The Implications of the September 11 Terrorist Attacks for California
A Collection of Issue Papers

K. Jack Riley and Mark Hanson, editors

Prepared for the
Speaker of the California Assembly

RAND Criminal Justice

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Preface

The attacks of September 11, 2001, on the World Trade Center and the Pentagon presented U.S. policymakers with unprecedented challenges. Just weeks later, the anthrax letters added to the demands and the complexity of the response. Some of the challenges were obvious and immediate, including management of the relief effort, resuming flight schedules in the context of revised security procedures, and preparing a national policy response to the issue of terrorism. However, many of the challenges only began to become clear in the weeks and months after the attacks. Questions that could not be immediately answered included how the terrorist attacks would affect key industries (travel and tourism, airlines, and insurance) and how well prepared other states and municipalities were to prevent and respond to terrorism.

In early October 2001, then-Speaker of the California Assembly Robert Hertzberg approached RAND with a request for assistance on the issue of terrorism. The speaker was interested in analysis of the terrorist attacks' medium- and long-term implications for the State of California. Specifically, he was interested in identifying gaps in knowledge and understanding that would help inform and shape the 2002 Assembly legislative agenda on terrorism. The objective was to help identify high-priority areas where hearings or legislation might be required and to help identify areas where the policy framework was likely already adequate.

The speaker initiated this project with a hearing on terrorism on October 15, 2001, in Los Angeles. Subsequently, RAND staff in collaboration with the speaker and his staff decided on a list of topics for RAND to investigate in more depth. We present a subset of the topics we collectively chose in this volume:

- terrorism's impact on the California travel and tourism industry
- the implications of the terrorist attacks for the airline industry in the state
- the consequences of the attacks for California insurance markets
- the state's preparedness for bioterror attacks
- the access to, and control of, dangerous biological materials in California
- the psychological effects of terrorism in California and the implications for state policymakers who communicate with the public on the issue.

The result is a set of six issue papers (referred to as sections in this collection). RAND issue papers usually contain early data analysis, an informed perspective on a topic, or a discussion of research directions, and they are not necessarily based on published research. Issue papers are a vehicle for quick dissemination and are intended to stimulate discussion in a policy community. In the case of this collection of issue papers, the authors build on RAND's considerable work on the issue of terrorism, and on the authors' substantive
knowledge of their academic and policy specialties.\textsuperscript{1} The sections have been reviewed, both by the speaker's staff and as part of RAND's internal quality control process.

The resulting collection of issue papers is intended for a wide range of audiences, including professionals with interests in emergency response management and planning, terrorism, interagency cooperation, and disaster mitigation. Although this collection focuses on California, the lessons are drawn from experience in various parts of the United States and from other countries, and they clearly have national implications. This collection extends a line of research that RAND has been instrumental in developing. Other recent examples of RAND's work on terrorism and domestic security issues include the following:


The sections in this collection compellingly illustrate that there is work to be done to improve our understanding of terrorism's longer-term effects, but also that some of the consequences feared in the initial days and weeks after the attacks are not likely to materialize as a result of September 11. In both of these regards, research will continue to play a vital role in shaping the development of appropriate long-term policy responses.

\textsuperscript{1}Search RAND's web site (www.rand.org/Abstracts/) with the keyword terrorism by description to view a list of available RAND documents on this subject.
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The coeditors and authors are grateful to the large number of people who provided direct and indirect assistance to this effort. We especially would like to thank the members of the former California Assembly Speaker Robert Hertzberg’s staff for their review of drafts and their guidance. On the latter topic, the speaker’s staff were especially helpful in ensuring that the sections were policy-relevant.

Among our RAND colleagues, we would like to thank Dick Neu for his careful review of each issue paper. Dick made many valuable suggestions and helped improve the sections considerably. We also thank Mark Bernstein, who gave us the benefit of his experience on addressing energy issues for the speaker. Cliff Grammich provided important review and assistance with the task of communicating complicated information.

Last, the coeditors of this collection would like to express their gratitude to the authors of the individual sections. Since September 11, these staff have been enormously busy. Each author, however, responded admirably and carefully to the challenge set forth by the client. In the end, they produced important critical thinking on an issue of national importance. Throughout the process they were collegial and responsive.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>Automobile Association of America</td>
</tr>
<tr>
<td>AC</td>
<td>Hydrogen cyanide</td>
</tr>
<tr>
<td>ASM</td>
<td>Available seat miles</td>
</tr>
<tr>
<td>ATA</td>
<td>Air Transport Association</td>
</tr>
<tr>
<td>Botox</td>
<td>Botulinum toxin</td>
</tr>
<tr>
<td>BSL</td>
<td>Biological safety level</td>
</tr>
<tr>
<td>CI41</td>
<td>A U.S. Air Force fixed-wing transport aircraft</td>
</tr>
<tr>
<td>C5A</td>
<td>A U.S. Air Force fixed-wing transport aircraft</td>
</tr>
<tr>
<td>CAARNG</td>
<td>California Army National Guard</td>
</tr>
<tr>
<td>CAIC</td>
<td>California Anti-terrorism Information Center</td>
</tr>
<tr>
<td>CBW</td>
<td>Chemical and Biological Weapons</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CDFA</td>
<td>California Department of Food and Agriculture</td>
</tr>
<tr>
<td>CG</td>
<td>Phosgene</td>
</tr>
<tr>
<td>CIA</td>
<td>Central Intelligence Agency</td>
</tr>
<tr>
<td>CL</td>
<td>Chlorine</td>
</tr>
<tr>
<td>CLIA</td>
<td>Clinical Laboratory Improvement Amendment of 1988</td>
</tr>
<tr>
<td>CS</td>
<td>Tear gas</td>
</tr>
<tr>
<td>CSTs</td>
<td>Civil Support Teams, National Guard units tasked to assist during WMD events</td>
</tr>
<tr>
<td>CT</td>
<td>Computed Tomography</td>
</tr>
<tr>
<td>DHHS</td>
<td>Department of Health and Human Services</td>
</tr>
<tr>
<td>DNC</td>
<td>Democratic National Convention</td>
</tr>
<tr>
<td>FBI</td>
<td>Federal Bureau of Investigation</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
</tr>
<tr>
<td>GA</td>
<td>A chemical nerve agent</td>
</tr>
<tr>
<td>GB</td>
<td>Sarin, a chemical nerve agent</td>
</tr>
<tr>
<td>GD</td>
<td>Soman</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross domestic product</td>
</tr>
<tr>
<td>HD</td>
<td>Mustard agent</td>
</tr>
<tr>
<td>IRA</td>
<td>Irish Republican Army</td>
</tr>
<tr>
<td>ISO</td>
<td>Insurance Service Office</td>
</tr>
<tr>
<td>kg</td>
<td>Kilograms</td>
</tr>
<tr>
<td>km</td>
<td>Kilometers</td>
</tr>
<tr>
<td>Kt</td>
<td>Kiloton</td>
</tr>
<tr>
<td>LAX</td>
<td>Los Angeles International Airport</td>
</tr>
<tr>
<td>LD50</td>
<td>Median Lethal Dose (&quot;the quantity of material that, if administered to a population of subjects, will cause 50% of the subjects to perish&quot;)</td>
</tr>
<tr>
<td>NBC</td>
<td>Nuclear, biological, or chemical</td>
</tr>
<tr>
<td>NYT</td>
<td>New York Times</td>
</tr>
<tr>
<td>OES</td>
<td>Office of Emergency Services</td>
</tr>
<tr>
<td>OPCW</td>
<td>Organization for the Prohibition of Chemical Weapons</td>
</tr>
<tr>
<td>OTA</td>
<td>Office of Technology Assessment</td>
</tr>
<tr>
<td>Ricin</td>
<td>A toxin</td>
</tr>
<tr>
<td>RPM</td>
<td>Revenue passenger miles</td>
</tr>
<tr>
<td>RTM</td>
<td>Revenue ton-miles</td>
</tr>
<tr>
<td>SEB</td>
<td>Staphylococcal enterotoxin B</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>SEMS</td>
<td>Standardized Emergency Management System</td>
</tr>
<tr>
<td>SFO</td>
<td>San Francisco International Airport</td>
</tr>
<tr>
<td>SWAT</td>
<td>Special Weapons and Tactics</td>
</tr>
<tr>
<td>TIA</td>
<td>Travel Industry Association of America</td>
</tr>
<tr>
<td>Toxin</td>
<td>A poison produced by living organisms</td>
</tr>
<tr>
<td>VEE</td>
<td>Venezuelan Equine Encephalomyelitis, a virus</td>
</tr>
<tr>
<td>VX</td>
<td>A chemical nerve agent</td>
</tr>
<tr>
<td>WMD</td>
<td>Weapons of mass destruction</td>
</tr>
<tr>
<td>zoonotic</td>
<td>Communicable from animals to humans under natural conditions</td>
</tr>
</tbody>
</table>
Section 1
The Impact of September 11 on the Travel and Tourism Industry in California

Lloyd Dixon

The travel and tourism industry is a major component of California’s economy and the primary industry in many local communities. It is likely one of the industries most affected by the September 11 terrorist attacks. This section provides an overview of the travel and tourism industry, examines how the industry has been affected by the September 11 attacks, and discusses the outlook for the future. It concludes by discussing principles that might guide policy responses by the state and issues that need to be further explored.

Overview of California’s Travel and Tourism Industry

Travel and tourism accounted for roughly 6 percent of California’s gross state product in 2000. The travel and tourism industry is the third largest employer in California, behind business services and health care. Approximately 1.1 million people work in the travel and tourism industry. Between 1992 and 2000, employment in the travel and tourism industry grew at an average annual rate of 2.9 percent, substantially higher than the 1.9 percent average annual increase in employment statewide over the same period.

Travel and tourism account for a large share of the employment in many counties. Panel C of Table 1.1 lists those counties with the highest proportion of

---

1Travel and tourism are usually defined as those activities associated with overnight stays away from home or travel to a destination more than 50 miles, one-way, from the traveler’s home (Dean Runyan Associates, 2001, p. 2). Travel and tourism do not include routine travel to school, work, or shopping. The travel and tourism industry covers businesses in many different sectors of the economy. These include hotels, restaurants, food stores, recreation facilities, air transportation, and businesses that make travel arrangements. Only the earnings attributable to travel expenditures in each sector are included in estimates of the size of the travel and tourism industry.


3The largest industries by 1999 employment: business services, 1,637,000; health services, 1,096,000; travel and tourism, 1,080,000; construction, 989,000; electronics, 443,000; and agriculture, 397,000 (California Tourism, 2001, p. 4).

4Ibid., pp. 1, 3.

5Dean Runyan Associates, 2001, p. 7. Dean Runyan Associates is a consulting firm that does a large amount of work for the California Division of Tourism in the Technology, Trade, and Commerce Agency.

6California Department of Finance, Table C-1, October 2001.
employment in the travel and tourism industry. Over 20 percent of the employment in 11 of California’s 58 counties is in travel and tourism. These counties are all outside major urban centers and illustrate the importance of travel and tourism in many rural parts of the state. Even though less dependent on travel and tourism, large urban counties have the largest number of jobs in the travel and tourism industry. Panel B lists the five counties with the largest travel and tourism employment.

Table 1.1
Travel and Tourism Industry Employment by County

<table>
<thead>
<tr>
<th>County</th>
<th>Employment in 1998 (1000s)</th>
<th>Percentage of Employment in 1998</th>
<th>Total Spending in 1998 ($millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Entire State</td>
<td>1,048</td>
<td>5</td>
<td>69,711</td>
</tr>
<tr>
<td>B. Counties with Largest Travel and Tourism Employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>188</td>
<td>3</td>
<td>15,250</td>
</tr>
<tr>
<td>San Diego</td>
<td>135</td>
<td>8</td>
<td>8,080</td>
</tr>
<tr>
<td>Orange</td>
<td>92</td>
<td>5</td>
<td>5,780</td>
</tr>
<tr>
<td>Riverside</td>
<td>75</td>
<td>13</td>
<td>4,010</td>
</tr>
<tr>
<td>San Francisco</td>
<td>66</td>
<td>8</td>
<td>8,110</td>
</tr>
<tr>
<td>C. Counties Most Dependent on Travel and Tourism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>El Dorado</td>
<td>15</td>
<td>23</td>
<td>690</td>
</tr>
<tr>
<td>Mono</td>
<td>6</td>
<td>67</td>
<td>330</td>
</tr>
<tr>
<td>Mariposa</td>
<td>5</td>
<td>70</td>
<td>250</td>
</tr>
<tr>
<td>Tuolumne</td>
<td>5</td>
<td>21</td>
<td>200</td>
</tr>
<tr>
<td>Calaveras</td>
<td>4</td>
<td>30</td>
<td>180</td>
</tr>
<tr>
<td>Lake</td>
<td>4</td>
<td>21</td>
<td>200</td>
</tr>
<tr>
<td>Plumas</td>
<td>3</td>
<td>27</td>
<td>120</td>
</tr>
<tr>
<td>Inyo</td>
<td>3</td>
<td>26</td>
<td>150</td>
</tr>
<tr>
<td>Trinity</td>
<td>2</td>
<td>36</td>
<td>70</td>
</tr>
<tr>
<td>Alpine</td>
<td>1</td>
<td>53</td>
<td>30</td>
</tr>
<tr>
<td>Sierra</td>
<td>1</td>
<td>37</td>
<td>20</td>
</tr>
</tbody>
</table>


There are a number of important characteristics of the travel and tourism industry to keep in mind when examining the consequences of the September 11 attacks.
• Roughly 75 percent of the travel to and through California is for leisure as opposed to business purposes.\textsuperscript{7}

• The vast majority of people traveling to and through California are Californians. International travel accounts for only 3 percent of person trips, and travel by U.S. residents from other states accounts for approximately 15 percent of person trips. California residents account for the remaining 82 percent of person trips.\textsuperscript{8}

• Air travel is an important mode of transportation for travelers to and through California, but by no means the most important. Air travel is the main mode of transportation for only 11 percent of person trips. The bulk of person trips are by motor vehicle, with a small percentage by bus and train.\textsuperscript{9}

These general characteristics of travel and tourism in California have several implications for an analysis of the effects of the September 11 attacks. First, particular attention should be paid to how the attacks affect leisure travel as opposed to business travel. Leisure travel is a far greater percentage of all travel than is business travel, and it is likely more discretionary. Second, while the effects of September 11 on travel in California by visitors from other states or other countries cannot be ignored, more important is the impact on California travel by Californians. Third, because of the importance of travel by motor vehicle, the effects, if any, of September 11 on the perceived safety of motor vehicle travel should be examined. Finally, the travel and tourism industry accounts for a large share of economic activity in many rural parts of the state, so particular concern about the impact of September 11 on rural parts of the state is warranted.

