposes. SB 1953, essentially an amendment to the Alquist Act, became law in January 1995, after being approved by the California legislature in September 1994. The regulations intended to implement the SB 1953 were published on March 18, 1998 (OSHPD b, 2005). They created a staged implementation scheme in which hospital buildings classified as most susceptible to seismic damage would be strengthened or taken out of service by January 1, 2008, and all acute care hospitals would have to meet Alquist Act standards by 2030.

On the face of it, who could object to wanting acute care hospitals "up to speed" in terms of seismic safety? Society is not well-served if these buildings do not survive earthquakes. After all, patients and staff should be safe during earthquakes, the facilities are needed to treat those injured by earthquakes, and, if a facility is damaged by an earthquake, it can be out of service for an extended period. Public policy intervention seems appropriate. Healthcare facilities have been regulated for a long time, largely because their societal importance and use by needy patients give such facilities special social importance warranting government involvement. The policy provided what appeared to seismic safety advocates a very reasonable time line to address what many people might consider a serious problem in a State where moderate earthquakes occur frequently, with the likelihood of several occurring in the course of a normal life span. Still, a large number of significant obstacles arose, resulting in modifications to the regulations and delays in the implementation timetable.

4.1 CHALLENGES TO IMPLEMENTATION

In this chapter, we focus on obstacles that arose during the first decade following enactment of SB 1953 and the responses to those obstacles and challenges by the regulators and the regulated. It did not take long after the regulations were adopted in 1998 for challenges to manifest themselves. We believe that some could have been predicted, while others likely came as surprises to many stakeholders. We have identified five challenges especially worthy of review.

4.1.1 Seismic Problems in Existing Buildings: A Long-Time Problem

As we have seen in the previous Chapters, it has not been easy in California to implement legislation intended to require retrofit of existing buildings and to make that legislation stick long enough to bring about the changes that safety advocates seek. It took a long time to develop codes that dealt with the inherent dangers of unreinforced masonry buildings built before 1933 in seismically-active areas. Building codes enacted

after the 1933 Long Beach earthquake prohibited continued construction of unreinforced masonry buildings, but it took municipalities more than a half century to address the problems with existing unreinforced masonry buildings (Alesch & Petak, 1986). Some communities have still not fully addressed the issue. As recently as December 2003, two people were killed in Paso Robles as a modest earthquake caused significant damage to an unreinforced masonry building as they ran out of the building during shaking. Thus, we suggest that advocates might have expected that efforts to address structural issues in hospital buildings built before the 1973 Alquist Act would fare similarly.

4.1.2 A Large Number of Buildings

A second challenge to implementation was the surprisingly large number of buildings that required retrofit or replacement and that constituted a large proportion of all acute care buildings in California. By 2002, just four years after the regulations became effective, 2,093 acute care hospital buildings were to be retrofitted to address nonstructural problems. By 2008, 1,096 acute care hospital buildings were to be structurally retrofitted, replaced, or taken out of service. Forty percent of California acute care hospitals were classified as SPC-0 or SPC-1, with SPC-1 assumed to be subject to collapse when subjected to seismic forces (See Figure 3-1). Unreported, SPC-0 facilities were assumed to be SPC-1 buildings and subject to SB 1953. Table 4-1 reiterates the magnitude of the challenge for the healthcare industry and for the regulators required to review and approve plans and monitor compliance.

Table 4-1. Seismic Performance Ratings of Acute Care Hospital Buildings in California.

SPC Buildings per category: Number (Percent)		NPC Buildings per category: Number (Percent)	
SPC-0	73 (2.7)	NPC-0	93 (3.4)
SPC-1	1,023 (37.8)	NPC-1	2,000 (73.8)
SPC-2	193 (7.1)	NPC-2	412 (15.2)
SPC-3	345 (12.7)	NPC-3	50 (1.8)
SPC-4	739 (27.3)	NPC-4	150 (5.5)
SPC-5	336 (12.4)	NPC-5	4 (0.1)
Total	2,709 (100)	*Total*	2,709 (100)

Source: Kurt Schaefer, Deputy Director, Facilities Development Division, California Office of Statewide Health Planning and Development. Presentation at MCEER Forum: Visions of Leaders (2004).

When the California Seismic Safety Commission contracted with the Applied Technology Council to do an analysis of hospital seismic resistance, long before SB 1953 was enacted, the Commission concluded from the data that about 10 percent of the

State's hospitals posed an imminent threat from a moderate earthquake (Tobin, 2004). However, the SB 1953 regulations were written such that almost four times as many acute care hospital facilities were classified as at risk of imminent collapse from an earthquake.

There is no clear dividing line between buildings that will collapse and those that will not when subjected to earthquake forces. The uncertainties associated with seismic resistance creates a large gray range within which even very good structural engineers might disagree among themselves as to whether a specific structure may survive a particular event. Some buildings, however, are not in the gray range and an assemblage of structural engineers would generally concur that the building would either fail or survive specific forces. As recently as September 2004, in a presentation on performance based engineering at the 2004 National Earthquake Conference, Chris Poland, a distinguished California structural engineer and past member of the Hospital Building Safety Board, stressed that regulatory bodies could achieve quick gains in the reduction of the risk from earthquakes by first classifying the buildings to be retrofitted in terms of those most likely to experience a catastrophic failure in the event of an earthquake and then focusing on fixing those problems first. That is, relevant parties could prioritize the buildings needing retrofit based on risk, correct the most serious problems immediately, and not get bogged down trying to do all buildings at once on a very tight deadline.

By all accounts, this was the approach desired by those who drafted and supported SB 1953 (Tobin, 2004). Proponents understood that trying to tackle all of the buildings at once would likely lead to a form of gridlock where little would be done. Importantly, and as stated previously, it appears that proponents were expecting that only about 10 percent of the State's hospitals would fit into the most at risk category. In brief, proponents appear to have underestimated the amount of work that would need to be done, given the metrics that were eventually applied. Given the health care environment in California between 1996 and the present, and given the resulting large volume of hospitals apparently needing immediate attention, it appears that greater effectiveness would have required a more fine-tuned prioritization of buildings.

The technical challenge, of course, is where to draw the line. In the case of SB 1953 regulations, some healthcare organizations and structural engineers argue that the SBC-1 threshold was set too high; that too many buildings are included in the imminent threat category. They argue that there should have been a clearer set of priorities so that the most dangerous buildings would have the most urgent timetable for addressing the problem. Supporters of the regulations argue that the line had to be drawn somewhere and that it was drawn appropriately in this case. In any event, the result of initial structural certification is that almost 40 percent of California's acute care hospitals were classified as being in imminent danger of collapse in an earthquake. The Seismic Safety Commission recognized the need for clarification in this area when in its November 2001 document, *Hospital Seismic Safety Findings and Recommendations,* it stated that the SPC-1 category should be refined to be consistent with risk levels, especially when extensions of time for compliance are requested.

In this context, some would argue that OSHPD should have, in consultation with its Hospital Building Safety Board, required site specific earthquake hazard assessment and specific building vulnerability in identifying the hospital buildings posing the greatest risks to life, thereby allowing the SPC-1 rated hospital buildings to be scheduled for retrofit in terms of structural performance. OSHPD argued that each hospital was permitted to do a site-specific analysis, but in general, hospital owners chose not to spend scarce resources to do this analysis, perhaps because it would not likely make any difference in the outcome since their buildings were built before 1973 and the legislation specified a compliance date of 2008. In retrospect, the advocates for SB 1953 and the Legislature should have required OSHPD to apply this risk categorization and prioritization approach by January 1, 2003.

4.1.3 High Costs

Partly because so many hospital buildings were classed as imminent threats in the event of an earthquake, the costs of complying with SB 1953 are projected to very high, especially by hospital owners, the ones expected to foot the bill for what they call an "unfunded mandate." Although there is no way to accurately estimate the total costs of compliance, a worst case cost scenario for SB 1953 is that is would cost more than $40 billion dollars to comply with SB 1953's provisions. This cost estimate is consistent with the $44 billion in damage associated with 1994 Northridge earthquake. In 2005, that would amount to a bill of more than $1,200 for every man, woman, and child in the state of California.