Effects of September 11 on Travel and Tourism in California

California’s travel and tourism industry was not doing well in the early 1990s. Fires, floods, civil unrest, and a weak economy hurt business and leisure travel during the early part of the decade.\textsuperscript{10} The travel and tourism industry grew steadily through the rest of the 1990s, however, and 2000 was a record year.\textsuperscript{11} Prior to September 11, industry watchers were predicting a slowdown in 2001. Caroline

\textsuperscript{7}California Tourism, 2001, p. 1.

\textsuperscript{8}A person trip is a trip for business or leisure by one person. Thus a family of four going on a vacation generates four person trips. International travelers do spend more per capita than domestic travelers, but even so, 85 percent of tourism and travel spending in California is by domestic travelers (ibid., p. 1).

\textsuperscript{9}As might be expected, business travelers are more likely to travel by air than leisure travelers—air is the main mode of transportation for nearly 20 percent of business travelers and less than 8 percent of leisure travelers.

\textsuperscript{10}Abrams and Roberts, 2001.

\textsuperscript{11}Beteta, 2001a.
Beteta, executive director of the California Travel and Tourism Commission, noted last summer that business travel was weakening because of a national economic slowdown and the drop in stock prices. Leisure travel seemed less affected, she noted, but was also showing signs of weakness as a result of California’s energy crisis, increased gas prices, and the softening economy.\textsuperscript{12}

Table 1.2 reports indicators of the effects of the terrorist attacks on travel and tourism in California. The second column of the table compares activity between January and August 2001 with the same period a year earlier. The third column reports the difference in activity level between September 2001 and a year earlier. The fourth column lists the difference between the change in September and the change during the first 8 months of the year. This difference gives a first approximation of the effects of the terrorist attacks netting out the effects of other changes that were occurring in the economy. The last two columns of the table report data for October when available.

Several indicators in Table 1.2 show that the travel and tourism industry suffered as a result of the September 11 attacks. Air travel was down substantially. Air traffic volume was 30 to 35 percent less at both Los Angeles and San Francisco International Airports in September than activity during the first 8 months of the year would predict. These figures cover all of September, yet the September 11 attacks only affected the later two-thirds of the month. The declines in air traffic may well have been 45 to 50 percent during the last 20 days of September.\textsuperscript{13} The declines for domestic and international travel were comparable. Passenger traffic at LAX and SFO in October bounced back some from the low levels implied for the last 20 days of September, with domestic travel recovering more quickly than international travel.

September hotel and motel occupancy rates were down by large amounts in many parts of the state. Hotel and motels were hit particularly hard in the state’s largest urban centers. Occupancy rates in Los Angeles, Orange County, San Diego, and the San Francisco Bay Area were 18 to 31 percent lower in September than would be expected from trends through August. Again, the declines after September 11 were likely substantially larger than the average declines for the whole month. The decline in occupancy rates appears to have been more moderate outside the state’s largest urban areas. For example, September occupancy rates in Ventura, Santa Barbara, Sacramento, and other parts of the Central Valley fell 10 to

\begin{footnotesize}
\begin{itemize}
  \item[\textsuperscript{12}]Ibid.
  \item[\textsuperscript{13}]To cause a 30 percent decline over the entire month, the decline during the last 20 days would have to be 1.5 times larger than the average decline over the entire month (assuming that there was no decline over the first 10 days).
\end{itemize}
\end{footnotesize}
15 percent versus 18 to 31 percent in the largest urban areas. The data in Table 1.2 do not represent occupancy rates well in the most rural parts of the state. It may be that the declines in occupancy rates were even more moderate in the least urban parts of the state.

Table 1.2
Indicators of Travel and Tourism in California (percentage change)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Travel (passengers)*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAX</td>
<td>-0.1</td>
<td>-34</td>
<td>-34</td>
</tr>
<tr>
<td>SFO</td>
<td>-11</td>
<td>-41</td>
<td>-30</td>
</tr>
<tr>
<td>International</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAX</td>
<td>0.8</td>
<td>-31</td>
<td>-32</td>
</tr>
<tr>
<td>SFO</td>
<td>0.2</td>
<td>-26</td>
<td>-26</td>
</tr>
<tr>
<td>State highway travel (miles)**</td>
<td>3</td>
<td>2</td>
<td>-1</td>
</tr>
<tr>
<td>National Parks in California (visitors)**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.3</td>
<td>0.6</td>
<td>1</td>
</tr>
<tr>
<td>Hotel–Motel Occupancy Rate**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern California</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los Angeles</td>
<td>-4</td>
<td>-25</td>
<td>-21</td>
</tr>
<tr>
<td>Orange County</td>
<td>-1</td>
<td>-32</td>
<td>-31</td>
</tr>
<tr>
<td>San Diego</td>
<td>-2</td>
<td>-24</td>
<td>-22</td>
</tr>
<tr>
<td>Inland Empire</td>
<td>1</td>
<td>-10</td>
<td>-11</td>
</tr>
<tr>
<td>Ventura</td>
<td>-2</td>
<td>-12</td>
<td>-10</td>
</tr>
<tr>
<td>Santa Barbara</td>
<td>-4</td>
<td>-18</td>
<td>-14</td>
</tr>
<tr>
<td>Northern California</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Francisco</td>
<td>-11</td>
<td>-33</td>
<td>-22</td>
</tr>
<tr>
<td>San Jose/Peninsula</td>
<td>-20</td>
<td>-38</td>
<td>-18</td>
</tr>
<tr>
<td>Monterey/Carmel</td>
<td>-5</td>
<td>-25</td>
<td>-20</td>
</tr>
<tr>
<td>Central Valley</td>
<td>-0.1</td>
<td>-11</td>
<td>-11</td>
</tr>
<tr>
<td>Sacramento</td>
<td>-3</td>
<td>-15</td>
<td>-12</td>
</tr>
<tr>
<td>Marin</td>
<td>-6</td>
<td>-29</td>
<td>-23</td>
</tr>
<tr>
<td>Napa/Sonoma</td>
<td>-7</td>
<td>-27</td>
<td>-20</td>
</tr>
<tr>
<td>Other Northern Calif.</td>
<td>3</td>
<td>-13</td>
<td>-16</td>
</tr>
</tbody>
</table>

October hotel and motel occupancy remained depressed but rebounded significantly from the low levels implied for the last 20 days of September. The bounce back was particularly large in Orange County where October occupancy was down 20 percent from a year earlier compared with something on the order of 45 percent during the last two-thirds of September.

There are indications that not all parts of the travel and tourism industry were negatively affected by the September 11 attacks. Particularly noteworthy are statistics on attendance at California’s national parks. Attendance in September and October were actually higher than a year earlier and slightly higher than would be expected from attendance during the first 8 months of the year.\textsuperscript{14} Travel on the state highway system also appears to have been affected little by September 11: Miles traveled was 2 percent higher in September 2001 than 2000, compared with a 3 percent rise during the first 8 months of the year. Travel in October 2001 was 4 percent higher than a year earlier. Note, however, that vehicle miles traveled may not be overly sensitive to changes in the travel and tourism industry. The majority of vehicle miles is probably for travel to work, school, or shopping, which are not considered part of the travel and tourism industry.

The stability of park attendance and vehicle miles traveled suggests that increased travel by California residents in California may have offset some of the decline in travelers from outside the state. Air traffic dramatically fell in September, and presumably some of these travelers would have attended National Parks. Yet National Park attendance and vehicle miles traveled did not fall, perhaps propped up by Californians who decided to travel locally rather than outside the state. The substitution of in-state versus out-of-state travel may have moderated declines in travel and tourism from what would have occurred otherwise, particularly in non-urban parts of the state.

Estimates of the Impact of the September 11 Attacks
Nationwide and Expectations for the Future

Industry analysts predict that the travel and tourism industry in the nation as a whole will recover in 2002. The Travel Industry Association of America (TIA) predicts that travel will increase in 2002 but that it will not exceed the record levels from 2000 until 2003.\textsuperscript{15} Surprisingly, the TIA expects visits and spending by

\textsuperscript{14}\textit{Park attendance depends importantly on weather. We have not been able to statistically control for changes in weather in 2001 versus 2000.}

\textsuperscript{15}\textit{The Travel Industry Association of America is a nonprofit association that represents and speaks for the common interests and concerns of all components of the U.S. travel industry.}
international travelers to recover faster than those by domestic travelers. Initial data from LAX suggest that domestic travel is recovering faster. There does not appear to be any consensus on whether business travel will recover more quickly than leisure travel. One forecast predicts that business travel will be the first to recover. Another predicts that leisure travel will come back faster.\(^{17}\)

There are promising signs that the travel industry has begun to recover. Car, cruise, and train trips booked by Automobile Association of America (AAA) members dropped by 50 percent immediately following September 11 but increased steadily to within 7 percent of pre-attack levels by mid-October. Similarly, air reservations booked by AAA agents had increased to within 14 percent of pre-attack levels by October 15.\(^{18}\) Thanksgiving travel was higher than most had forecast, although travel was still down roughly 20 percent from a year earlier.\(^{19}\)

**Industry and Government Responses to the Attacks**

There have been many industry and government responses to the decline in travel and tourism since the September 11 attacks. The TIA launched the Travel Industry Recovery Campaign, a media campaign to rebuild confidence and stimulate travel by Americans and international visitors to and within the United States. The campaign ran in November and December 2001. TIA raised more than $12 million in voluntary contributions from the travel industry with a goal of $20 million.\(^{20}\)

Promotional campaigns have also been established in a number of different states:

- **New York City.** NYC & Company has set up a $40 million “Stronger than Ever” campaign. The state and the Port Authority of New York and New Jersey are jointly funding the campaign.

- **District of Columbia.** The Washington D.C. Convention & Tourism Corporation has launched a $2.5 million “Be Inspired” campaign.

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\(^{16}\)International refers to travel in the United States by people from other countries. Domestic travel refers to travel in the United States by U.S. residents. TIA predicts that domestic traveler expenditures will be 7 percent lower in 2001 than 2000 and that international traveler spending will fall 11 percent (Travel Industry Association, 2001a).

\(^{17}\)Travel Industry Association of America, 2001b.

\(^{18}\)Travel Industry Association of America, 2001a.

\(^{19}\)Peter Pae, “Thanksgiving Travel by Air Tops Forecasts,” *Los Angeles Times*, November 26, 2001.

\(^{20}\)Travel Industry Association of America, 2001c.
- Florida. "Visit Florida" is kicking off a $4 million advertising campaign that will run through February 2002. "Visit Florida" expects to spend $20 million through June 2002, and additional money is being sought from the Florida legislature.

- Las Vegas. The Las Vegas Convention and Visitors Authority launched a $13 million, 3-week campaign that began in October 2001.21

California has not authorized additional funding on tourism promotion at the state level. However, at the end of September 2001, Governor Davis authorized the redirection of $5 million in the California tourism advertising budget for a media campaign targeted at in-state tourism. The advertising campaign encouraged people "to explore the world in their own backyards" and responded to concerns about the safety of air travel and about traveling too far from home after the September 11 attacks.22

The federal government adopted legislation aimed at improving the safety of air transportation. The legislation includes the following:

The Aviation and Transportation Security Act (Public Law 107-71). The law makes the federal government responsible for security screening at major airports, authorizes the training and deployment of air marshals, and establishes a number of other security programs and requirements.

The Air Transportation Safety and System Stabilization Act (Public Law 107-42). The act affirms the president's decision to spend $3 billion on airline safety and security.23

The Travel Industry Association of America is pursuing federal legislation that it believes would ensure the ongoing viability of the travel and tourism industry and encourage travel to and within the United States. The provisions sought include

- low-interest small-business loans for tourism organizations
- restoration of 100 percent tax deductibility for business travel and entertainment expenses
- federal funding for domestic and international marketing campaigns.

Principles for Guiding State Policy on Travel and Tourism

When considering what California might do to lessen the effects of the terrorist attacks on the state's travel and tourism industry, policymakers need to

21 Travel Industry Association of America, 2001a.
22 Beteta, 2001b, p. 2.
identify the goals for state action, the appropriate division of responsibility among the state government, federal government, and the private sector, and the cost and benefits of the proposed actions. Below, I discuss each of these in the context of the travel and tourism industry.

During her testimony in front of the Speaker's Task Force on the Impact of Terrorism on California, Caroline Beteta identified the following three conditions for a healthy travel industry:

- Safety during travel and at destinations.
- Ease of travel.
- Economic stability.\(^{24}\)

I would add moderate travel costs to the list because cost is an important factor in household decisions on whether to travel.

These conditions conflict to some extent. Tighter security at airports may improve safety, thus inducing more travel, but it may also reduce the ease of travel. The reduced ease of travel may offset some of the increase in travel due to tighter security. The costs of tightening security may also be passed on to travelers, further reducing the amount of travel. Such interactions mean that the ramifications of policies should be broadly evaluated. For example, in assessing proposals to improve airport security, the impact on the ease of travel should also be evaluated.

The state must also consider the appropriate division of labor between government and the private sector and among the different levels of government. Private industry has incentives to advertise and promote travel in California, and the state should evaluate whether state funding is warranted.\(^{25}\) State funding might be warranted if there is some market imperfection that prevents the private sector from investing the proper amount. In the case of the travel and tourism industry, this might be the high cost of coordinating and collecting contributions from an industry made up of many small businesses. State funding may also be warranted in response to tourism promotion by other states. California may lose business to other states if it does not act.

California may be able to influence actions by the federal government to some extent, but it is largely in the position of reacting to federal policies. California needs to assess what else needs to be done to complement federal

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\(^{24}\)Beteta, 2001b.

\(^{25}\)Currently the state spends about $7 million a year on travel promotion through the Technology, Trade, and Commerce Agency, Division of Tourism (Beteta, 2001a, p. 7).
policies so that the combined package of state and federal policies most benefit California.

Finally, state policymakers should consider the costs and benefits of proposed policies and their alternatives. California Tourism has commissioned studies on the benefits of its advertising campaigns. The most recent study found a very high rate of return on advertising investments. It found that for every advertising dollar spent by California Tourism, travelers responding to the advertising spent $350 on travel in California. It also found that for every dollar spent on advertising, state and local tax revenues rose by $12. We have not been able to evaluate the reliability of these findings, but this type of analysis is an important input into assessments of policies to offset the effects of the September 11 attacks on California’s travel and tourism industry.

Additional Information That Would Be Useful for the Policy Debate

Additional information in a number of areas would help the legislature assess how the September 11 attacks affected the travel and tourism industry and how the state should respond. I conclude by outlining some of the issues that would be useful to explore in legislative hearings.

First, it would be useful to better understand the difference in how urban versus rural parts of the state have been affected. There is some indication that urban areas were much harder hit, but the data are limited.

Second, when assessing advertising and tourism promotion programs, it would be useful to better understand the following:

- The likely efficacy of campaigns targeting business versus leisure travel.
- The likely efficacy of campaigns targeting California residents versus residents of other states or other countries.
- Barriers faced by the private sector in coordinating and funding its own promotional campaigns.
- The interplay between advertising by California and advertising by other states. If California does not advertise, the states that do might gain market share. But if California does advertise, that might encourage responses from other states that will reduce the value of the California promotions.

Lastly, better information on public perceptions regarding the safety of travel and the consequences of various programs or proposals to improve airport

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safety is also desirable. For example, how much have airport security programs affected the ease of travel, and what impact, if any, has this had on the attractiveness of air travel? Most travel occurs using motor vehicles. Are there any effects of the September 11 attacks on the safety of motor vehicle travel?

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Beteta, Caroline, Testimony to Speaker’s Task Force on the Impact of Terrorism on California, Los Angeles, CA, October 15, 2001b.

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San Francisco International Airport, personal communication with Chap Solomon, November 29, 2001.


Section 2
The Impact of the September 11 Terrorist Attacks on the U.S. Airline Industry and the California Economy

Justin Adams

The U.S. airline industry includes the companies that directly provide scheduled or nonscheduled air transportation of passengers and cargo. Scheduled airlines are the largest component of the industry, and in 2000 U.S. scheduled airlines generated over $129 billion in revenues, mostly resulting from passenger air service (72.3 percent) rather than from cargo. Domestic, as opposed to international, air service accounted for most operating revenues (76.2 percent).

There are various estimates of the U.S. airline industry's contribution to the economy as a whole, although they all tend to be somewhat small. The Bureau of Economic Analysis (U.S. Department of Commerce, 2001, p. 41) and the Air Transport Association (October 25, 2001a) estimate that the air transportation industry generates between 2.9 and 3.2 percent of U.S. gross domestic product (GDP). This GDP results from the industry's direct expenditures on labor, capital equipment, services, and materials. It also results from indirect effects through economic activity that supports the airlines, such as airport concessions and retail sales, travel agencies, and airport shuttles.

This section provides a rough snapshot of the U.S. airline industry and its effects on the California economy, particularly in the wake of the September 11 terrorist attacks. Because the airline industry and its major trade associations are national in scope, information relating specifically to California is not readily available or is not detailed to the regional or county level. Nevertheless, this section attempts to draw inferences from national trends and to supplement with California-specific data where possible.

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1Scheduled air carriers—including well-known companies such as United Airlines, American Airlines, and Federal Express—primarily fly regular routes on regular schedules. Nonscheduled air carriers, such as air taxis and chartered aircraft, operate without regular routes or predetermined schedules. Passenger air carriers transport people and freight (in separate compartments), whereas cargo air carriers transport freight solely.

2The Air Transport Association also takes into consideration induced effects resulting from economic activity facilitated by the airlines, such as tourism, conferences, and business transactions.
U.S. Airline Industry and the California Economy

Economic Activity

California accounted for roughly 11.2 percent of the nation's total passenger enplanements (i.e., boardings) in 2000. This is slightly below California's share of the national population (12.0 percent; U.S. Census Bureau, 2001), but it is not entirely surprising since most passenger air travel is domestic and most domestic hubs are centrally located in the country. With respect to passengers (as opposed to enplanements), California has two of the ten busiest airports in the world, Los Angeles International Airport (LAX) and San Francisco International Airport (SFO) (Lampl, 2001, p. 391). California also produced 13.2 percent of the nation's freight tonnage and 14.1 percent of the nation's mail tonnage.

U.S. airlines employed nearly 1.3 million workers in 2000 (U.S. Department of Labor, 2001). These included everyone from pilots to airline mechanics to office personnel. Most air carriers are not based in California (none of the 15 major air carriers in 2000 was based in California). But about 11.1 percent (142,000) of these employees were based in California, representing just under 0.9 percent of the state's total workforce (California Employment Development Department, 2001).

Regional Impact

In California, much of this economic activity is regionally localized as a result of air traffic patterns. LAX and SFO accounted for over half of California enplanements in 1996. And the nine airports in the Los Angeles and San Francisco metropolitan regions together accounted for 85 percent of California enplanements (Gosling et al., 1998, p. 3). This high concentration of air traffic in California means that most economic activity resulting from the airline industry (e.g., airport shuttles, hotels, and tourism) tends to be focused in just a few regions as well. Figure 2.1 shows the regional breakdown of enplanements in California for 1996.

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3 Except where noted, industry statistics are drawn from various press releases and publications of the Air Transport Association (ATA). Its members account for 95 percent of the passenger and cargo traffic carried by U.S. scheduled airlines. ATA data are used primarily rather than U.S. Bureau of Transportation Statistics data because they are more extensive and timely.

4 An enplanement is anytime a passenger boards a flight, whether an originating flight or a connecting flight. Boarding and reboarding the same plane counts only as one enplanement, however.

5 In addition to LAX and SFO, these airports included Ontario, John Wayne, Burbank, Long Beach, Palm Springs, San Jose, and Oakland.
Airlines generate significant tax revenues. In 2000, U.S. scheduled airlines paid $150 million in property taxes to California counties and $113 million in sales and use taxes to the state and counties for purchases of jet fuel (Hultquist, 2001). Airlines also generate other revenue for airports through leases, landing fees, and passenger facility charges, which are earmarked for airport operations and related capital improvements.

**Airline Industry—Recent Performance**

**Industry Performance**

The financial health of the airline industry tracks the economic health of the United States and the rest of the world. Business travel, for example, increases when the amount of commerce generally being transacted increases, and business travel decreases when the amount of commerce decreases. So business travel fluctuates with the state of the economy. Similarly, leisure travelers travel more when the economy is strong and disposable income grows; they travel less when the economy is weak and disposable income shrinks. Figure 2.2 shows the cyclical

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6 Tax breakdowns by county are not readily available.

7 Except where noted, industry statistics are drawn from various press releases and publications of the Air Transport Association.
nature of the airline industry by comparing the annual change in GDP with the annual change in enplanements over the last ten years.

![Graph showing GDP growth rate and enplanements over years from 1990 to 2000.](image)

SOURCE: Air Transport Association, October 25, 2001b.

**Figure 2.2—U.S. GDP Growth and Air Passenger Demand**

Although GDP provides a broad gauge for assessing the performance of the airline industry, the chief economist of the Air Transport Association describes four industry-specific elements that are critical to understanding the profitability of airlines (Swierenga, November 7, 2001). The first two elements, *air traffic* and *average price*, are revenue-related. The second two elements, *capacity* and *unit costs*, are cost-related.

**Air traffic.** This element captures the volume of the air transportation system, measured for passengers by revenue passenger miles (RPM).\(^8\)

**Average price.** This is the amount of revenue collected by the airlines to transport one passenger one mile.\(^9\)

**Capacity.** This element describes the number of seats available for passenger use multiplied by the number of aircraft miles flown (also called available seat miles (ASM)).\(^10\)

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\(^8\)A revenue passenger mile is one fare-paying passenger transported one mile.

\(^9\)Passenger yields and freight and express yields are particularly useful as estimates of price because fares can vary widely across passengers and cargo.

\(^10\)The often-cited passenger load factor, then, is the percentage of aircraft seating that is actually sold and used (RPM divided by ASM).
Unit costs. These are the costs required to provide one ASM.\textsuperscript{11}

Taken together, air traffic and average price provide an outlook of the industry’s income, whereas capacity and unit costs provide an indication of the industry’s expenses.

Trends Before September 11, 2001

Air traffic statistics show that the U.S. airline industry began to suffer early in 2001 from the downturn in the economy. Passenger and cargo traffic peaked in 2000, but between January and August 2001 air traffic remained flat and airfares dropped. During this time, enplanements fell by 0.3 percent compared to year-before levels, RPM rose by only 0.7 percent, and revenue ton-miles (RTM) dropped by 8.1 percent compared to year-before levels. And by August domestic airfares were 12.6 percent below year-before levels. These flat traffic levels and falling airfares caused industry revenues to fall.

Additionally, industry expenses increased between January and August 2001. During this time, capacity increased as ASM rose by 2.8 percent compared to year-before levels, and fuel costs increased relative to year-before levels in every month but August. However, despite the slowdown in economic growth and the pressure on airline profitability prior to September 2001, analysts still expected the industry to grow (although more slowly) over 2000 levels (Klein and Stice, 2001).

Performance Since September 11, 2001

The U.S. airline industry was hit especially hard immediately after the terrorist attacks. In September and October, U.S. scheduled airlines reported a 33.5 percent and a 23.0 percent drop in enplanements, respectively, compared to year-before levels, and similar drops in RPM. Airfares were also down by around 19.0 percent. These drops in air traffic and airfares caused industry revenues to fall by between 38.0 percent and 45.0 percent for the period. Thus, even in light of the reduced revenues seen earlier in the year, the September 2001 attacks had a very noticeable effect.

Despite the partial rebound in air traffic beginning toward the end of September, the airlines were compelled to take a number of drastic steps including layoffs and route reductions to cut operational expenses. In September and October, U.S. scheduled airlines laid off about 110,000 (14.0 percent) of their total workforce. Assuming that these layoffs were spread proportionately across the

\textsuperscript{11}The largest operating expense is for salaries and benefits, accounting for about 36 percent of total costs, and the second largest is for purchases of fuel, accounting for 10 to 15 percent (Klein and Stice, 2001, p. 26).
country according to the airlines' workforce, this implies a loss to California of just over 12,000 jobs.

U.S. airlines also reduced their routes (ASM) by 19.0 percent and 16.4 percent, respectively, for September and October compared with the year before. United Airlines, for example, ceased operations of its United Shuttle on November 1, 2001. This shuttle operated short flights primarily in the West, and its elimination means that United Airlines will operate 40 percent fewer flights out of LAX (Castles, November 27, 2001). In all, U.S. airlines cut their operational expenses significantly in September and October. And although the exact amount of these cuts is still unclear, these cuts were unable to match the loss in revenues (Swierenga, 2001). For example, United Airlines expected to lose $800 million in the fourth quarter of 2001 (Peltz, December 5, 2001), and American Airlines expected to lose $600 million to $750 million in the fourth quarter of 2001 (Reed, December 11, 2001). Air traffic statistics following September 11, 2001, are summarized in Table 2.1.

**Table 2.1**

**Trends in the U.S. Airline Industry Pre- and Post-September 2001**
*(compared to year-before levels)*

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Domestic and Int’l</td>
<td></td>
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<tr>
<td>Enplanements</td>
<td>-0.6%</td>
<td>-33.7%</td>
<td>-23.2%</td>
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<tr>
<td>Revenue pass. miles</td>
<td>+0.8%</td>
<td>-31.7%</td>
<td>-25.6%</td>
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<tr>
<td>Revenue ton-miles</td>
<td>-6.2%</td>
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<td>Domestic only</td>
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<tr>
<td>Airfares</td>
<td>-12.6% (in Aug.)</td>
<td>-18.2%</td>
<td>-19.2%</td>
</tr>
<tr>
<td>Revenues</td>
<td>-6.3%</td>
<td>-46.0%</td>
<td>-38.1%</td>
</tr>
<tr>
<td>Avail. seat miles</td>
<td>+2.8%</td>
<td>-19.0%</td>
<td>-16.4%</td>
</tr>
<tr>
<td>Domestic and Int’l</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel costs</td>
<td>-3.5% (in Aug.)</td>
<td>-10.4%</td>
<td>-19.9%</td>
</tr>
</tbody>
</table>

SOURCE: Air Transport Association, November 20, 2001a–d.

**Historical Parallels**

The September 11, 2001, terrorist attacks are unequaled in American history, in light of the immense loss of life and widespread economic dislocations. And the long-term impact on the economy and on consumer confidence in airlines is still unfolding. Nevertheless, past natural and man-made disasters can provide some guidance in conceptualizing the effects of the September 2001 attacks. In particular, past disasters can suggest patterns, from which we can begin to infer the length and depth of slowdowns to the industry (or the economy). They can also illustrate the likely effects of private-sector or governmental efforts to mitigate or counteract these slowdowns.
Below, I examine specifically the Persian Gulf War and the Loma Prieta and Northridge Earthquakes because of their particular attributes. The Persian Gulf War saw a drop in international flights during an economic downturn. The Loma Prieta and Northridge Earthquakes witnessed a sharp drop in tourism travel to California as a result of fear (of additional earthquakes) as well as significant economic dislocations. Although other international and domestic examples (e.g., in Lockerbie and Oklahoma City) might prove to be insightful, data regarding their impact on air traffic and the airline industry are not readily available.