Estimates of the total cost of complying with the structural and nonstructural requirements of SB 1953 vary, depending on how the healthcare industry might respond. Analysts at RAND, the California-based not-for-profit research organization, concluded that meeting the initial requirements would cost about $42 million. Meeting the nonstructural upgrade requirements for 2008 and 2030 would cost an additional $646 million (Meade, Kulick, & Hillestad, 2002). Since RAND's analysts were provided a reasonably reliable estimate of the number of square feet to be upgraded, the total cost varies up or down depending on the cost of structural and nonstructural retrofitting.

To estimate the cost of meeting SB 1953's structural requirements, RAND analysts created four basic scenarios. For the first of the four scenarios, the analysts used a nominal replacement cost of $1 million per bed, or about $666 per square foot. These replacement costs – representing the total out-of-pocket expenditures incurred in the process of complying with SB 1953 – were calculated using the actual costs associated with building and equipping several recently completed hospital projects (e.g., UCLA Westwood, UCLA Santa Monica, Sutter Roseville). Each scenario had a variant ("b") in which only 70 percent of the hospital beds were replaced. The 70 percent scenarios were predicated on a relatively low occupancy rate at the time of the analysis and population growth projections.

Scenario 1a assumed that all 41,100 beds in OSHPD's SPC-1 category would be replaced, for a total cost of about $41 billion. Scenario 1b, in which only 70 percent of

the beds would be replaced, would cost about $28.8 billion. Scenario 2 subtracted the costs of medical furnishings and equipment from the total replacement cost to more closely approximate construction costs alone, yielding an assumed construction cost of $220 per square foot. Scenario 2 cost estimates were $8.8 billion for complete replacement (Scenario 2a) and $6.2 billion for 70 percent replacement (Scenario 2b).

In Scenario 3, the analysts removed construction costs associated with parking structures (never part of SB 1953) and heating, ventilating, and air conditioning (HVAC). The rationale for these deletions was that parking structures contribute minimally to keeping a hospital operational after an earthquake, and that advanced HVAC systems could be viewed as medical equipment. Based on an assumed construction cost of $128 per square foot, Scenario 3 cost estimates were $5.1 billion (Scenario 3a) and $3.6 billion (Scenario 3b).

Finally, Scenario 4 was an attempt to isolate only those costs for facility replacement applied to seismic strengthening. In this way, the analysts were able to calculate what some might consider the "true" or "pure" costs of compliance with SB 1953. The RAND analysts used an estimate that seismic design elements add about 10 to 20 percent to the cost of a building's structural frame. Thus, the assumed construction cost were about $3 per square foot. In that case, Scenario 4 projected costs in the area of $120 million for complete bed replacement (Scenario 4a) and $80 million to replace 70 percent of the beds (Scenario 4b).

Our discussions with engineers involved in the implementation of the regulations indicated that improving some nonstructural elements of individual hospitals required both structural changes and often significant disruption of hospital operations. Likewise, several hospital administrators estimated the costs associated with the logistics required to do the retrofits (i.e., disrupting hospital operations, moving patients and activities, building sound and dust barriers) could be on the order of 60 percent of the structural and nonstructural work itself. These additional (indirect) costs would increase the costs of compliance well in excess of RAND's estimate of construction and equipment (direct) costs.

One could argue that the cost of replacing all or even 70 percent of the existing hospital beds in buildings classified as SPC-1 should be a non-issue. After all, by 2008, most of these facilities would be at least a quarter of a century old, with a mean age of almost half a century (Meade, Kulick, & Hillestad, 2002: 12). If the organizations had depreciated the buildings over their assumed lifetime and funded that depreciation, then the sinking fund for depreciation should be able to pay for much of the mandated upgrading. This argument, however, fails to recognize the complexity of the situation. First, many of the buildings were not built at a single time and then left to depreciate. A large number of them were modified and added to over the years. New wings and other kinds of additions were added to what today are considered noncompliant buildings.

Second, few organizations actually fund depreciation. Governments and not-for-profit organizations, for the most part, do not. The governments and not-for-profits that borrow to build and service the bonds over time have a reasonable rationale for not funding depreciation. The argument for paying through borrowing is that the beneficiaries of the service should pay for it; adding debt service to other operating costs when calculating user fees helps to ensure that those who benefit from the service or facility pay for it. A similar argument could be made for depreciation, except that, if the organization is simultaneously servicing debt incurred to build the facility and funding depreciation, then current users pay twice.

Finally, no matter how one might pare away or reallocate the costs of replacing the healthcare facilities among various purposes, it seems pretty straightforward that healthcare owners will have to find and spend on the order of $40 billion to meet the requirements of SB 1953 as interpreted by OSHPD. It really does not matter if some of the cost consists of medical equipment. Nor does it matter that some of the costs will pay for nonstructural equipment; one cannot simply pick up an HVAC system and move it from an existing facility about to be demolished into a new one being built. For practical purposes, then, all related costs must be included in any reasonable and meaningful total cost estimate. After all, capital budgeting requests, decisions, and subsequent actions are not made piece-meal, at least not when people are thinking systemically.

The critical question for key stakeholders is this: where will the $40 billion come from? The original recommendation from the Seismic Safety Commission was that the State of California should help healthcare organizations pay for the improvements, but that recommendation got lost along the road to enactment as the State of California encountered its own serious financial problems. Without financial assistance from state government, healthcare organizations have been faced with the challenge of funding the needed capital improvements some other way.

Traditionally, capital improvements are financed through a combination of operating cash flow, corporate reserves, new investor equity, and debt. Local government typically builds hospitals by borrowing money with either general obligation or revenue bonds. Not-for-profit organizations use a combination of capital fund-raising from philanthropists and borrowing. Investor-owned firms finance from the sale of shares, equity, and borrowing. In addition, hospitals often benefit from governmental subsidies for construction. As we will see, borrowing has not been an option for most healthcare organizations.

Finally, in many cases, the costs of structural and nonstructural retrofitting existing buildings are estimated to be very expensive – perhaps more than half the cost of simply building a new building. As suggested throughout our interviews, the costs associated with retrofitting are almost always higher than anyone originally imagines: drawings may not match actual construction, pipes may not be where they are expected to be, materials thought to be in adequate shape may not be, and so on. Because of the incredible diversity among facilities, the cost of compliance varies dramatically among them. The highest costs are not necessarily for the oldest or most vulnerable structures.

For many organizations, retrofit costs represent dollars spent to add a couple of years to the life to an already inadequate building, thereby prompting them to consider more seriously the option of rebuilding. In this context, hospital owners have been faced with an unexpected choice. Should they skip the retrofit step all together and simply build a new building now? In at least some cases, building new seems to make more economic sense. After all, buildings built before 1973 are inefficient in terms of today's medical practice, require quite a bit of maintenance compared with new buildings, and retrofitting while caring for patients in the same building is, at best, extremely difficult.

Thus, hospital owners faced the problem of retrofitting buildings by 2008 or attempting to buy time with an extension to the 2008 deadline, the better to consider the retrofit or rebuild question. Rather than commit to a retrofit in short order, many hospitals and their advocates pressed the legislature and OSHPD for extension opportunities.

4.1.4 Logistical Difficulties at Individual Facilities

As noted earlier, one of the major difficulties some healthcare organizations have with complying stems from the way the hospitals and hospital campuses have been built. Hospital buildings frequently grow incrementally from a central core. One wing is added, time passes, and another wing or ancillary building is added. A new building is wrapped around an old building. An old building, having been renovated a number of times, becomes the first building of a campus of buildings clustered on a land parcel surrounded by other land uses.

In the simplest case, structural engineers would evaluate pre-1973 buildings, determine ways to make them compliant with SB 1953, and submit plans to OSHPD for review. However, as structural engineers worked with healthcare organizations to evaluate their buildings and to examine retrofit options for individual structures, they and administrators began to realize that the logistic problems for some larger facilities were much more complex than anticipated.

As an example, the authors have seen a large hospital that consists of a non-complying core tower with attached (functionally, not physically) wings that, because they were built after 1973, comply with seismic standards. While this case may represent an anomaly, since the entire building system (older core and newer wings) should have met the seismic provisions of the code in force at the time of the newer wings' construction, the case still exists and must be addressed. To complicate matters, the noncompliant core structure houses the infrastructure systems for the new wings, linking them inextricably. No one likes the unpleasant prospect of having to tear down one or more newer, complying structures in order to retrofit or replace an adjacent or functionally-attached noncompliant structure.