**Persian Gulf War**

The circumstances that the airline industry faces in the aftermath of September 11 resemble those it faced during the Persian Gulf War:

- Both cases saw a noticeable drop in international enplanements and air traffic (although the drop following September 11, 2001, was as much as ten times larger than that following the Persian Gulf War).
- In both cases, the United States was in the midst of an economic downturn.
- As a reference point, it took approximately eight to ten months after the end of the Persian Gulf War for air traffic to rebound to prewar levels (Rabin, October 22, 2001).

There are some important differences, however, between the events surrounding the Persian Gulf War and September 11, 2001:

- The Persian Gulf War saw a drop in air traffic (primarily international) due to general unease with the world situation, whereas September 11, 2001, involved direct attacks on the air transportation system.
- The U.S. government is currently enacting permanent and costly structural changes to airline and airport operations, especially regarding security, which have not been seen in times past.
- U.S. airlines received a large infusion of federal funds after the September terrorist attacks but not after the Persian Gulf War.

These differences mean that a return to pre-September trends will depend critically on restoring consumer confidence in the safety of U.S. airlines (which was not necessary during the Persian Gulf War) and on minimizing the inconveniences of higher airport security (such as longer screening lines and more-invasive baggage searches).

**Loma Prieta and Northridge Earthquakes**

The Loma Prieta and Northridge Earthquakes affected the U.S. airline industry only indirectly; they had a more direct effect on the tourism industry in California and on the regional economies. Also, Loma Prieta occurred when the San Francisco Bay Area was experiencing a relatively healthy economy, while Northridge occurred during an economic slowdown in Los Angeles. Even so, these
earthquakes serve as instructive examples because they illustrate the typical pattern of economic rebound from a severe natural (or man-made) disaster.

The Loma Prieta and Northridge Earthquakes, respectively, resulted in $7 billion and $18–20 billion (in current dollars) in property damage, yet their economic dislocations were relatively small. Regional economic indicators dropped immediately after both earthquakes for one to three months, rebounded as an infusion of federal and insurance money fueled rebuilding efforts, and remained at slightly depressed levels for one to two years relative to a no-quake baseline. Economic activity remained depressed in this period essentially because local residents had to forgo some consumption to finance their own rebuilding efforts earlier (Romero and Adams, 1995).

Therefore there are two main lessons pertaining to the U.S. airline industry in the aftermath of the September 11, 2001, terrorist attacks:

- Economic dislocations to the airline industry will be moderated to some extent by an infusion of outside money, which is relevant given the federal assistance to the airline industry (see below).
- The industry's current out-of-pocket financing of recovery efforts (e.g., deployment of new security measures) will lead to somewhat reduced industry activity for a few years as the airlines pay off their loans.

The major issues faced by the U.S. airline industry during the Persian Gulf War, the Loma Prieta Earthquake, the Northridge Earthquake, and the September 11, 2001, terrorist attacks are summarized in Table 2.2.

Table 2.2

<table>
<thead>
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<th>Circumstances</th>
<th>Disruptive Events</th>
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<tbody>
<tr>
<td></td>
<td>Loma Prieta Earthquake</td>
<td>Persian Gulf War</td>
<td>Northridge Earthquake</td>
<td>September 11, 2001</td>
</tr>
<tr>
<td>Drop in Air Traffic</td>
<td>Mild</td>
<td>Mild</td>
<td>Mild</td>
<td>Severe</td>
</tr>
<tr>
<td>Economic downturn</td>
<td>None</td>
<td>National</td>
<td>Regional</td>
<td>National</td>
</tr>
<tr>
<td>Consumer confidence in airline safety</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Structural changes</td>
<td>None</td>
<td>Temporary</td>
<td>None</td>
<td>Permanent</td>
</tr>
<tr>
<td>Outside funding</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>$5 Billion</td>
</tr>
</tbody>
</table>

- 20 -
Responses to September 11

Industry Responses

As mentioned above, U.S. airlines faced significant losses in revenue after the September 11, 2001, terrorist attacks, and they immediately acted to reduce their operational expenses through layoffs and route reductions. U.S. scheduled airlines eliminated over 110,000 jobs (about 14 percent of their total workforce; probably about 12,000 in California) including pilots, flight attendants, and mechanics. They also reduced their routes by 15 to 20 percent. However, the industry has not yet been able to cut its operating expenses to cover its revenue losses, so further layoffs and route reductions may be necessary.

Some air carriers are also attempting to reduce their property tax assessments, given that they are taking airplanes and other assets out of service. This will help air carriers’ tax liability, but it will also strain local governments. At SFO, for example, United Airlines and Delta Airlines claim losses of $1.53 billion and $49.5 million, respectively, to the value of their aircraft and facilities. United Airlines’ claim alone would result in a loss to San Francisco of $15 million in tax revenue (Wilson, December 7, 2001).

Regional Responses

Airports are also facing difficult circumstances. Many airports exist as financially independent municipal enterprises or as profit centers. Consequently, they depend on revenue from airlines (landing fees, leases, passenger facility charges, and operating permits), concessionaires (leases and permits), and passengers (parking fees) as well as city coffers to fund their operations.

The following snapshot comes from press reports about the financial condition of various California airports:

- **LAX** expects a 35 percent drop in annual passenger traffic and a loss of $108 million in revenue for fiscal year 2001 relative to its pre-September projections. It also saw an increased security cost of $8 million in September 2001 for airport police patrols and is working to cut its current budget by 15 percent (Rabin, October 22, 2001).

- **SFO** projects a loss of up to $100 million for fiscal year 2001 from shortfalls in landing fees, parking revenue, and rent from retailers and restaurants. The drop in concession revenue means that the airport’s mandated contribution to San Francisco’s general fund could fall from $28.5 million to only $20 million (Armstrong, October 18, 2001).

- **Lindbergh Field** (San Diego) lost $600,000 (0.7 percent of its annual revenue) in the middle of September, mostly from reduced parking and car-rental fees. The airport anticipated that it could weather the air traffic downturn reasonably well as long as it was short-lived (Powell, October 1, 2001).
• John Wayne Airport (Orange County) projected a 15 percent decline in passengers for 2001. It considered doubling parking rates and raising rents to cover an anticipated $10.4 million loss in net income for fiscal year 2001 (Weikel, December 5, 2001).

Federal Responses
Since the September 11, 2001, terrorist attacks, the U.S. government has enacted legislation and taken other steps to stabilize the airline industry. The government has required significant security measures to increase aviation safety to lure back wary passengers and provided financial assistance to prevent air carriers from going into bankruptcy in the meantime. As of January 2002, the three relevant bills that have passed are the following:

• 2001 Emergency Supplemental Appropriations Act (PL 107-38). The law appropriates $40 billion total, half of which is to be used for recovery efforts (in New York, Virginia, and Pennsylvania) and half of which is to be used for antiterrorism efforts. About $3 billion is for aviation security measures, including the purchase of new baggage and passenger screening machinery, upgrades to airline cockpit security, and funding for additional air marshals and customs personnel.12 None of this money is earmarked as direct assistance to the airlines.

• Air Transportation Safety and System Stabilization Act (PL 107-42). The law provides $15 billion in direct financial assistance to U.S. air carriers ($5 billion in the form of cash payments to compensate air carriers for lost revenue and $10 billion in the form of loan guarantees). The law also includes a number of provisions limiting the liability of air carriers for past and future attacks. None of this assistance is directed toward airline employees laid off following September 11, 2001.

• Aviation and Transportation Security Act (PL 107-71). The law places responsibility for security screening operations under the U.S. Department of Transportation and requires screeners to be federal employees. The law gives all airports the option to switch to contracted screening after two years. The law also authorizes the deployment of federal air marshals on all domestic (as well as international) flights. These measures will be paid for by a $2.50 enplanement fee not to exceed $10.00 per round trip.

The specific effects of these measures on California are difficult to estimate. Federal funding for new airline security measures often goes to federal agencies rather than local jurisdictions. (The Federal Aviation Administration, for example, is responsible for purchasing passenger-screening equipment.) Financial assistance for the airline industry is provided to air carriers with operations across the nation. In January 2002, there were no other relevant pieces of legislation close to enactment.

12The supplemental appropriations act did not earmark funding for specific projects. Instead, it provided the Bush Administration discretion over the use of the money with some congressional oversight. In press reports, however, the Bush Administration pledged to set aside about $3 billion specifically for aviation security (ABCNews.com, September 20, 2001).
Economic Forecast

Assuming that the airline industry behaves as larger economies have behaved when faced with natural or man-made disasters, we would expect to see a dislocation phase followed by a recovery phase and a financing phase:

- **Dislocation phase.** The airlines would experience a significant drop in air traffic and a corresponding drop in revenues for a few months, and respond by cutting costs and deferring large capital projects and purchases.

- **Recovery phase.** The airlines would then experience a gradual return in air traffic to near-normal levels (relative to pre-September 2001 trends) over six to nine months and a strengthening of the financial positions of the airlines as they receive an infusion of federal funding and guaranteed loans.

- **Financing phase.** The airlines would then experience a slightly depressed level of air operations (relative to pre-September 2001 trends) for one to two years as the airlines pay off their loans and restart their deferred capital expenses (e.g., purchases of planes and renovations of terminals).

The Air Transport Association provides some insight into the pre-September trends of the airline industry. It estimates that U.S. airlines lost $1.8 billion in the first two quarters (Q1 and Q2) of 2001 combined (Swierenga, November 7, 2001). Extrapolating from these trends, assume that, absent the attacks, the airline industry would have lost $900 million a quarter from Q3 2001 through Q2 2002. Also assume that the losses would have gone to zero from Q3 2002 onward, the period when many economists expect the national economy to rebound (Silverstein, December 5, 2001).

The Air Transport Association estimates that U.S. scheduled airlines lost $2.4 billion in Q3 2001 and the same amount in Q4. Subtracting out the pre-September trend implies that the terrorist attacks were directly responsible for about 62 percent ($1.5 billion) of the losses in Q3 2001. Assume for simplicity that the airlines continue to lose $2.4 billion in each of Q1 2002 and Q2 2002, and that these losses shrink considerably afterward. Finally, we assume that the decline in profits is completely due to a decline in revenue. 13

These assumptions yield the following economic impact on California, lasting approximately two years:

- A dislocation phase lasting 2 to 3 months. If California suffers from these revenue declines in proportion to its share of air travel, the

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13 In reality, reduced profitability will be a function of both declines in revenues and increases in operating costs. For purposes of estimating economic impact, it is preferable to use revenue figures, because they are the more commonly used metric. However, at the time of this writing, revenue figures were not available, and thus for purposes of this estimate, I assume that reduced profits result fully from reduced revenues.
state would lose $550 million (0.05 percent of gross state product) and job losses totaling 12,500 (0.08 percent) in the state.

- A recovery phase lasting another 6 to 9 months, with economic gains totaling $185 million to California (0.02 percent of gross state product) and a gain of 4,200 jobs (0.03 percent) in the state.

- A financing phase lasting another 12 months, with uncertain economic and job losses in light of the continuing uncertainty over possible future terrorist attacks and the uncertainty over the state of the economy.

It should be stressed that these economic and job forecasts are relative to a pre-September baseline. The central point of this exercise is that even though the losses are large and unprecedented for the airline industry, the impact on California will be modest. Because economic trends prior to the terrorist attacks were already recessionary, the actual economic and job losses (from the recession and from the terrorist attacks) in Q3 2001 are larger, and the economic and job gains in Q4 2001 through Q2 2002 are wiped out. The results are in Table 2.3.

**Possible State Responses**

There are four broad areas surrounding the U.S. airline industry in which California could take action if it deemed such action was appropriate. These areas involve airline customers, commercial air carriers, airline employees, and airports and related services.

<table>
<thead>
<tr>
<th></th>
<th>Dislocation Phase (Q3/01)</th>
<th>Recovery Phase (Q4/01 through Q2/02)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. airline profits</td>
<td>− $1.5 Billion</td>
<td>− $4.5 Billion</td>
</tr>
<tr>
<td>Federal cash grants</td>
<td>None</td>
<td>+ $5.0 Billion</td>
</tr>
<tr>
<td>Net impact</td>
<td>− $1.5 Billion</td>
<td>+ $0.5 Billion</td>
</tr>
<tr>
<td>California’s enplanement share (11.2%)</td>
<td>− $168.0 Million</td>
<td>+ $56.0 Million</td>
</tr>
<tr>
<td>Regional economic multiplier (3.3)</td>
<td>− $554.4 Million</td>
<td>+ $184.8 Million</td>
</tr>
<tr>
<td>Percentage of gross state product</td>
<td>− .05%</td>
<td>+ .02%</td>
</tr>
<tr>
<td>California job losses</td>
<td>− 12,500</td>
<td>+ 4200</td>
</tr>
<tr>
<td>Percentage of California employment</td>
<td>− 0.08%</td>
<td>+ 0.03%</td>
</tr>
</tbody>
</table>

**Table 2.3**

**Economic Forecast of September 2001 Attacks on the Airline Industry and the Impact on California**

(relative to a pre-September baseline)

**Sources:** Swierenga, November 7, 2001; U.S. Department of Commerce, March 1997; California Employment Development Department, September 14, 2001; and California Department of Finance, October 2001.

**Airline Customers**

Because the airline industry was directly involved in the September 11, 2001, attacks, restoring confidence in the safety and security of the airlines is essential for customers (both passengers and shippers) to return to air transportation and...
stabilize the industry. Thus, confidence-building measures such as better security and screening procedures are useful. Most of these procedures are federal responsibilities (e.g., the Federal Aviation Administration has responsibility for baggage and passenger screening), and the federal government has taken a number of actions in this respect (see above). The California National Guard, however, is currently authorized to maintain a presence at California’s airports.14

Commercial Air Carriers

Generally speaking, any state actions that reduce the operating costs of U.S. airlines improve the financial position of the industry, and indirectly the state. The largest component of airline costs is expenditures on salaries and benefits; the second largest is expenditures on fuel. California currently has a 6.0 percent sales and use tax on jet fuel; the state and counties (which average a 2.25 percent sales and use tax) collected $113 million in tax revenue from U.S. airlines in 2000 (Hultquist, 2001).

At the same time, none of the 15 major air carriers are based in California. Thus, there is a question of whether the state should act primarily to benefit non-California firms. Additionally, the airline industry was experiencing an unprofitable 2001 even before the September attack; it lost $1.8 billion in the first six months of the year. It is thus difficult to tell whether any assistance to U.S. airlines compensates them for the effects of the terrorist attacks or for economic conditions that were already deteriorating prior to September 11.

Airline Employees

The Congress has discussed a number of provisions to provide financial aid, health care coverage, and job training for the roughly 110,000 airline employees laid off as a result of the September 2001 terrorist attacks. However, none of the federal bills enacted into law since the attacks included any of these provisions, and it appears unlikely that any of these provisions will get passed.

Airports and Related Services

Airports are currently undergoing significant, structural transformations with regard to how security is maintained, and these transformations have ramifications for airports and related services. LAX, for example, now allows only ticketed passengers past passenger screening checkpoints, meaning that concessionaires located between screening checkpoints and the gates have lost a

14The National Guard was called up by Governor Davis at the request of President Bush. As such, this deployment is being paid for with federal funds.
significant amount of business, perhaps permanently.\textsuperscript{15} Airports are also spending more on airport police and other measures.

Airports are financially self-sufficient, relying on income from landing fees, leases, and passenger facility charges for their operations. An important issue, then, is whether airport-revenue models created pre-September 2001 can be adjusted sufficiently post-September 2001 to continue to meet airports’ needs. If airports’ financial shortfalls are only temporary (resulting from wary passengers, for instance, who will eventually return), then airports may absorb their losses through budget cuts and municipal assistance. If instead, financial shortfalls become chronic, then state assistance may be needed.

Conclusions

The U.S. airline industry is national in scope, with air carriers regulated by the federal government operating across the country. At the same time, the airline industry has tangible effects on local economies and tax bases throughout California. In the aftermath of September 2001, then, the main dilemma facing the state is whether and how to assist the industry and effectively protect its localities.

Most people agree that the most effective way to bring stability back to the airline industry is to lure back passengers, so restoring consumer confidence is critical. To this end, the federal government is implementing stricter security measures as well as providing financial assistance to tide over air carriers in the meantime. Additional state efforts to raise consumer confidence in airline and airport security may be worthwhile. Confidence appears to be returning under the existing measures. But in the event that the downturn in air traffic becomes prolonged, state assistance to airports, their supporting firms, and localities may be necessary.

References


\textsuperscript{15} The major food and beverage concessionaire at LAX reported losses of $1.4 million (33 percent) in September 2001 (Rabin, October 22, 2001).
www.airlines.org/public/industry/bin/fuel.pdf.

www.airlines.org/public/industry/bin/traffic.pdf.

www.airlines.org/public/industry/bin/cargo.pdf.


Section 3

How Limitations on the Availability of Insurance May Affect the California Economy

Stephen Carroll

The terrorist attacks on September 11 caused staggering losses to the insurance industry. Insurance industry analysts estimate that insurance companies will pay out between $30 billion and $58 billion, by far the largest single-event insurance loss in U.S. history.1 It seems likely that insurers will no longer provide future coverage for terrorist acts within standard insurance policies as has implicitly been done in the past. It also seems likely that, because the consequences of terrorist acts cannot be anticipated, commercial insurance premiums will increase significantly to reflect the possibility of unforeseen losses, notwithstanding terrorism exclusions. The resulting limitations on the availability of insurance and increases in insurance costs may have significant effects on economic activity in California.

This section provides a rough snapshot of the effects of September 11 on the insurance industry, the industry’s possible responses, and the ways in which those responses might affect the California economy. Because the insurance industry and its major trade associations are national in scope, data relating specifically to California are not readily available. Nevertheless, this section attempts to draw inferences from national trends and to supplement them with California-specific data where possible.

The Effects of September 11 on the Insurance Industry

The insured losses incurred on September 11 were unprecedented—substantially larger than the losses incurred as a result of any prior natural or man-made disaster. Table 3.1 shows the magnitudes of the ten most expensive natural disasters in the United States.2

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Table 3.1
The Ten Most Expensive Natural Disasters in U.S. History

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Insured Losses ($ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurricane Andrew</td>
<td>1992</td>
<td>15.5</td>
</tr>
<tr>
<td>Northridge Earthquake</td>
<td>1994</td>
<td>15.3</td>
</tr>
<tr>
<td>Hurricane Hugo</td>
<td>1989</td>
<td>4.2</td>
</tr>
<tr>
<td>Hurricane George</td>
<td>1998</td>
<td>2.5</td>
</tr>
<tr>
<td>Hurricane Opal</td>
<td>1995</td>
<td>2.1</td>
</tr>
<tr>
<td>Hurricane Floyd</td>
<td>2000</td>
<td>1.8</td>
</tr>
<tr>
<td>Pacific Northwest Storms</td>
<td>1995</td>
<td>1.8</td>
</tr>
<tr>
<td>Hurricane Fran</td>
<td>1996</td>
<td>1.6</td>
</tr>
<tr>
<td>Hurricane Iniki</td>
<td>1992</td>
<td>1.6</td>
</tr>
<tr>
<td>Northern California Firestorm</td>
<td>1991</td>
<td>1.6</td>
</tr>
</tbody>
</table>

The three most expensive man-made disasters in the United States, prior to September 11, are shown in Table 3.2.3

Table 3.2
The Three Most Expensive Man-Made Disasters in U.S. History

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Insured Losses ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles riots</td>
<td>1992</td>
<td>775</td>
</tr>
<tr>
<td>World Trade Center bombing</td>
<td>1993</td>
<td>510</td>
</tr>
<tr>
<td>Oklahoma City bombing</td>
<td>1995</td>
<td>125</td>
</tr>
</tbody>
</table>

Thus, the total insured losses from the September 11 terrorism attacks are likely to be two to four times as much as Hurricane Andrew, the costliest single U.S. event on record before September 11, and 40 to 75 times more than the Los Angeles riots, the costliest prior man-made U.S. event.

Further, unlike prior events, the September 11 attacks triggered huge costs in several different lines of insurance simultaneously. Table 3.3 shows Morgan Stanley Research estimates of the distribution of insured losses from the September

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attacks by line of insurance. These estimates imply total insured losses of about $50 billion. Other analysts’ estimates are similar for most of the lines. The primary differences among the estimates that have been put forward concern other liability; estimates of insured other liability losses range from $5 billion to $20 billion.

Table 3.3

<table>
<thead>
<tr>
<th>Line of Insurance</th>
<th>Estimated Loss ($ billion)</th>
<th>Share of Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>Aviation liability</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>Other liability</td>
<td>20</td>
<td>39</td>
</tr>
<tr>
<td>Aviation hull</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Event cancellation</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Workers’ compensation</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>Business interruption</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Property: WTC 1 &amp; 2</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>Property: Other</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

These estimates are, at this point, highly speculative. They are based on numerous estimates regarding both the extent of the losses various parties will claim to have incurred as a result of the attacks and the extent to which those losses are covered by insurance. Any of the figures presented in Table 3.3 may change over time. For example, the estimates include $10 billion in business interruption losses. It is clear that many businesses had their operations interrupted by the attacks and, consequently, lost profits and, in some cases, had to incur additional payroll and other costs resulting from the need to relocate to another site. Some of those who were forced to close for a while have reopened. Others will relocate. But numerous firms are still closed. It is uncertain whether they will ever reopen and, if so, whether they will do so at a different location. How much money any of these firms will claim to have lost as a result of the attacks and the degree to which their insurers will accept their claim is clearly unknown at present.

Notwithstanding the specifics of the estimates, it is clear that September 11 was unique not only in the magnitude of the total insured losses but also in the simultaneous incidence of significant losses in several different lines of insurance.


5 See, for example, the estimates prepared by the Insurance Information Institute reported in BestWeek, Economist, “Industry Should Prevail,” November 26, 2001, p. 5.
including lines that had not previously experienced catastrophic losses. September 11 triggered the first catastrophic loss event in workers’ compensation and in life insurance.

Insurance companies had not included potential terrorism losses in the premiums they charged for commercial insurance. Nor had they reserved for losses from terrorism. Terrorism had not been considered a significant threat in the rating and underwriting processes in the United States and was not listed as a separate peril in insurance policies. Nonetheless, insurance industry analysts and trade associations generally agree that the industry has sufficient capacity to cover the losses arising from the September 11 attacks. Some individual companies may encounter difficulties in resolving claims against them. But it appears that the industry will generally be able to cover the September 11 insured losses.

However, the costs of September 11 claims will severely deplete the insurance industry’s capacity. It would be hard pressed to respond to another catastrophic event, whether man made or a natural disaster.

**Insurance Industry Responses to September 11**

Industry leaders have argued that terrorism is inherently uninsurable in the traditional sense.

>Terrorism is . . . a peril that is not quantifiable and therefore not insurable . . . . The potential harm that terrorists can inflict is unpredictable in frequency and unlimited in severity . . . Insurers (including reinsurers), cannot assess, measure, or spread the risk of terrorism.

Press accounts and industry analysts have reported that after September 11 insurers quickly moved to sharply reduce their exposure to future terrorism attacks. The world reinsurance market is reportedly imposing terrorism exclusions or dramatically scaling back terrorism coverage in contracts as they come up for renewal. Reinsurance plays a critical role in the insurance function. Reinsurance provides individual insurance companies the mechanism for spreading risks

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6See, for example, comments by senior executives of several insurance companies at the National Association of Insurance Commissioners 2001 Commissioners Summit on the September 11 Terrorist Attack, Washington, D.C., October 22, 2001.


across the industry, thus limiting the degree to which any particular company is exposed to catastrophic losses. To put the role of reinsurance in perspective, current estimates imply that more than half, about 58 percent, of the insured losses associated with September 11 will be paid by reinsurers. Because roughly 70 percent of reinsurance contracts are renewed on January 1 of each year, these exclusions have likely already profoundly affected the industry.

Primary carriers in California, however, do not have the same flexibility. Whereas reinsurance is generally considered a contract between insurance companies and not subject to state regulation, any terrorism exclusion a primary carrier might choose to introduce must be approved by the California Department of Insurance. Proposition 103, enacted in 1988, provides that any “insurer which desires to change any rate shall file a complete rate application with the commissioner” for his or her approval. Because a rate approval is justified on the basis of the coverage a policy provides, any change in the coverage terms of a policy is generally considered to be a change in rate. In other words, a change in either the coverage provided by a policy or in the price of a policy constitutes a change in “rate.” In either case, the change requires prior approval by the California Department of Insurance.

California’s prior approval process prevents insurers from excluding terrorism risk without both going through the complete rate application process with the department of insurance and obtaining the commissioner’s approval of the change. The first step is time consuming, at best. Historically, it has generally taken at least six months for the approval process to be completed, including the time required to prepare the application. It can take considerably longer to complete the process for a complex commercial policy. The second factor, approval, is a highly uncertain issue. The commissioner has nearly unrestricted discretion in approving or disapproving an application. Because the question of terrorism exclusion has not arisen in the past, there is no basis for predicting how an application will fare. However, the department of insurance recently made a decision with respect to a terrorism exclusion provision drafted by the Insurance Service Office (ISO), an organization that designs insurance policy language.

The California Insurance Code requires that ISO forms go through the same prior approval process as individual insurer applications. ISO developed a draft


10California Insurance Code 1861.05.

11California Insurance Code 1855.5.
policy provision excluding coverage of terrorism acts, and the National Association of Insurance Commissioners subsequently approved the provision. Twenty other states have approved the inclusion of the provision in insurance policies. However, the California Department of Insurance has already announced that it would not approve terrorism exclusions based on this provision.\textsuperscript{12} Therefore, at present, primary insurers do not have the right to include terrorism exclusions in policies written in California.

Presently, the only options open to a California primary insurer with respect to the renewal of an existing policy are either to renew it and hope that it will not result in terrorism losses or to not renew the policy. A California insurer considering the offer of a new policy could either include a terrorism exclusion or accept the risk of a terrorism loss and price the policy accordingly. In either case, the California Department of Insurance would have to approve the policy language and rate. Also, even if the department approves a policy with a premium that reflects the risk of terrorism losses, there is obviously a question of whether the entity seeking insurance will be willing to pay that price.

Terrorism acts aimed at U.S. interests have been extremely rare. In addition, since September 11, a host of public and private organizations, ranging from the armed forces to private security companies, have become deeply engaged in efforts to prevent future terrorism events. The high levels of security that have been put in place will, hopefully, further reduce the probability of a terrorist action that succeeds in causing significant harm to persons or property. Primary insurers may believe the potential for terrorism losses associated with some risks are sufficiently small that they will be willing to offer policies covering those risks that do not include terrorism exclusions and will not seek substantially higher premiums for them.

However, the widespread adoption of terrorism exclusions by reinsurers severely limits the degree to which primary insurers can spread the risks of terrorism losses. Thus, offering a policy that does not include a terrorism exclusion may amount to a “bet the company” risk. If, as will undoubtedly be the case for the vast majority of policies, the policyholder does not incur any terrorism related losses, the insurer will have no consequent problem. But, if a terrorism act succeeds in causing significant harm to persons or property, the companies whose policies cover those harms may well find themselves insolvent.