Further, when healthcare facilities with multiple buildings are packed onto a single, crowded site, the logistical problems can be more complex than those posed by the retrofit or replacement decision. Acute care facilities cannot simply be closed while

the old building is torn down and the new one erected; it is necessary to remain open for business while complying with the seismic retrofit law. Healthcare facilities for which buying additional adjoining land is not an option (or, not an easy option) have additional problems. “Should we build on the parking lot while continuing to operate the old acute care facility? Where else can we build? How will we handle cars, traffic, and parking in the interim? Where will we put the patients? How often will we have to change where we conduct various healthcare activities? How must we redesign support services and systems to support the new facility in the new location?” As stated above, these logistic problems can add as much as 60 percent to the engineering and construction costs of complying with the regulations.

4.1.5 Upheaval in Healthcare Economics and Finance

Despite concerns about cost and logistics, the single greatest obstacle to implementing SB 1953 provisions has been the unprecedented financial and structural upheaval in healthcare economics experienced in the decade following passage of SB 1953. This upheaval made it financially impossible for most California hospitals to comply with the legislation in the years immediately following issuance of the rules, regardless of their designation as investor owned, not-profit, or public.

Since 1994, the healthcare industry has undergone extraordinary structural and financial changes. Rapid changes in healthcare economics and an increasingly bewildering industry structure have created incredible instability and uncertainty for most healthcare organizations as they have attempted to make reasonable business decisions across a wide spectrum of problems and issues.

When SB 1953 was enacted, most of California’s healthcare organizations were generating profits or, in the case of not-for-profit and public hospitals, surpluses. By the late 1990’s, however, more than 80 percent of California’s healthcare organizations were losing money. More specifically, they were experiencing net operating losses (Shattuck Hammond, 2001).

Fundamentally, two things happened to change the industry’s financial situation and structure. First, the number of individuals participating in managed medical care increased dramatically during the second half of the 1990s, primarily as a response to rapidly escalating health insurance premiums. Between 1995 and 2005, a single decade, participation in managed care programs was projected to increase from 12.2 million Californians to 20.1 million (Shattuck Hammond, 2001; Harrison & Montalvo, 2002). For many decades, hospitals had charged patients for services received on a cost-plus basis. In the managed care environment, they were 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.

Second, at the same time California HMOs were experiencing explosive growth, Medicare was experiencing its problems associated with rising costs. The problem was not new, but it reached a point where something had to be done. Medical hospital costs per patient more than doubled from 1970 to 1975. They doubled again by 1980 (Shattuck Hammond, 2001). The Federal government took action on the high cost of Medicare as part of the 1997 Federal Balanced Budget Act. It called for reducing Medicare expenditures by $215 billion over five years. Alas, the number of Medicare patients and the costs of treating them continued to increase. To meet the goal of cutting federal expenditures, Congress cut Medicare reimbursements to hospitals and healthcare professionals, often to levels below the cost of providing the services. To help achieve the balanced budget goal, hospitals were paid a fixed amount per discharge based on the patient's general diagnostic group, regardless of the actual cost of treating the patient.

All of this took place in an ongoing context of rapidly escalating costs for healthcare organizations. Dating to the early 1970s, the federal and state governments had been involved in trying to contain the rising costs of health care. Prior to 1986, for example, Congress had strongly encouraged states to enact "Certificate of Need" laws that required state health planning agencies to issue a permit before a health care facility could construct or expand, offer a new service, or purchase equipment exceeding a certain cost. The intent behind such "CON" laws was threefold: "to restrain escalating health care costs, prevent duplication of health resources, and yield equal access to quality health care at a reasonable cost." Such laws ultimately proved ineffectual in the fight to reduce health care costs. At the same time, both the cost of and the demand for contemporary diagnostic and treatment equipment were skyrocketing, particularly with the introduction of sophisticated new medications and advanced technologies. Moreover, the cost of supplies was increasing much faster than the Consumer Price Index.

Labor costs, which are a major component of hospital operating costs, were also increasing dramatically. Several forces drove the costs up. The number of Catholic nuns, devoted women who had provided nursing care for more than a century in hospitals with Catholic religious affiliations, declined precipitously. Since the nuns had worked for low pay, the rapid decline in their numbers had to be made up by hiring secular nurses at much higher cost. Simultaneously, California's population was swelling. More nurses were needed, but by the 1990's, both women and men had many professional occupational choices beyond nursing and teaching. Hospital work was demanding and did not pay competitively. The availability of licensed registered nurses declined in the face of increasing demand, even as pay increased.

Some hospitals, unable to staff themselves with the required number of nurses, found that they 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 the need to allocate large, fixed overhead costs across fewer patients.

The response by hospitals to this complex, dynamic, and troublesome combination of challenges was generally rational and rapid. Hospitals and physicians began to reorganize themselves to gain efficiencies. Hospitals sought 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 third-party payers that provides for a set amount of money per enrolled member per year, regardless of the number or types of treatment required.

At the same time, individual hospitals merged or affiliated with one another in hopes of realizing economies of scale (Spetz, Mitchell, & Seago, 2000). Bigger, stronger corporations with more assets could presumably benefit from integrated management and operations. Hospital mergers swept the nation during the 1990s. They peaked from 1995 to 1997, during which more than 680 hospital mergers were completed nationally.

Despite their efforts, California hospitals, on average, could not reduce costs quickly enough or deeply enough to make up for the reduction in revenue and the increases in the costs of equipment, labor, and materials. In 1999, California hospital median operating margins became negative. That is, by 1999, more than half of California's hospitals had negative cash flows. In other words, they were losing money.

In 1995, the median operating margins for California hospitals were 1.65 percent compared with 2.8 percent nationally. Operating margin, defined as "total operating revenue minus total operating expense," is considered "… a primary and 'early warning' indicator of the financial health of California's hospitals" (Shattuck Hammond, 2001: 2). In part, operating margin is considered an important indicator because "operating margin directly and indirectly provides access to the capital required to sustain and/or grow a business in the future. Particularly in the capital-intensive hospital industry, access to capital (or lack thereof) determines future viability" (Shattuck Hammond, 2001: 2). By 1999, California hospital median operating margins had become negative (- 0.33 percent) while national median operating margins had declined, but remained positive (0.4 percent). In 1999, the top quartile of California's hospitals was outperforming the top 25 percent nationally, with operating margins of 5.7 percent compared to 5.0 percent, but the lowest quartile of California's hospitals was experiencing operating margins of – 7.8 percent vs. –5.1 percent nationally (Shattuck Hammond, 2001: 3).

The financial distress that developed in the second half of the 1990's was not shared equally by all the healthcare organizations. Hospitals most likely to have operating losses were small, owned by a local government (municipality, county, or special district), rural, not part of a healthcare system, and/or serving mostly poor patients. Those healthcare organizations most likely to still have positive operating margins were medium-large or large, investor-owned, urban, part of a system, and not receiving a disproportionately large number of poor patients as was the case with the public or Catholic hospitals (Shattuck Hammond, 2001).

In the midst of the financial crisis facing more than half of California's healthcare organizations, the California legislature decided that requiring one nurse for every six patients in acute care units was not sufficient. In 2001, therefore, the legislature enacted a revised requirement for one nurse for every four patients in acute care facilities. It was, of

course, unlikely that sufficient numbers of nurses existed in California to meet those new requirements. Consequently, healthcare organizations have been faced with further increasing pay for nurses to attract them from other states and from foreign countries. Alternatively, hospital organizations could reduce their available beds to meet the standards. Whatever the medical merits of the new nursing ratio requirement, the financial burden for a very significant number of hospitals could be expected to further depress net operating revenues.

In this milieu, healthcare organizations with many facilities had more flexibility and options. Such organizations could presumably afford short-term losses in one or a few facilities, as long as other facilities generated sufficient revenues to cover any losses incurred by the organization overall. Likewise, healthcare organizations that were investor-owned typically had more flexibility and options than did not-for-profit and publicly-owned hospitals. Some readers will leap to the assumption that investor-owned hospitals are more efficient than not-for-profit or public hospitals. That is not necessarily the case. What is more likely is that investor-owned healthcare organizations can generally choose where, how, and to whom to provide service. They are in a better position to locate in upscale markets and are able to focus on providing services that have favorable reimbursements from insurance and Medicare payers. Further, they are in a better position to lure and retain medical specialists whose expertise is associated with higher revenues (e.g., orthopedics, plastic surgery).