It is far too soon to determine how insurers will react to the September 11 event. But it seems quite likely that unless terrorism exclusions are approved by

the department of insurance, California insurers will simply be unwilling to cover risks deemed vulnerable to terrorism for new policies. It also seems likely that premiums for the commercial insurance coverages insurers are willing to offer will increase substantially even if terrorism exclusions are allowed. For example, the New York State Superintendent of Insurance observed that a major philanthropic organization that operates several New York hospitals recently renewed its property insurance. Although the new policy included broad terrorism exclusions, its coverage limit was only 20 percent of the expiring policy’s coverage limit and its cost was three times the previous policy’s premium.  

In sum, insurers, in reactions to September 11, are likely to be unwilling to cover certain risks under any circumstance and willing to cover certain other risks only if terrorism exclusions are approved. They are also likely to generally seek much higher premiums for the coverages they offer. The combination of lack of terrorism coverage and rising rates is likely to create availability and affordability problems for the business sector and, consequently, for the California economy.

The Effects of Insurance Industry Responses to September 11 on the California Economy

Property/casualty insurance plays an important role in California’s economy. Numerous commercial entities rely on insurance to protect against losses to themselves, their employees, and their facilities and equipment. Table 3.4 offers a perspective on the extent to which California businesses rely on property/casualty insurance. It shows the direct premiums earned by line for California in 2000, the most recent year for which these data are available.  


14The data are derived from annual statements filed with the National Association of Insurance Commissioners by insurers whose premium volume is in excess of 95 percent written in the United States. See, National Association of Insurance Commissioners, Report on Profitability By Line By State in 2000, Kansas City, MO, December 6, 2001, p. 41.
Table 3.4

Property/Casualty Direct Premiums, California, 2000

<table>
<thead>
<tr>
<th>Line of Insurance</th>
<th>Direct Premiums Earned (billions of dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private passenger auto, total</td>
<td>13.5</td>
</tr>
<tr>
<td>Commercial auto, total</td>
<td>1.9</td>
</tr>
<tr>
<td>Homeowners’ multiple peril</td>
<td>3.7</td>
</tr>
<tr>
<td>Farmers’ multiple peril</td>
<td>0.1</td>
</tr>
<tr>
<td>Commercial multiple peril</td>
<td>1.9</td>
</tr>
<tr>
<td>Fire</td>
<td>0.6</td>
</tr>
<tr>
<td>Allied lines</td>
<td>0.7</td>
</tr>
<tr>
<td>Inland marine</td>
<td>1.1</td>
</tr>
<tr>
<td>Medical malpractice</td>
<td>0.6</td>
</tr>
<tr>
<td>Other liability</td>
<td>3.4</td>
</tr>
<tr>
<td>Workers’ Compensation</td>
<td>6.2</td>
</tr>
<tr>
<td>All other</td>
<td>2.6</td>
</tr>
<tr>
<td>Total, all lines</td>
<td>37.2</td>
</tr>
</tbody>
</table>

Businesses and individuals spent over $37 billion insuring California activities in 2000. Just under half of the premiums for insurance in California purchased coverage of individuals’ autos and homes. About $20 billion was spent to purchase coverage of various types of commercial activities in California. If commercial insurance becomes less available and—when available—more expensive, businesses will have to adjust their activities accordingly. If, for example, the average cost of commercial insurance were to increase by 20 percent in California and there were no changes in business activities or in the amount of insurance in force, the cost of doing business in the state would be increased by $4 billion. There are no available data that would allow estimation of the extent to which insurers will withdraw from any segment of the insurance market or otherwise limit the availability of any particular line of insurance. Nor do we have any data that will allow estimation of how the cost of insurance will be affected by terrorism concerns.

When the price of insurance covering certain risks increases, businesses that encounter those risks essentially have three choices: At one extreme, they can cease engaging in the business activities that give rise to those risks. At the other extreme, they can self-insure, going without coverage from an insurer. In between, they can purchase some amount of coverage. Because the price of the coverage they purchase will reflect insurers’ estimates of the magnitude of risk, businesses that decide to purchase insurance are likely to modify their activities in ways that will reduce the risk and, therefore, the cost of insurance. In addition, the additional cost of insurance will enter into decisions regarding the level of production of whatever good or service is in question.
Conclusions

The attacks of September 11 will affect the California economy in at least three different ways: First, some economic activities that would have been undertaken will be aborted or canceled. The employment, revenues, and so forth that would have been generated by those activities will accordingly not be realized. Second, some activities will go forward as they would have had the attacks not occurred, but a share of the revenues generated by those activities will not accrue to the businesses that undertook those activities and will, instead, flow to insurers. This shift of revenues will reduce the profitability of the affected activities and the capital available to the affected businesses for future investments. Finally, some activities will be conducted in different ways to reduce their risk or at different levels in response to the increased cost of insuring them or a combination of both. Because these changes will be made to the ways in which the activities would have been conducted had the attacks not occurred, the modifications to the ways in which they are conducted will result in less preferred and presumably less profitable activities.

At this point, we do not yet know what insurers will decide regarding the coverages they will offer California business activities and the premiums they will demand. Neither do we know how businesses will respond to the options insurers offer them. Further, the ongoing recession has affected the California economy and we have no basis for sorting out the extent to which post–September 11 business decisions reflect responses to the recession. Accordingly, we cannot predict the extent to which the September 11 events will affect any particular area of the California economy. We can, however, provide some suggestions regarding issues or concerns that would appear to merit policymakers’ attention.

Policy Agenda

Monitoring Insurance Markets

As noted above, insurers, in reactions to September 11, are likely to be unwilling to cover certain risks under any circumstance and willing to cover certain other risks only if terrorism exclusions are approved. They are also likely to generally seek much higher premiums for the coverages they offer. The combination of lack of terrorism coverage and rising rates is likely to create availability and affordability problems for the business sector and, consequently, for the California economy.

The state has no system for monitoring the extent to which insurance availability or pricing is affected by terrorism concerns. Because of the nature of the September 11 attacks, the popular press and general public discussion has focused on coverage for large commercial structures—office towers, stadiums,
landmark buildings, and the like. However, the risk of losses as a result of terrorist acts arises whenever an activity might be affected by a terrorist attack, even though the attack might not have been directed at that activity. For example, a number of businesses located in the vicinity of the World Trade Center have submitted business interruption insurance claims for lost profits, payroll, extra expenses needed to conduct business in a new location, and so forth. Similarly, although the terrorists targeted World Trade Center Towers One and Two, the insured losses for property damage caused by the attack to other structures were substantially larger. Thus, simply considering whether a risk is a likely terrorist target is not sufficient to fully assess the potential for loss. Again, as noted above, insurance executives believe that traditional underwriting methods are not appropriate for assessing the risks associated with terrorism.

The possibility of large losses may inhibit insurers from offering coverage at premiums businesses can afford, both for activities that might become the targets of terrorist acts and for more mundane, but nonetheless economically important, activities. California policymakers should explore the development of a system that will provide the information needed to identify disruptions at an early stage in insurance markets, so appropriate responses can be developed.

**Approving Terrorism Exclusions**

At least 20 states have approved the terrorism exclusion provision drafted by ISO. However, the California Department of Insurance apparently is not presently prepared to approve that provision. This difference might lead businesses to undertake activities in other states that they would have undertaken in California had a terrorism exclusion been available in California.

Consider a business concerned with insuring against the normal risks of business activities and not particularly concerned with the risk of terrorism losses. An insurer considering this risk in California must weigh the possibility that if it accepted that risk, it could incur losses as a result of terrorist acts.

It is conceivable that if insurers are not allowed to include a terrorism exclusion in a policy covering some activity in California, they will either decline to insure that risk, or offer insurance only if paid a substantial premium. Meanwhile, insurers might be willing to offer coverage of that activity at a lower rate if the activity is conducted in another state in which they can include a terrorism exclusion in the policy. The business seeking coverage of the risk would then be faced with the question of whether the difference in the availability and cost of insurance would warrant moving the activity out of California to a state in which a terrorism exclusion is approved.
The California Legislature should investigate the extent to which the lack of approval of a terrorism exclusion provision is likely to drive economic activity out of the state. At a minimum, it seems worth investigating whether other states are attempting to capitalize on the relative inflexibility of California’s insurance regulations.

**Maintaining Limits on Workers’ Compensation Death Benefits**

Workers’ compensation insurance poses a particular challenge in the environment of terrorism. An insurer considering offering workers’ compensation coverage to a company that has a large number of employees in a single location must recognize the possibility that an attack that affects that location could cause a large number of casualties. That, in turn, would result in a substantial insured loss. The World Trade Center attack, for example, resulted in an estimated $3.5 billion in workers’ compensation losses. The workers who were killed in the September 11 attacks were employed in a number of different firms and, therefore, covered by numerous different policies and insurers. But an employer who would prefer to have a significant number of its employees located in a single location would have to find an insurer willing to incur the risk of a very large loss should that site be involved in a terrorism event. Also, if it were able to find an insurer prepared to cover the risk, it would likely incur a substantial premium. Self-insurance might be an option, but then the business would have to be prepared to accept the risk of a catastrophic loss. (Again, the site might not, itself, be a terrorism target. But, if it is hit in the course of an attack, whether directed at it or elsewhere, the resulting loss will have to be borne by a single insurer or, if self-insured, by the employer.)

California stands in a relatively strong position in this regard. California is one of 10 states that limit workers’ compensation death benefits. In California, the total workers’ compensation benefit provided to the survivors of a worker who is killed in the course of his or her employment is roughly $150 thousand–$200 thousand, depending on the number of survivors. The limits in the other states that also limit death benefits are generally somewhat higher than in California. In comparison, death benefits under workers’ compensation in the 40 states that do not have limits can run into the millions of dollars. In sum, the limit on workers’ compensation death benefits in California make this state a more attractive location to employers who would prefer to have a substantial number of employees located at the same site.

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The fairness of limits on workers’ compensation death benefits in California is an issue. The limits were put into place well before September 11. Thus, the adoption of the limits implies that, prior to September 11, the benefits of the limits were thought to outweigh the costs. It may be, however, that public policy should weigh the interests of the survivors of a worker killed in a terrorist attack from a different perspective than the interests of the survivors of a worker killed in some other form of workplace accident.

The legislature might consider whether the survivors of workers killed in a terrorist incident deserve special treatment and, even if they do, would that outweigh the benefits to the California economy of relatively lower workers’ compensation premiums. More generally, an analysis of how other lines of insurance in California are affected by September 11 may be warranted.

Modifying the Proposition 103 Approval Process

Proposition 103 established a process whereby the California Department of Insurance must give prior approval to any change in an insurance rate. Because the rate is relevant to the terms of a policy, this rule essentially requires prior approval of any change to an insurance policy. The approval process can be lengthy and opens the entire policy to review. At best, the need for prior approval slows insurance transactions. In some cases, insurers may simply decline to offer coverage of some risks rather than engage in the process. The approval process may slow down or otherwise impede responses to the new insurance environment introduced by September 11.

Proposition 103 was motivated by concerns for the abilities of individuals to effectively negotiate with large insurance organizations and for the perceived refusal of insurers to pass cost savings on to consumers by lowering premiums. However valid those concerns might be with respect to individuals, they might not be as relevant to commercial insurance transactions. Many purchasers of commercial insurance are themselves large, sophisticated organizations thoroughly capable of effectively dealing with a large insurance company.

To be sure, many commercial insurance transactions involve small businesses, and the nature of the transaction between the business and an insurer is little different from the nature of the transaction between a homeowner and an insurance company. But, in those instances in which there is reason to believe that the insurance purchaser is not at a disadvantage in negotiating with an insurer, greater flexibility might allow insurers and large commercial customers to move more quickly and effectively to develop nonstandard insurance arrangements appropriate to the post-September 11 environment.
The legislature might consider modifying the regulatory approval process for commercial transactions, possibly for large firms if not all purchasers of commercial policies.

The California Stake in Federal Legislation

If an insurer cannot get reinsurance, it must assume that it will be solely responsible up to the maximum payment possible under the policy for a loss incurred by the policyholder. Because the amount of insurance an insurer can write is limited by its exposure to loss relative to its capital base, insurers who cannot spread their risks through reinsurance cannot write as many policies. Insurers can avoid risks viewed as potential terrorism targets, like landmark buildings. And they can seek to limit their exposure to losses caused by terrorist attacks through terrorism exclusions, if such exclusions are approved. But the responses of reinsurers to September 11 may impede the workings of insurance markets in lines of business not directly threatened by terrorism. Any such impediments will, in turn, adversely affect the California economy.

The U.S. Congress is considering various proposals that would establish federally sponsored risk-sharing loan programs to stabilize the property/casualty insurance market in the wake of September 11. A host of concerns have been discussed in the course of that debate. California’s large congressional delegation implies that the state could have an impact on the debate over whether the federal government should assume a role in the insurance arena and, if so, what that role might be. The California Legislature might consider exploring the various arguments regarding what would be an appropriate federal role from the perspective of the state to inform California’s federal Congress members.

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\[16\text{For example, the Oxley-Baker Terrorism Risk Protection Act, H.R. 3210, November 1, 2001.}\]
Section 4
California’s Preparedness for Weapons of Mass Destruction Attacks

Russell W. Glenn and Bruce W. Bennett

Weapons of mass destruction (WMD) are nuclear, chemical, biological, or radiological implements “that are capable of a high order of destruction and/or of being used in such a manner as to destroy large numbers of people or cause massive damage to facilities, infrastructure, livestock, or crops.”¹ Their physical and psychological effects make them desirable for use by domestic or international terrorists seeking to cause either considerable numbers of casualties or substantial social and economic disruption.