Public hospitals and many not-for-profit hospitals rarely have the option to "cherry pick" their markets and customers. Indeed, they are often serving the customers who are least able to pay. Not-for-profit hospitals typically have missions to serve particular neighborhoods or communities, whether they are secular or religiously-based. As such, while not-for-profit and public hospitals might benefit by adopting more of the efficiency-oriented practices associated with investor-owned hospitals, they could not implement all of them and still be true to their missions. Moreover, neither the not-for-profits nor the public hospitals could segment the market as aggressively as the investor-owned hospitals could. Finally, in considering especially the case of the not-for-profit and the public hospitals, local governments have suffered with their own fiscal problems and have been limited in their ability to provide sufficient funds for either contemporary capital infrastructure or preventive maintenance.

These financial and structural changes in the healthcare industry have a great deal to do with the responses of healthcare organizations to SB 1953. Hospitals experiencing financial hemorrhaging or barely surviving were not likely able to justify spending money on seismic retrofitting, at least in the short run. At the same time, healthcare organizations able to remain profitable may have been in a position to benefit from the mandated seismic improvements. The costs of retrofits provide legitimate reasons to eliminate "loser" hospital facilities and complexes, by either selling or closing them. Since so many healthcare organizations were in difficult financial straits, this also presented profitable healthcare organizations with the opportunity to strengthen their market positions by acquiring desirable facilities and market locations from financially-strapped organizations. One might expect, in this environment, that the largest and most

profitable organizations might greatly expand their market share. Unfortunately, one could 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 of all this was that, depending on their fiscal position and their primary organizational objectives, it made sense for some healthcare organizations to support SB 1953 and to move forward with compliance on schedule. Compliance would be easier for them because they would have had a variety of options for dealing with inadequate buildings, and because they could benefit organizationally from the difficulties stressing other healthcare organizations. It was to their clear advantage to address their buildings' seismic issues, and then declare to potential customers and coveted medical providers that they were "ahead of the curve" – both in terms of seismic issues, and in terms of updated facilities overall. Other organizations might have been barely able to comply. Still others may have been unable to at all.

Could healthcare organizations have borrowed or otherwise generated sufficient funds to finance the mandated retrofits or replacement? It appears that they could not. Standard and Poors noted that "cash flow generation for a high percentage of California hospitals is insufficient to finance any significant increase in capital expenditures" (Harrison, Montalvo, & Fiorella, 2001, cited in Shattuck Hammond). Shattuck Hammond analysts compared credit ratio data for the sum of California hospitals and for the overall median with Moody's national median ratios. The ratios compared with Baa credits, the lowest investment grade bond rating offered by Moody's. The lower the bond rating, the higher the interest that must be paid to sell the bonds.

Importantly, the State of California has an office to help healthcare organizations borrow money. It works to find the best rates, using the State's bond rating, but few hospitals sought help from the agency to borrow money for retrofits, in large part because their precarious financial positions made it difficult for them to demonstrate credit-worthiness. Given the negative cash flow situation that more than half of California's hospitals were experiencing during the late 1990s, it appears as though they would have considerable difficulty servicing the debt, even if they could float a bond issue. Paradoxically, those investor-owned and not-for-profit healthcare facilities with strong cash positions and positive cash flows typically would not need the State's services to obtain favorable bond rates or to meet the costs of meeting SB 1953.

4.2 DISCUSSION

While few could object to the stated goals of SB 1953, few healthcare organizations found themselves in a position to retrofit or replace their buildings in the years immediately following issuance of the regulations. For many healthcare organizations, retrofitting old buildings did not make economic sense; replacement was a better option. However, about 80 percent of California's hospitals found themselves in extremely difficult financial straits and without the financial resources to comply with SB 1953, regardless of whether retrofitting or rebuilding was the "smart choice."

CHAPTER 5.
HEALTHCARE ORGANIZATION RESPONSES TO SB 1953

At the time of this writing, it has been a decade since SB 1953 was enacted in California. The original legislation mandated that all collapse-hazard hospital buildings be seismically strengthened or removed from acute care service by 2008. Proponents of the original legislation believed that about 10 percent of the hospital building stock in California would need to meet the 2008 deadline, and that the remaining 90 percent would have until the 2030 deadline (Tobin, 2004). Since enactment, the consequences of SB 1953 have constituted a dynamic story that continues to unfold.

In terms of providing a linear chronology of activities, the initial implementation timetable was straightforward, as seen in Table 5-1. Essentially, the timetable called for certifying the structural and nonstructural classification of the facilities by 2001, nonstructural retrofit by 2002, structural retrofit by 2008, and replacement by 2030. However, in the authors' experience, virtually all regulatory decisions are followed by responses from the regulated parties that play out in the context of other factors and forces with which those organizations must contend. SB 1953 was no different.

Table 5-1. Legislatively Required Deadlines for SB 1953 Implementation.

Due Date	Action Required
January 1, 2001	All hospitals to be evaluated and placed in a structural performance category (SPC) and a nonstructural performance category (NPC) based on levels of risk of damage in the event of an earthquake.
March 1, 2001	OSHPD required to establish a schedule of interim deadlines that hospitals must meet to be eligible for an extension of the 2008 deadline.
January 1, 2002	Requires all general acute care inpatient hospitals to meet NPC-2 requirements and to install brace systems for communications, emergency power, bulk medical gas, and fire alarms.
June 1, 2003	Requires OSHPD to adopt regulations to allow replacement buildings to be used while hospitals are being retrofitted or replaced.
January 1, 2008	Requires all general acute care inpatient hospitals to be such that they can withstand a major earthquake and all nonstructural mechanical, electrical and plumbing systems in critical care areas to be braced and anchored.
January 1, 2013	Rural hospitals in Seismic Zone 3 must have braced fire sprinkler branch lines.
January 1, 2030	All general acute care inpatient hospitals must be in substantial compliance with the Health Facilities Seismic Safety Act.

Source: Legislative Analysis of Assembly Bill 656, introduced February 22, 2001.

To say that healthcare organizations' responses to SB 1953 varied across organizations and through time would be an understatement. Some organizations were strongly opposed to the regulations and sought legislative relief. Others seemed to largely ignore approaching deadlines, focusing on other issues. Still others worked to comply with the regulations on a timely basis. However, the approaches they used to comply also varied. Some considered retrofitting the old structures. Others simply changed the use from acute care to something else. Others looked to replace the non-complying buildings. Still others sought to sell old buildings or simply closed their doors.

Our discussions with healthcare administrators indicate that the responses of individual organizations varied depending on the characteristics of those organizations and the circumstances in which they found themselves following adoption of the SB 1953 regulations. Moreover, the responses of individual organizations changed through time as their circumstances changed. In this chapter, we provide an overview of the responses by healthcare organizations and how they changed through time. We attempt to explain the varying and changing responses.

At the risk of oversimplification, the decade since enactment, and the seven years since the implementing regulations were adopted, might be divided into three basic stages from the perspective of the affected healthcare organizations:

- Stage 1. Realization
- Stage 2. The Quest for Relief
- Stage 3. Organizational Responses in a Dynamic and Strategic Context

5.1 STAGE 1. REALIZATION

It did not take long for healthcare organizations to grasp the implications of SB 1953 after the law was enacted and the regulations were issued, especially given the adverse financial climate in which they were operating. For most, the realization seemed to come during their initial efforts to ascertain which classification into which their individual buildings fell. As healthcare organizations hired structural engineers to assess what it would take to comply with SB 1953, many owners and administrators were stunned to learn how much it would cost and the extent of the logistical complications associated with structural and nonstructural retrofitting.

As described previously, the statute was enacted just as healthcare finances and organization were undergoing massive changes – changes that are just now beginning to settle out. The changes resulted in 85 percent of California hospitals struggling with a turbulent environment and operating losses while, at they same time, they were expected to initiate plans to retrofit or replace extraordinarily expensive hospital buildings. Few healthcare organizations were in a position to borrow money and to service the debt. None of these considerations was lost on owners and boards of trustees and directors. For

many, the problem of how to comply while they were struggling to remain solvent appeared intractable.

Some healthcare organizations were able to comply. Fifteen percent of the healthcare organizations were not losing money. A few had significant resources upon which they could draw to retrofit or rebuild buildings. Others had relatively simple buildings, so relatively modest, inexpensive retrofits would be required to meet the new regulations. Some of the larger healthcare organizations, those owning many facilities, found that they could comply with the OSHPD regulations in part by selling, closing, or changing the use of acute care buildings that did not comply. When the non-complying structures were also marginal financial operations, the choice was relatively simple for investor-owned organizations, and even some not-for-profit organizations. The choices were not nearly as simple for other not-for-profit or for public organizations with missions to serve the poor and underserved, no matter the fiscal health of the hospital organization.

5.2 STAGE 2. QUEST FOR RELIEF

One approach to unfunded mandated implementation by regulated parties is to seek relief from regulations they perceive as onerous. Many California healthcare organizations believed SB 1953 imposed extraordinary costs on them without compensating benefits to either themselves or the public. One could argue that decision makers in many healthcare organizations did not "believe" in earthquakes and their presumed consequences. Of course, these individuals *do* believe in earthquakes and their negative consequences, in general, but they may not believe that an earthquake will strike their facility in the foreseeable future, that any probable earthquake will cause significant damage or threaten life safety, or that their immediate community will be without adequate healthcare in the aftermath of any probable earthquake. Thus, they may believe that they are being asked to spend money to thwart an event that will never occur, at least not during their organizational tenure or lifetime. As one healthcare executive told us, "Money spent on seismic "fixes" to our facilities is money that could be better spent actually delivering healthcare to people who need it."

Consequently, many of California's health organizations sought relief in the legislature.

It may be easy to picture California's healthcare organizations as singularly united in their appeal for legislative relief, but they were not. Their positions varied depending on their circumstances. Some were bitterly opposed to the legislation and wanted it repealed. These were generally healthcare organizations with only one or two facilities that saw themselves faced with intractable financial and logistic problems, and that had buildings they believed to be relatively safe from earthquakes. Other healthcare organizations saw the legislation as creating a possible business opportunity. Hospitals with many locations, often but not always investor-owned, with a positive cash flow, and with good credit could potentially shed themselves of facilities that were not generating sufficient return and replace them with facilities located in high-end markets where they

could provide services with large financial margins. At the same time, they might be able to "cherry pick" other markets or other facilities covered or owned by organizations unable to finance the required improvements.

Not-for-profit healthcare organizations typically have a mission of providing service to a particular clientele, defined either by location or by some other characteristic, such as low income. Along with publicly-owned hospitals, which are often the healthcare provider of last resort for the poor, many were not in a position to take advantage of the regulations and put themselves in a better marketing position. Hospitals owned by municipalities or counties found themselves in a particularly difficult position. Local governments were themselves in desperate financial straits. The federal and state government, in an effort to trim its own deficit, cut back on resources for local governments. All states, including California, were responding to federal cuts to domestic programs by pushing responsibility for financing off onto local governments, while, at the same time, the capability of local governments to raise taxes to pay for those services and facilities was severely limited. California was in worse financial shape than most states, owing in part to the effects of the energy crisis, economic recession and market collapse for elements of the economy, like high tech dot com businesses, that were concentrated in California. Further, state level policies were raising the cost of doing business in California. Hospitals owned by local governments in California could not refuse to comply with SB 1953, even though they had serious financial problems, simply because it would be politically unacceptable. Some action had to be devised.

Many not-for-profit hospitals, but not all, seemed willing to comply if it were financially feasible, but, for most, at that time, it was not. At least some hoped to stretch out the time for complying and to get some financial assistance.

Because of the healthcare organizations having different agendas and objectives, they were unable to agree on a unified legislative position for their primary association to advocate in the legislature. Moreover, the issue had become politicized. The union representing most hospital workers (SEIU) took up the issue, framing it as a "safety in the workplace" issue and opposing the efforts of healthcare organizations to seek relief. Without a clear, reasonable and workable proposal backed with near unanimity by the healthcare organizations and supported by the unions, the legislature showed little interest in providing significant relief to healthcare organizations.

None of the legislators in office was there when SB 1953 was enacted and none of those in office when help was sought would be there when 2008 rolled around. The lobbying organizations, a few legislative staffers, and the officials charged with administering SB 1953 were the only ones in whom institutional memory resided, and they each perceived the history through different lenses. It was, consequently, difficult to drum up much interest in the legislature for fixing the problems that healthcare organizations claimed were there. Moreover, the State of California had its own financial problems that were giving state officials serious difficulties. In the final analysis, there was no one "fixer" to address the issues that occurred following adoption of SB 1953.

Despite the fact that California healthcare organizations did not have a unified position on what relief, if any, the legislature should provide, and despite the absence of legislators who had created and voted for SB 1953 and the absence of a committed legislative "fixer," considerable activity on SB 1953 took place in the 2000 and 2001 sessions of the California legislature. Table 5-2 summarizes the activity and results. Working both independently and through the California Hospital Association, many healthcare organizations sought either to have the implementation timetable deferred or to get financial support from State government. Healthcare organizations that saw SB 1953 as advantageous to their position provided lukewarm support or none at all in these efforts. Other healthcare organizations opposed SB 1953 altogether and hoped that it would be repealed.

Not only healthcare organizations realized the enormity of the response required by SB 1953. The Seismic Safety Commission created an ad hoc committee to examine compliance with the statute. Formation of the committee was precipitated by concern in the Commission that 40 percent of California's operating hospitals were classified in the highest category of collapse risk. At the same time, the Commission remained steadfast in its call for upgrading those facilities. In its November 2001 report, the Commission made several important recommendations (California Seismic Safety Commission, 2001a). First, the Commission recommended that compliance deadlines be adjusted based on overall reduction of risk to the public. The committee recommended accelerating the 2030 deadline for reconstruction in exchange for extending the 2008 deadline. Second, the Commission urged that deadlines not be extended without evidence of interim progress toward meeting the goals. Third, it was recommended that the SPC-1 building priorities be adjusted to be consistent with risk levels. That is, sub-categories should be developed based on the level of earthquake hazard to which each individual building was likely to be subjected and the vulnerability of the building. Fourth, the Commission recommended that OSHPD invest in applied earthquake research that could make hospital retrofits safer. Fifth, the Commission recommended that hospital owners be encouraged to construct new buildings rather than retrofit older buildings.

The Seismic Safety Commission also made three recommendations concerning financial assistance by the State for the required improvements. The first recommendation was that OSHPD consider the importance of regional hospital coverage when allocating financial assistance for facilities. The second was that the State provides financial assistance to healthcare organizations based on demonstrated need. The final recommendation was that the State considers incentives other than direct financial assistance for hospitals not eligible for public financing, including accelerated depreciation and funding priorities for federal assistance from organizations like FEMA.

The legislature was generally responsive to requests to provide limited relief in the form of stretched timelines, but was steadfastly opposed to providing financial assistance to hospital organizations, no matter their claims of financial and logistic constraints.

Table 5-2. Legislation Introduced in 2000 and 2001 to Provide Relief for Healthcare Organizations to Comply with SB 1953.

Year	Action	Disposition
2000	SB 1801 would permit five year extension from 2008 to 2013 of structural seismic standards for hospitals under certain circumstances.	Became law in Fall 2000
2000	SB 1886 would require hospitals to submit cost data for compliance to a third party named by OSHPD.	Vetoed
2000	SB 2006 would exempt hospital facilities in Seismic Zone 3 from certain existing nonstructural requirement deadline if the facilities meet existing 2002 nonstructural requirements and the owners submit a geological analysis.	Became law in Fall 2000
2000	AB 2194 would create a statewide liaison office of hospital seismic safety issues and require hospitals to submit compliance plans for use of temporary facilities.	Became law in Fall 2000
2000	AB 2902 would make a technical correction to SB 1953 to remove sunset on entire Act.	Became law in Fall 2000
2001	AB 1156 would establish a Safe Hospitals Bond Act of 2002.	Died
2001	AB 842 would grant five-year extension to 2008 for hospitals with at least one building meeting standards.	Died
2001	SB 928 would provide financial assistance to hospitals to comply.	Died
2001	AB 656 would provide relief for Alameda County Hospital to meet 2002 requirements; in process, but can't finish; OSPHD had not issued permit for the work	Became law in Fall 2001
2001	AB 832 would make all regulatory submissions to California Building Standards Commission by OSHPD emergency regulations, thus speeding the change process.	Became law in Fall 2001
2001	AB 577 Safe Hospitals Bond Acts of 2004 and 2006.	Died

Source: California Legislature Archives

Bills submitted to the California legislature seeking support for helping to implement SB 1953 with financial assistance to hospitals for rebuilding and retrofit got nowhere. AB 577, called the Safe Hospitals Bond Acts of 2004 and 2006, for example, was introduced in February 2001 and died that fall in the Appropriations Committee. Similar bills were introduced and failed to be enacted. The State of California was simply not going to provide financial assistance to support implementation of SB 1953. This was, of course, understandable in the context of the State of California's dire fiscal

condition. Virtually all the states in the Union were suffering the fiscal effects of the recession, federal devolvement of costs to the states, and massive financial pressure from healthcare entitlement programs, particularly for the elderly, but California, for a variety of reasons, appeared to be suffering more than most (Shattuck Hammond, 2001).