California should not be complacent with regard to the threats WMD pose to its residents, economy, and way of life. However, prevention of all such possible strikes is virtually impossible regardless of how well prepared California might be. While prevention should always remain a high priority, much of the state’s preparation for an attack should focus on consequence management. Benefits to such preparation exist even if attacks do not take place. There is a strong interaction between preparedness and deterrence since terrorists will tend to attack the unprepared. It is therefore necessary to consider how to improve post-event response in addition to maintaining preventative vigilance.

Such readiness will require extensive intra-agency training and interagency cooperation. Early detection and agent identification are only two parts of an effective initial post-attack response. The following is a partial list of additional multidisciplinary and multiorganizational requirements:

- Exploitation of available intelligence and warnings pertaining to further strikes.
- Attack assessment that identifies when the attack occurred; the areas and individuals affected; how many people need treatment; the required amounts of medical care, supplies, and protective equipment; and where services will be provided.
- Rapid dissemination of warning and promulgation of guidance to emergency services personnel, medical staffs, and the public.
- Limitation of physical damage (preservation of human life, livestock, crops, physical infrastructure, buildings).
- Development of uniform and accurate information releases.

¹This definition is adapted from that in Joint Pub 1-02, Department of Defense Dictionary of Military and Associated Terms at www.dtic.mil/doctrine/jel/doddict/index.html. The list of acronyms and terms in the front matter of this collection provides a complete list of those used in this section.
• Isolation or quarantine of victims and areas, if appropriate, and
destruction of animals or crops when necessary.
• Determination and initiation of appropriate treatment regimens.
• Decontamination of victims, rescue personnel, equipment, and
contaminated areas.
• Preservation of criminal evidence and conduct of criminal
investigations; capture and identification of the perpetrators and
others responsible.
• Consequence “war gaming” and management (e.g., determination
of economic implications, second- and higher-order effects, and
development of appropriate responses).
• Filtering legitimate threat information from hoaxes.
• Compilation and dissemination of lessons learned for immediate
and subsequent use by local, intrastate, interstate, and international
users.
• Preservation of responder capability. Responders may be a
deliberate terrorist target so as to handicap the effectiveness of
subsequent and counterterrorist actions.

California’s Preparedness Strengths

California’s longstanding initiatives for dealing with natural (e.g.,
earthquake) and man-made (e.g., hazardous material spills) emergencies do much
to abet state readiness to deal with WMD attacks. If not directly applicable to a
terrorist strike, they nonetheless provide a foundation on which authorities can
readily build. Consideration of these in-place resources offers much in the way of
lessons learned (notably regarding interagency command and control), reduced
preparation times, and developmental cost savings.

More-specific strides toward readiness are also in progress. The Los
Angeles County Department of Health Services and the San Francisco Department
of Public Health have introduced education programs for both medical personnel
and the general public [as has the U.S. Centers for Disease Control and Prevention
(CDC)]. Hardcopy products such as posters and flyers have cyber-based
complements. Web sites provide greater (and potentially more current) detail than
is feasible with the production and distribution of printed matter. While it has been
difficult to determine the extent and effectiveness of distribution, a cursory survey
in the Los Angeles area reflected that the posting of products varies depending on
the organization and the distance from the downtown area. The local nature of
these initiatives likely influences the funding available for both production and
education programs.
Los Angeles County authorities collaborated with the CDC to monitor specific syndromes (syndromic surveillance) during the 2000 Democratic National Convention. Post-event analysis concluded that a number of valuable lessons had been derived that would increase the efficiency and effectiveness of similar undertakings in the future. Additionally, relationships with nontraditional surveillance partners were improved. Such benefits enhanced the subsequent effectiveness of the county’s ongoing Syndromic Surveillance and Rapid Reporting System, and its Volume-Based County Hospital Surveillance System.²

California has similar capabilities in large animal veterinary medicine. Cooperative efforts exist between the state veterinarian’s office; the School of Veterinary Medicine at the University of California, Davis; the Office of Emergency Services; other agencies; and veterinarians in individual practices. Procedures and training to abet early detection and confirmation of biological threats (either the result of malfeasance or natural occurrence) are in place and widely known in the veterinary and emergency services communities. Awareness with respect to the most threatening diseases (e.g., Q fever, brucellosis, plague, foot and mouth, and mad cow) is generally high, and response procedures have in many instances been practiced. Similarly, both official and professional links between California and national organizations are in place. The California and American Veterinary Medical Associations both have web sites that provide excellent and detailed information regarding bioterrorist threats (several of which are sited in the reference list to this section).

This is not to imply that the state could not suffer from a terrorist strike against agricultural animal targets. A recent U.C. Davis modeling of milk contamination by foot-and-mouth disease estimated the loss of revenue due to such an event at $13 billion. While the dangers of an attack (or contamination by other means) cannot be altogether mitigated, there are procedures in place to minimize loss of human life and animal property. The extent to which individuals in this arena have attempted to better serve Californians is in part demonstrated by a recently completed agreement to speed suspected animal disease samples to the only testing facility in the country authorized to handle specified cases. Previously such samples were shipped via commercial carrier to the Plum Island, NY, facility. The Secretary of Food and Agriculture and the state Air Guard have agreed that the latter will transport samples of notable concern via F16 jet aircraft, thereby cutting 12 hours or more off the state’s threat verification and reaction time.

The size of the state and the resultant wide dispersion of veterinarians mean that some of these care providers are less current with respect to WMD threats than others. There are concerns that the current level of interest and emphasis with respect to bioterrorism preparedness will atrophy as the events of September 11, 2001, recede into the longer historical past. Nevertheless, the noted preparations, general veterinarian familiarity with threat diseases (agents), and the limited number of animal species (versus the variety of plant crop types) combine to make the veterinary community currently better prepared for a WMD attack than are those concerned with protecting the human public health and plant agricultural sectors.

The subsequent subsections consider in more detail the nature and viability of WMD threats that California might confront and, consequently, ways through which the state might improve its preparedness.

The Nature and Viability of WMD Events

The impact of WMD attacks is in part a function of their delivery. Dr. Ken Alibek, the one-time technical director of the Soviet biological weapons program, has described three basic ways biological weapons can be delivered and has evaluated their effects. Chemical and radiological weapons have similar delivery characteristics:

- Contamination of food and water supplies: It is hard to overwhelm modern water purification systems; contamination of food is feasible but would affect only a limited number of people.\(^3\)
- Releasing infected vectors, such as mosquitoes or fleas: Inefficient and likely to affect the attackers as well as the intended targets.
- Aerosol release: Thought to be generally most effective at causing mass casualties. Delivery could result from either an explosion or spraying.\(^4\)

Aircraft used for crop dusting and trucks supporting fumigation both offer readily available means for creating a large-scale aerosol cloud and doing so covertly (especially for biological weapons). Aerosols could also be caused by an industrial accident (notably in the case of chemical threats). Aircraft, vehicles, or

\(^3\)An FDA representative recently testified that "food-borne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the United States each year." This does not include any cases of bioterrorism. See Statement of Bernard A. Schwetz, Acting Principal Deputy Commissioner, Food and Drug Administration, October 10, 2001, found at www.fda.gov/ola/2001/foodsafety1010.html.

\(^4\)Ken Alibek, Prepared Testimony Before the House Armed Services Committee Oversight Panel on Terrorism, May 23, 2000. The 2001 delivery of anthrax through the mail system was a variant of an aerosol release.
ships can deliver nuclear weapons that produce blast and electromagnetic effects, radiation, heat, craters, and fallout.

Table 4.1 provides an overview of the magnitude of the potential WMD threats to people. It compares the damage that might be done by a nuclear, biological, or chemical (NBC) attack assuming no medical intervention. The size of nuclear weapon shown in the table is roughly what a terrorist organization might possess; the quantities of biological and chemical agents shown are probably more than a single terrorist would have available for use. Because the assumed chemical and biological attacks would be carried out as an aerosol release, the agents would be spread by the wind and the areas affected would be very much a function of the atmospheric conditions. The blast effects of the nuclear attack would be little affected by atmospheric conditions.

The difference in areas covered by chemical and biological agents reflects their relative toxicity [as shown in terms of the median lethal dose (LD50) for inhalation in Figure 4.1].5 The lower the LD50 value, the more toxic an agent is (i.e., less is required to cause death). Chemical agents vary significantly in lethality though even the most toxic of them tend to be three to four orders of magnitude less toxic than many biological agents. The relative toxicity of biological agents can only be exploited by very effective preparation and dissemination. That is, while in theory there are 100 million lethal doses of anthrax per gram (as shown in Figure 4.1), the several grams of anthrax sent in each letter in 2001 led to only 10 cases of inhalation anthrax. Indeed, Table 4.1 suggests that each kilogram (1,000 grams) of anthrax might affect only 10,000 to 30,000 people even in the most favorable weather conditions.

**How Serious Might a WMD Attack Be?**

WMD attacks would cause both primary and higher-order effects in California. The primary effects would be the human and animal casualties and the lost use of facilities, products, and areas that were contaminated. Higher-order effects include the psychological impact, time spent on protection, animals/crops destroyed to prevent disease spread, loss of business due to people being afraid to go to the contaminated area or product boycotts, overall disruption of the economy, and time spent on consequence management and cleanup. Most analysts focus on primary effects; yet, secondary effects can have much greater impact. For example, it is often postulated that with chemical and biological attacks, the number of "worried well" (those insisting on medical treatment despite a lack of

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5LD50 “indicates the quantity of material that, if administered to a population of subjects, will cause 50% of the subjects to perish.” See http://chemlabs.uoregon.edu/Safety/toxicity.html.
physical symptoms) could amount from 5 to 15 times the actual number of casualties.

Table 4.1

Comparing the Potential Lethality (Untreated) of Various WMD Attacks

<table>
<thead>
<tr>
<th>NBC Weapons</th>
<th>Clear, Sunny Day</th>
<th>Overcast Day</th>
<th>Clear, Calm Night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear (12.5 Kt blast effects)</td>
<td>7.8 km², 23,000–80,000</td>
<td>7.8 km², 23,000–80,000</td>
<td>7.8 km², 23,000–80,000</td>
</tr>
<tr>
<td>Biological (100 kg of anthrax)</td>
<td>46 km², 130,000–460,000</td>
<td>140 km², 420,000–1,400,000</td>
<td>300 km², 1,000,000–3,000,000</td>
</tr>
<tr>
<td>Chemical (1,000 kg of sarin)</td>
<td>0.74 km², 3,000–7,000</td>
<td>0.8 km², 4,000–8,000</td>
<td>7.8 km², 30,000–80,000</td>
</tr>
</tbody>
</table>

*Assuming an aerosol release, with 3,000 to 10,000 unprotected people per km².

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6Proliferation of Weapons of Mass Destruction: Assessing the Risks, U.S. Congress Office of Technology Assessment (OTA), August 1993, 53–54. The three weather conditions shown are standards used in the NBC community. They relate to the inversion layer that keeps an aerosol trapped at an altitude at which it poses a threat. The conditions also differentiate sun conditions. Biological agents are more rapidly destroyed in sunlight; sunlight also affects many chemical agents. The chemical fatalities printed by OTA were off by an order of magnitude (a multiplication error?), as confirmed by comparison to Steve Fetter. “Ballistic Missiles and Weapons of Mass Destruction: What Is the Threat? What Should Be Done?” International Security (Summer 1991): 21–27. The biological fatalities assume that all of the lethal area is urbanized. Because the biological cloud could be very long and narrow and extend well beyond the urbanized area (unless the attacker is very well prepared and very skilled), these fatalities should be considered as an upper bound.

The OTA was established by Congress in 1972 to provide congressional committees with analyses of emerging, difficult, and often highly technical issues. Services include major assessment reports, background papers, briefings, and testimony. OTA explores complex issues involving science and technology, helps Congress identify policy options, and provides foresight about new developments that could have important implications for future federal policy. See www.wmich.edu/politics/resources/congress.html.
Figure 4.1—Lethal Dosages for Selected Chemical and Biological Weapons

Table 4.2 provides a rough estimate of the threat likelihood and primary effects of various types of WMD. The point of reference is the "moderate" level of effects of a sarin attack. The Aum Shinrikyo terrorist group in Japan used perhaps 10 kilograms of sarin in their March 1995 attack during which they released the nerve agent in Tokyo subway cars, killing 12 and sending over 5,000 to hospitals. (It is usually argued that only about 20 percent of these were true casualties, the rest being "worried well.") While confined areas such as subways or buildings are favorable for the release of such agents (because winds will not cause rapid dispersion), there were fewer casualties in Tokyo than might have been expected for various reasons. A similar attack could be carried out in California subways, enclosed parking garages, or buildings with closed ventilation systems and windows that do not open.