OSHPD also sought relief, as it was faced with enormous workloads as a consequence of the large number of facility plans to be evaluated, and because it knew about the difficulties many hospitals were encountering. Normally, it takes about 18 months to make changes to administrative regulations in California. Emergency changes to administrative regulations, however, can be approved much more quickly. Understanding the need to respond quickly to problems that emerged as SB 1953 implementation proceeded, OSHPD sought to have changes to SB 1953's administrative regulations classified as emergency changes. A bill to do that was introduced in February 2001 (AB 832). Supported by both the Seismic Safety Commission and the California Hospital Association, the bill passed both houses and was signed into law in September of that same year.

Other legislation provided important relief to healthcare organizations faced with complying with SB 1953. SB 1801, introduced by Senator Jackie Speier, would enable OSHPD to provide extensions to hospitals for complying with the SB 1953 timetable from 2008 to 2013 under special circumstances. This provision essentially affords hospitals the opportunity to avoid the costs of retrofitting existing buildings by agreeing to comply with the 2030 provisions 17 years earlier. For many hospitals, this could be an attractive alternative, provided, of course, that they could get past their fiscal crises.

SB 2006, introduced by Senator Tim Leslie, recognized the variation in seismicity in the state and provided an exemption for hospital facilities in Seismic Zone 3, a zone associated with lower probabilities of severe earthquakes, from certain nonstructural requirement deadlines if the buildings met existing 2002 nonstructural requirements and if hospital owners submitted a site specific geological analysis approved by both OSHPD and the California Division of Mines and Geology (now named the California Geological Survey). It, too, was adopted in the fall of 2000.

The result of legislative actions in 2000 and 2001 was that individual hospitals could obtain extensions to the hospital seismic safety timetable under three criteria (OSHPD, 2005b).

1. **Diminished Capacity**. The Office (OSHPD) may grant hospitals an extension to the January 1, 2008 seismic compliance deadline, for both structural and SPC 2 & NPC 3, nonstructural requirements (SPC 2 and/or NPC3 compliance) if it is evident that compliance will result in an *interruption of healthcare services* provided by general acute care hospitals within the area. The hospital owners shall request extensions in one-year increments up to a maximum of five years beyond the mandated date of compliance (1/01/08).

2. **1801**. The Office may grant hospitals an extension delay to the January 1, 2008 seismic compliance deadline for both structural and nonstructural requirements (SPC 2 and/or NPC 3 compliance), if the hospital agrees that on or before January 1, 2013, designated services shall be provided by *moving into an existing conforming building, relocated to a new building or retrofit existing building* to designated seismic performance categories.

3. **2006**. The Office may grant hospitals an extension delay to the January 1, 2008 seismic compliance deadline for nonstructural requirements, (NPC-3 Compliance) if the hospital is *located in Seismic Zone 3 areas* as indicated in the 1995 edition of the California Building Standards Code and have met the NPC 2 requirements and associated deadlines (OSHPD, 2005, *emphasis added by authors*).

A review of the OSHPD's *Hospital request for extensions to seismic safety deadlines* documents (OSHPD a, 2005) suggests that the overwhelming number of extension requests have fallen into the diminished capacity category. Likewise, nearly all requests appear to have been approved.

The legislation enacted in 2000 and 2001, along with OSHPD's amendments to the regulations implementing SB 1953, resulted in relatively modest modifications to the timeline for implementing the Hospital Facilities Seismic Safety Act of 1983, as amended, but afforded some needed flexibility from the standpoint of the hospitals.

The quest for financial relief was pursued just as aggressively by healthcare organizations as the quest for programmatic relief. Given the unwillingness of the State of California to provide financial assistance to hospitals to meet the requirements of SB 1953, members of the California Congressional delegation sought financial assistance from the Federal Government. Senator Dianne Feinstein introduced legislation in 2001 for Federal support, but the bill was derailed following the September 11 terrorist attacks (Sticker, 2004). Congressman Jerry Lewis of Orange County, California introduced a similar bill (H.R. 1669) in the House, but it did not go further.

5.3 STAGE 3. ORGANIZATIONAL RESPONSES IN A DYNAMIC AND STRATEGIC CONTEXT

The responses by healthcare organizations to SB 1953 can hardly be separated from their responses to the dramatic and rapid changes in healthcare economics and organization in the years immediately following its passage. It is, however, useful and informative to look at privately-owned and public hospitals separately, since their responses may differ considerably simply because of the form of ownership and the decision making context within which they find themselves.

5.3.1 Hospitals Owned by Local Governments

Decades of financial paucity in California local government, generated to a considerable extent by fallout from Proposition 13, made complying with SB 1953 a significant challenge for most public hospitals evaluated as part of this study. The State of California's fiscal woes have contributed to that challenge. Like private hospitals, California's local government hospitals experienced the same financial upheavals caused by escalating costs of providing healthcare, reductions in reimbursements for procedures and services rendered, and the growing role of third party payers in the industry. Hospitals owned by local governments, however, were unable to aggressively pursue some strategies for increasing their efficiency that were employed successfully by privately-owned organizations. They were not, for example, in a good position to merge with facilities in other communities and other states in an attempt to generate scalar economies. Moreover, as part of local government, investment decisions were often made by political bodies with little knowledge of healthcare dynamics, with different agendas and constituents, and in the face of intense competition for money from a shrinking purse.

Administrators of hospitals owned by local governments found themselves caught between a rock and a hard place. It was impossible for local governments not to comply, at least minimally, with SB 1953 because so much could be made by political opponents if the administration did not "make the hospital safe from the threat of collapse." Some public facility administrators decided they had to do something – anything – to comply in the short run, even if doing that something would mean spending a lot more money in the end. To paraphrase one official, "We'll cut open the walls and strengthen the column, then close up the hole; if we find pipes that are so badly rusted we expect they will break in a matter of weeks, we'll still close up the hole. We simply don't have enough money to fix even obvious problems while we're in there. It's inefficient and stupid, but we don't have a choice." Thus, while long-term decision making might compel a more comprehensive approach to addressing seismic issues, one that would take into account the need to modernize facilities and fix any number of issues, the resources needed to accomplish this were not forthcoming.

5.3.2 Investor-Owned and Not-for-Profit Hospitals

As was true for most hospitals, many investor-owned and not-for-profit healthcare organizations faced significant financial obstacles to complying with SB 1953. At the facility level, most were faced with operating losses and reserves that were inadequate to cover the costs of retrofit. One individual said that estimates for completing initial renovations and related construction on its many buildings would cost about $1.38 billion. Thus, whereas SB 1953 and other forces (e.g., increasing population) were effectively pushing for a building boom, most hospitals found themselves unable to pay for such a boom (Catholic Health World, 2003). In addition, some faced what they saw as almost intractable logistic problems. Moreover, it would be more efficient in many cases to build new, rather than retrofit and then build new for 2030. In any event, changes in medical practice and third party financial coverage called for new hospital designs.

Initial responses to SB 1953 varied across the array of healthcare organizations. Given their circumstances, some healthcare organizations sought legislative relief in the attempt to gain some flexibility. To the best of our knowledge, no healthcare organizations worked actively to get the legislation revoked, but almost all wanted time to comply and, if they could get it, some financial help. Generally, there existed an underlying sense that they would comply, even though some hospitals were opposed to the legislation for a variety of reasons: "it's an unfunded mandate," "it's a full employment act for structural engineers," "we're not likely to see an earthquake of any meaningful size in my lifetime," "our buildings are not as susceptible to damage as suggested by SB 1953," and so on. No matter their objection, all agreed that they would seek to comply with SB 1953, because law-abiding behavior was part of their corporate mission and because they understood the need to address the public's concerns about their facilities' safety.

Over the past four years, as circumstances changed and healthcare organizations have begun to learn how to cope with new financial and market realities, we have seen variations in how healthcare organizations decided how to comply with the regulations. In some cases, we have seen how they have had decisions thrust upon them by financial realities.

First Things First: the Quest for Solvency. Like everyone else, hospital administrators have to set priorities. In the case of SB 1953, there would be no retrofit or replacement unless the individual hospital regained solvency in the face of changes experienced in the late 1990s. In most cases, the decision was to ignore temporarily the looming SB 1953 requirements and charge ahead toward achieving solvency. First things first.

The primary strategy employed to gain solvency in the new milieu was to implement greater efficiencies in conducting their healthcare business and to create a bigger financial flywheel. To do that, many hospital organizations attempted to align themselves with a financially stronger organization, focus on developing a market niche, and implement organizational changes. In some cases, that meant doing things such as dividing the one business into several corporations as a way to obtain higher reimbursements from Medicare and medical assistance programs. Almost all healthcare organizations sought to become more efficient internally and to merge with larger organizations to benefit from economies of scale.

It appears to us that, over the past decade, most privately-owned California hospitals have transformed themselves from operations that focused mainly on delivering services into businesses that continued to focus on delivering services while also paying serious attention to costs, product mix, marketing, and strategic planning. The change was forced on them by the dynamic environment. Survival required successful adaptation. By 2004, a significant proportion of private-equity owned hospitals had begun to turn a profit, and, in the case of not-for-profit hospitals, to generate an operating surplus. The proportion of hospitals with net operating losses was shrinking as adaptors survived and non-adaptors closed their doors.

As a consequence of their transformation, healthcare organizations began to look at complying with SB 1953 in a strategic business context. Compliance was not viewed as a technical decision about how to retrofit the old building, but as a decision made in a context of corporate goals and strategies for achieving those goals. Choices were made at the structure, facility, organization, and corporate levels.

The question posed was no longer "how should we retrofit the structure?" Instead, the organization began asking a series of questions. Primary among these was "How much, if anything, should we spend to protect against extreme events and on what should we spend it?" The choice to mitigate earthquake risks always weighed against other priorities, always took place in a dynamic environmental and organizational context, and always faced difficult obstacles. Only rarely was the decision driven by the availability of an engineering solution. In fact, the availability of one engineering solution often prompted decision makers to ask technical staff and consultants for more and different engineering solutions, such that any final decisions reflected more than the quickest or most obvious fix.

Based on our discussions with healthcare executives and others close to the decision making process, it seems that healthcare organizations approached the question of retrofit, rebuild, or close iteratively, cycling back and forth through the amalgam of identified problems, possible solutions, relevant players, and likely costs and consequences. Thus, the conversation might begin with "Should we retrofit the structure?" From there, questions might include, "If not, what could we do with the building: sell it or perhaps change its use to something other than acute care?" "Should we even keep the building? Perhaps we should replace it." "Well, should we even keep that facility open? Can it generate enough revenue to cover the costs? Does it fit into our mission? Is it the right location?" And, finally, "Can we afford to stay in business, or should we fold?" In considering their response to SB 1953, healthcare organizations thought seriously about their options in the context of their strategic plan and mission.

While we think that individual hospitals and healthcare organizations have always known that they needed to be competitive to survive, we also think that the environment of the 1990's and going forward offered hospitals new lessons in what it meant to be competitive and avoid organizational entropy. Some hospitals did not or could not adapt, and did not survive. Other hospitals learned how to adapt, and some even thrived in the new financial environment. They became more sophisticated and learned how to gain access to new resources.

We also think that competitive strategies (e.g., differentiation, focused differentiation) created a demand for new buildings. High labor costs and shortages of skilled personnel demanded new labor-saving approaches, and new healthcare technologies and methods demanded new kinds of space. At the same time, we think that healthcare organizations realized that SB 1953 was not going to go away. There might be some options for delaying compliance, but, in general, the requirement for stronger and safer acute care hospital buildings would remain in force. Finally, we think that the goals of SB 1953 were furthered when it became financially advantageous for healthcare

organizations to replace old, outmoded buildings with new ones. Though organizations might publicly point to SB 1953 as a "trigger" or "compelling force" behind their decision to rebuild, in fact it was usually other considerations that drove their decision (e.g., desire to upgrade their buildings in line with modern medical practice, in order to attract certain doctors and patients). In the end, the need to generate a profit or surplus is a day-to-day concern for hospital owners, whereas the need to remain operational after an earthquake is not a day-to-day concern. Since the day-to-day tends to be more salient, and since that which is more salient tends to be addressed, it should come as no surprise that compliance with SB 1953 might result more from the desire to generate revenue than from the desire to avoid structural and nonstructural seismic damage.

5.4 OUTCOMES

The consequences of healthcare organizations thinking strategically about their options with regard to individual buildings and facilities led to some unanticipated consequences. Some of these consequences included administrative glitches, requests for extensions, and changes in the number of acute care facilities. Each of these consequences is discussed in the pages that follow. Importantly, some very interesting means of compliance have resulted because hospitals placed SB 1953 compliance in the context of other interests and have devised unique strategic responses. These are just now beginning to unfold.

5.4.1 Administrative Glitches

SB 1953 provided that healthcare organizations that submitted plans for review by OSHPD pay the cost of the review. Thus, the agency has sufficient financial resources, even without State budget allocations. Unfortunately, as California's financial crisis deepened, an across-the-board hiring freeze was imposed by the Governor, keeping the agency from hiring additional staff to review the plans. In June 2003, the agency had 18 vacant positions, leading to delays in processing plans. Significant effort was made by the California Healthcare Association in helping to achieve a change in the State's hiring freeze policy by allowing OSHPD to recruit and hire staff to handle the work load caused by implementing SB 1953. OSHPD, also working to address the problem, contracted plan checking and reviews to external parties, but, even so, the freeze created delays.

5.4.2 Requests for Extensions

As of May 2005, 211 hospitals had applied for extensions to comply with SB 1953 deadlines (OSHPD a, 2005). Table 5 shows the number of requests and actions taken. Of these, 90 percent cited "diminished capacity." That is, they maintained that complying with SB 1953 would result in an interruption of healthcare services provided by general acute care hospitals within their service area. Diminished capacity provides for extensions in one-year increments for up to five years beyond January 1, 2008. None of the hospitals claiming diminished capacity was denied, but 19 applications were pending as of May 19, 2005.

Table 5-3. Status of Applications to OSHPD for SB 1953 Extensions as of May 2005.

	Diminished Capacity	2006	1801	Totals	% Distribution
Pending	19	6	2	27	13
Approved	171	4	2	177	84
Denied	0	1	6	7	3
Totals	190	11	10	211	100
% Distribution	90	5	5	100	

Source: OSHPD a, 2005.

Hospitals were also able to request extensions to compliance deadlines if they agreed that on or before January 1, 2013, they would relocate into a new building or retrofit building that meets designated seismic performance standards. Ten hospitals applied under this provision (SB 1801), but six have been denied and only two approved. Remaining requests are pending. Eleven hospitals applied for extensions under the SB 2006 rule, which applies to hospitals located in Seismic Zone 3, a zone identified as being less seismically active. Four of these have been approved.

About 19 percent (211/1,096) of the acute care hospital buildings classified as SPC-0 or SPC-1 in 2002 have applied for extension. So far, 84 percent of those (177) have received extensions. The number of applications continues to rise, however (e.g., the number of applications on July 23, 2004 was 184, compared to 211 on May 19, 2005). It is likely that the number will continue to rise, as 2008 gets closer.

5.4.3 Facilities Have Closed, But New Facilities Are Being Built

Closures attributed in part to SB 1953 costs. In more than one conversation with hospital executives, we were reminded that the ultimate consequences associated with complex decisions are sometimes contrary to the originators' intended purposes. In the case of SB 1953, for example, we were confronted with the paradox of a law intended to ensure adequate medical care *after* an earthquake – SB 1953 – that might contribute to less hospital care being available not only after an earthquake but *before* an earthquake, at least for those individuals having the least ability to afford adequate and routine medical care. More directly, in the case of hospital closures attributed to SB 1953 (e.g., because of inadequate financial resources to retrofit and/or rebuild), there will be less healthcare available to those in the affected communities. Importantly, since the hospital organizations most likely to have the least in terms of financial resources tend also to care for society's least financially able, hospital closures may disproportionately affect society's poor. In the end, the quest to ensure adequate access to healthcare after an earthquake may yield less access both before and after said earthquake. In saying this, our intent is not to argue that hospitals should not be seismically sound. Rather, our intent is to identify and describe what we think is a very real and unintended consequence of injecting a given policy into a complex environment.

Some California hospitals have closed their doors since the SB 1953 regulations were adopted. To what extent might those closures be attributed to the enactment of SB 1953? A 2001 report entitled *California's Closed Hospitals, 1995-2000* (Nicholas C. Petris Center, 2001) identified 23 acute care hospital closures in the five-year period and attempted to assess the reasons for those closures. Financial factors dominated. We have already seen that the State's hospitals were financially stressed during the period, but "As a group, the closed hospitals reported some of the worst financial indicators." The report notes, "While the state's hospitals have amassed debt at nearly twice the national average and maintain thin operating margins, the closed hospitals show even lower margins and greater accumulation of debt. Further, each closed hospital "performed poorly in the three years prior to closure, with a dramatic decline in the last year before closing" (Nicholas C. Petris Center, 2001: 11-12). The report concludes that "retrofit requirements are likely to lead to additional closures in areas where the market is over saturated and margins and bed use are low (Nicholas C. Petris Center, 2001: 14). In 2000, the president of the California Healthcare Association predicted that closures related to seismic retrofit requirements would range from 50 to 150 (cited in Nicholas C. Petris Center, 2001: 14). For hospitals in difficult financial circumstances, SB 1953 might be the straw that breaks the camel's back.

Thus, it would appear that in some places at least, access to healthcare might be reduced at least partially because of the high costs of complying with structural and nonstructural requirements imposed by SB 1953. Tenet Healthcare Corporation, for example, announced early in 2004 that it planned to sell nearly one-third of its hospitals, 19 of them in California. Tenet's Chief Executive Officer said that the restructuring would create a company with the potential for stronger performance over the long term (Vogt, 2004).

Marcy Zwelling-Aamot, MD, Los Angeles County Medical Association president, said she was concerned that Tenet would be unable to find buyers for all of the hospitals, leading some of them to close and contributing to what she describes as a crisis in health care in Los Angeles. "You can't mistake the idea that these hospitals might close," said Dr. Zwelling-Aamot, a specialist in internal medicine and critical care. "Tenet is a well-versed, well-greased Fortune 500 company. If they cannot make money in the health care marketplace, who is going to buy the hospital?" (Vogt, 2004).

Tenet said that one reason the California facilities are being sold is SB 1953. The organization's Chief Executive Officer said the 19 hospitals for sale in California would have required a $1.6 billion investment to meet SB 1953's provisions. The 17 California hospitals that Tenet planned to continue operating in California were estimated to cost less than $300 million to bring up to standards. A Tenet spokesman "scoffed at the suggestion that the company was selling the hospitals as a means of generating cash to offset legal costs or to pay for a settlement in one of its legal battles. He said the divestiture of all 27 hospitals is expected to generate total net proceeds of about $600 million, much of which will be in the form of tax benefits" (Vogt, 2004).

In August 2004, Northridge Hospital Medical Center announced it would close its Sherman Way campus in the Van Nuys area of the San Fernando Valley (Los Angeles). Importantly, this facility housed the sixth and largest emergency room scheduled to close in Los Angeles County in a 14 month period. *The New York Times* reported that the announcement followed "by a week the closing of the emergency room at Elastar Community Hospital in the East Los Angeles neighborhood . . . In the last two years, four other emergency rooms, mostly in low-income areas, have closed in the county, primarily because of the high cost of treating thousands of uninsured people . . ." (Madigan, 2004).

The *Times* reported that a hospital spokesperson "estimated that the hospital had spent $13 million on so-called charity care in the fiscal year that ended on June 30. In addition, she said, the hospital faced a $16 million bill for state-ordered earthquake retrofitting and could not afford it." The paper went on to report that "Since 1990, 70 hospital emergency rooms and trauma centers have closed in California, a state whose emergency and trauma system is overwhelmed and under-financed, health officials say" (Madigan, 2004).

A boom in hospital construction. While some hospitals are closing due, at least in part, to the costs imposed by SB 1953, others are engaged in building programs (Rundle, 2004). As hospital administrators examined the option of retrofitting old hospitals or building new, it became clear to many that upgrading outmoded buildings did not make business sense (Jones, 2004; Rundle, 2004). Hospitals that were able to survive the financial consequences of changes in the healthcare industry had to become even more competitive to survive. They concluded that new buildings were needed that were congruent with modern medical practice, that incorporated new technologies, and that reduced the need for scarce and expensive medical staff. Those with the financial wherewithal to do so moved in that direction.

'We don't want to just go out and build new versions of old hospitals,' said Tony Wagner, executive administrator for hospitals at the San Francisco Department of Public Health. 'We should rethink how we are providing care' (Russell, 2003).

5.5 A CONTINUING STORY

The SB 1953 story continues to unfold and, as it unfolds, it continues to provide important insights. Careful study of SB 1953 can inform us about the implications of how public regulatory policy is designed, about the importance of how programs intended to implement policy are designed, about the importance of context to implementation, about the unanticipated consequences of policy implementation, and about how those organizations that are impacted by the policies respond to them.

The SB 1953 story will continue to unfold up to 2030 and beyond. In fact, the California Senate recently voted to give hospitals an additional 12 years to make their buildings safe from earthquakes. According to the *Los Angeles Times*, "…all hospitals except those in the most precarious condition would no longer have to meet the 2008

standards if they agreed to finish all their safety renovations by 2020, a decade ahead of schedule. Supporters said it was a worthy trade-off and noted that no hospital had fallen down due to a quake since 1971" (Rau, 2005). The article continued with a quote from the bill's sponsor, Senator Jackie Speier, who stated that, "No one has died in a hospital in California due to seismic safety or stability, but we have had over 7,000 patients who have died each year due to infections they acquired in the hospital" (Rau, 2005). Despite the Senate's approval, the bill to alter the timeline for SB 1953 has its critics, including the California Nurses Association and the Service Employees International Union, both of which represent hospital workers. Thus, the debate about SB 1953 and the means for ensuring adequate seismic safety in California hospitals continues.

We expect to continue to develop this case study beyond this initial assessment. Our goal is to understand the phenomenon in its broader context, so we are engaged in additional, complementary work. That work focuses on organizational decision making around the hazard mitigation investment decision, with a special focus on hospitals dealing with SB 1953. At the same time, we will continue to document the SB 1953 story and attempt to understand and explain what has happened and why. In continuing with this case, we expect to generate preliminary assessments of SB 1953's effectiveness, as we consider the extent to which SB 1953 has accomplished its stated goals. In the end, will the State of California and its citizens enjoy increased seismic safety because of SB 1953? Besides evaluating whether this goal is or likely will be accomplished, we will also consider other direct and indirect consequences associated with SB 1953. For example, in a "post SB 1953 world," are there better or worse healthcare options, more or fewer hospital facilities, more or less efficient operations, and so on in the state of California. What are the impacts of a wide scale, time delimited, and construction-oriented public policy such as SB 1953 on commodity prices, labor costs, and local and regional economies? Finally, what lessons may be drawn from the SB 1953 experience for policy makers, administrative staff, organizational decision makers, and society at large? These and similar questions will be addressed in our Stage 3 and final reports.

CHAPTER 6.
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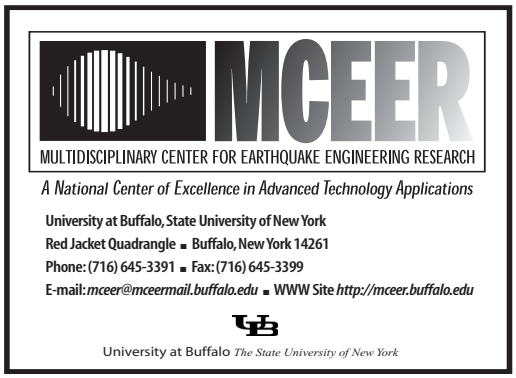

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