7Source: International Defense Review, March 1995, p. 40, © Crown Copyright/MOD. Reproduced with the permission of the Controller of Her Majesty’s Stationery Office; ricin and botulinum toxin (Botox) modified per the U.S. Army Medical Research Institute of Infectious Diseases, Medical Management of Biological Casualties, February 2001, Appendix I. Toxins are organic poisons created as products of biological organisms and are also considered biological agents.
Table 4.2
Estimates of the Primary Effects of Potential WMD Terrorist Attacks

<table>
<thead>
<tr>
<th>Type of Threat</th>
<th>Possible Quantity</th>
<th>Adversary Capability</th>
<th>People*</th>
<th>Agriculture/Animals*</th>
<th>Facility/Area/Denial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Agents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nerve agents:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GB (sarin)</td>
<td>10 kg</td>
<td>Low</td>
<td>Moderate</td>
<td>Low/Mod.</td>
<td>Low</td>
</tr>
<tr>
<td>GD (soman)</td>
<td>10 kg</td>
<td>Low</td>
<td>Moderate</td>
<td>Low/Mod.</td>
<td>Low–Mod.</td>
</tr>
<tr>
<td>VX</td>
<td>10 kg</td>
<td>Very Low</td>
<td>Moderate</td>
<td>Low/Mod.</td>
<td>Moderate</td>
</tr>
<tr>
<td>Mustard (HD)</td>
<td>10 kg</td>
<td>Low</td>
<td>Low</td>
<td>?/Low</td>
<td>Low–Mod.</td>
</tr>
<tr>
<td>Phosgene (CG)</td>
<td>10 kg</td>
<td>Moderate</td>
<td>Low</td>
<td>Low/Low</td>
<td>Very low</td>
</tr>
<tr>
<td>Hydrogen Cyanide (HC)</td>
<td>10 kg</td>
<td>Moderate</td>
<td>Low</td>
<td>None/low</td>
<td>Very low</td>
</tr>
<tr>
<td>Tear gas (CS)</td>
<td>10 kg</td>
<td>High</td>
<td>Very low</td>
<td>?/?</td>
<td>Low</td>
</tr>
<tr>
<td>Industrial chemical</td>
<td>tons</td>
<td>High</td>
<td>Low–high</td>
<td>?/Low</td>
<td>Low</td>
</tr>
<tr>
<td>Biological Agents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthrax</td>
<td>1 kg</td>
<td>Low</td>
<td>High</td>
<td>None/High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Botulinum</td>
<td>1 kg</td>
<td>Low</td>
<td>High</td>
<td>None/?</td>
<td>Very low</td>
</tr>
<tr>
<td>Ebola</td>
<td>1 kg</td>
<td>Very low</td>
<td>Very high</td>
<td>None/?</td>
<td>Low</td>
</tr>
<tr>
<td>Plague</td>
<td>1 kg</td>
<td>Very low</td>
<td>High</td>
<td>None/?</td>
<td>Low</td>
</tr>
<tr>
<td>SEB⁹</td>
<td>1 kg</td>
<td>Low</td>
<td>High</td>
<td>None/?</td>
<td>Low</td>
</tr>
<tr>
<td>Smallpox</td>
<td>1 kg</td>
<td>Very low</td>
<td>Ext. high</td>
<td>None/None</td>
<td>Moderate</td>
</tr>
<tr>
<td>Animal disease</td>
<td>1 kg</td>
<td>Moderate</td>
<td>?</td>
<td>None/High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Crop disease</td>
<td>1 kg</td>
<td>Low</td>
<td>None</td>
<td>High/None</td>
<td>Moderate</td>
</tr>
<tr>
<td>Nuclear weapon</td>
<td>20 Kt</td>
<td>Very low</td>
<td>Very high</td>
<td>Very high</td>
<td>Low–Mod.</td>
</tr>
<tr>
<td>Radiological weapon</td>
<td>3 kg</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
<td>High</td>
</tr>
</tbody>
</table>

* "?" represents situations in which the level and character of threat depend on conditions and/or whether or not the strain of threat agent is zoonotic (communicable from animals to humans under natural conditions).

In comparison to sarin, some chemical agents have lesser or less serious human or animal effects (fewer affected by a given-size attack), while some biological weapons could have much more serious human effects and could affect animals as well. Many chemical weapons (e.g., sarin) evaporate rapidly and thus are not effective in denying the use of facilities or areas. Other chemicals (like VX) can persist for days or weeks and require decontamination depending on weather

⁸Notes: Estimates by the author. Compared to a “moderate” value, a “low” value is roughly 10 times less, and a “high” value is 10 times more. “Very low” is 100 times less, “Very high” is 100 times more, and “Ext. high” is 1,000 times more.

⁹SEB: Staphylococcal enterotoxin B. See www.tdh.state.tx.us/bioterrorism/facts/staphotox.html.
conditions and the porosity of the surface on which they land. Traditionally it was felt that biological weapons would not pose a facility/area denial threat because most organisms decay quickly in the air, but the 2001 anthrax letters demonstrated the potential for facility denial. Toxic industrial chemicals could cause a range of effects, the more dangerous of which was illustrated by the 1984 incident in Bhopal, India, involving the release of 20 to 30 tons of methylisocyanate. The accident caused 2,500 immediate fatalities and approximately 100,000 casualties requiring some form of medical treatment. There were also several thousand animals injured and roughly 1,000 killed.\textsuperscript{10} Nuclear and radiological weapons would affect people, animals, and crops. Residual radiation (including fallout) could deny the use of agricultural areas for a long period of time.

Various animal and crop diseases could seriously affect agriculture in California. Animal diseases include foot-and-mouth disease, classical swine fever virus, rinderpest, rift valley fever, avian influenza, Newcastle disease, and Venezuelan Equine Encephalomyelitis (VEE) virus. A number of these diseases are contagious and thus can spread easily and quickly. Many affect both animals and people. (These are referred to as zoonotic and include anthrax and VEE). Crop "diseases" include wheat stem rust, rice blast, and rye stem rust. Insects deliberately introduced by terrorists would also threaten California's agriculture. A recent university study conducted at U.C. Berkeley concluded that the direct costs of a Mediterranean fruit fly infestation would be between $1.3 billion and $1.8 billion annually. Related indirect costs would drive yearly losses into the billions of dollars.\textsuperscript{11} Because many of these animal and crop diseases can spread and treatment after exposure is of limited utility, animals or crops that may have been exposed are often quarantined and in many cases destroyed (a secondary effect). For example, a 1997 outbreak of foot-and-mouth disease in Taiwan killed one million pigs and forced the destruction of 3.8 million more in the effort to stop spread of the disease. The secondary effects of animal diseases are illustrated by a late 2001–early 2002 outbreak of avian influenza at six farms in Pennsylvania. This event resulted in the destruction of 130,000 chickens at the farms and led to a suspension of exports of all U.S. chicken and eggs to Japan.\textsuperscript{12} Thus, even an

\textsuperscript{10}The Bhopal case is described on the Organization for the Prohibition of Chemical Weapons web page. See "Chemical Accidents" at www.opcw.nl/chemhaz/chemacci.htm.

\textsuperscript{11}Interview with Don Henry, California Director of Plant Health and Pest Prevention Services. Telephone interview conducted by Russell W. Glenn, January 21, 2002.

outbreak of an animal disease two thousand miles from California can affect the state’s animal industry.

Areas of Potential Preparedness Enhancement

General

No state is fully prepared for WMD events. There remains a need to focus on both antiterrorism ("defensive measures used to reduce the vulnerability of individuals and property to terrorist acts") and counterterrorism ("offensive measures taken to prevent, deter, and respond to terrorism") in California and not simply to react to events after they have occurred. \(^{13}\) Authorities should both passively and actively seek to reduce the chances of WMD attack. This will at times require viewing challenges from a broader scope than may be the norm, to include assuming terrorists’ perspectives. For example, although cyberterrorism does not fall under the purview of WMD attacks, government and commercial authorities should screen and in the future design their web sites so as to ensure they do not provide vital information to potential attackers who might seek to use such weapons against vulnerable targets.

The following discussion of areas needing preparedness enhancements essentially follows the structure employed in the CDC strategic plan for preparedness and response to chemical and biological terrorism.\(^ {14}\)

Preparedness and Prevention

Preparedness and prevention are the first steps in dealing with WMD attacks. Preparedness involves education and planning, including the preparation of various tools and resources needed to respond to WMD attacks. Prevention includes intelligence collection and law enforcement activities undertaken to thwart such attempts.

The California public, its government authorities, and nongovernmental enterprises are on the whole ill prepared for a WMD event. Education will be the single most effective weapon in the state’s fight against terrorism. Effectively educating appropriate officials and the public at large would enhance the probability of early discovery of criminal intent and detection of attacks. The failure to better handle the 1995 Aum Shinrikyo sarin attack in the Tokyo subway was in considerable part attributable to ignorance among the Japanese public and transportation security personnel. British citizens, in contrast, are attuned to the

\(^{13}\)Definitions from JP 1-02, 111 and 34, respectively.

threat posed by abandoned items in public places or unusual activities in their community. Their awareness is the product of years of public education in response to threats of IRA bombings. Californians and Americans in general are for the most part no better prepared in this regard than were the residents of Tokyo in 1995.

Education would further serve the California public in improving the likelihood that local authorities will respond appropriately in the case of a WMD attack. Training for those most likely to come in contact with the results of a strike would facilitate early detection and correct decisions regarding whether a particular agent is contagious or noncontagious and whether evacuation or containment of those exposed is appropriate. These individuals include emergency responders, medical personnel, veterinarians, laboratory analysts, teachers, and health care home visitors. Furthermore, an enlightened public would be less likely to overreact to an attack or to respond inappropriately. Benefits of the latter include reducing demands for what would be counterproductive government or personal actions, e.g., the purchase of protective masks or the administering of unnecessary and possibly dangerous prophylactic vaccinations. Education should include training and exercises to better prepare medical facilities for the handling of large numbers of WMD attack victims, to include those needing decontamination and/or quarantine.

Some of the efforts by the California medical community to address the education issue were discussed above. For example, web sites managed by the Los Angeles County Department of Health Services, the San Francisco Department of Public Health, and other local and state agencies allow easy access to basic information on chemical and biological agents. (Information on radiological symptoms and treatments is less readily available.) In addition, the several “consensus statements” published by the American Medical Association are particularly good in their coverage of biological agents as weapons. (These papers are cited in the reference list to this section. Individuals can access them directly at http://jama.ama-assn.org/.) There is room for improving the medical community’s readiness, however. Identification of discriminators that distinguish dangerous agent symptoms from common ailments could dramatically speed detection, helping hospital personnel to distinguish between the results of a terrorist attack and other diseases due to natural causes. Well-designed education programs would further seek to identify at-risk segments of the population, improve understanding of how contamination or illness could be spread (and

13Although all vaccinations involve some level of risk, several of those affiliated with biological agents that might be used during a WMD attack appear to pose particular dangers for specific demographic groups, e.g., pregnant women.
therefore contained), and help in identifying effective versus dangerous decontamination procedures (e.g., water accelerates the through-skin penetration of some chemicals). Any such training initiative should seek to capitalize on in-place emergency procedures such as those designed for earthquake response.

There is potential benefit in education programs with more limited scope in addition to those aimed at the general public and individuals in selected occupational specialties. Currently, too few programs incorporate emergency response volunteers despite the inevitability that California will experience catastrophic events in its future. High-rise apartment residents in Mexico City volunteer to undergo special training and are prepared to assist in building evacuation, render basic first aid, and otherwise act to mitigate the effects of disasters. Developing similar programs and reintroducing mandatory emergency reaction (to include fire drills) would increase state readiness and provide what could be much needed assistance to first responders in the event of a terrorist strike.

Informing the public and those in situations most likely to experience a WMD attack increases alertness in those groups and thereby enhances detection of unusual behavior that may precede terrorist action. Education therefore has the added benefit of dramatically increasing the chances of discovering intentions before an event in addition to abetting the chances of early detection during an attack and of proper response. Further, knowledge offers the prospective benefit of a psychologically prepared public, one less likely to panic, otherwise overrespond, and, conceivably, one less susceptible to posttraumatic stress.

A major objective of the recently created Office of Homeland Security is to improve the sharing of appropriate intelligence information among federal and local agencies. This intelligence may well be vital to preventing specific WMD attacks or to promptly responding to attacks that have already occurred. California needs to make sure that it is well integrated into this sharing, and that particular threats are conveyed rapidly to local law enforcement and public health agencies.

Detection, Identification, and Surveillance

Other than in the case of a nuclear explosion or some chemical agent exposures, it is possible that the consequences of a WMD attack will not be detected until well after an agent’s initial release. While some agents and doses will have immediate effects (seconds or minutes), the consequences of many biological, radiological, and some chemical threats will be evident only hours or days after exposure, in some cases long after most traces of the original discharge have disappeared. Emergency service and medical personnel need to be prepared for localized mass casualty events akin to the 1995 sarin gas attack in the Tokyo
subway, but it is far more likely that an episode will be discovered via diagnosis by medical personnel days after victims’ exposure. In addition to problems introduced by long incubation times, detection can be further complicated by several factors, including the following:

- A given agent may cause different symptoms in various individuals. A mother and child suffering from inhalation anthrax may react quite differently to exposure. They may not exhibit any of the symptoms normally associated with contamination. One of two postal workers exposed to anthrax at a northern Virginia hospital appeared to be only mildly ill; only after a CT scan was the source of his ailments determined. His coworker had none of the classical outward signs of anthrax exposure; a blood sample taken after he complained of a terrible headache revealed the bacteria’s presence.16

- Symptoms of those exposed to a WMD attack may be similar to those for common ailments such as the flu. That medical training encourages students to look for the most likely explanation complicates diagnoses. One doctor asked about his confidence in his own and colleagues’ ability to rapidly detect a biological agent attack was not optimistic: “You’re taught in medical school to look for the most obvious cause first. When you’re looking for a horse and it looks like a zebra, you’re going to find a horse, not a zebra. It’s too expensive and time-consuming to check for all the possibilities in every case.” In the absence of blatantly definitive symptoms, a considerable number of individuals may have to be seen by medical personnel before proper diagnoses are made.

Early detection is made yet more difficult in that there are few programs in place to assist medical personnel in this regard. Few clinics maintain timely databases of incoming symptoms, nor do most pharmacies, senior homes, schools, childcare centers, or like facilities formally monitor symptom frequency at all. There are notable exceptions. New York City has had such a system in place for some time, one credited with detection of the West Nile virus. The Los Angeles County Department of Health Services has recently introduced a similar initiative. An initially promising program at Stanford University Medical Center has thus far proved disappointing, a victim of problems in adapting long-standing admission procedures and the extraordinary effort that detecting symptom anomalies can require.

Statewide readiness would be notably enhanced with the introduction of an effective medical early warning system. Reliance on hospital emergency rooms and clinics is insufficient. Tracking pharmaceutical orders (both bulk and individual); school health reports; convalescent home problems; and relevant observations by police, bus drivers, transportation authorities, and others already

mentioned is but a sampling of additional means for better readying the state for an attack. The costs inherent in these procedures will be in part offset by earlier detection of ailments or contamination not related to a WMD event, e.g., product tampering, food poisoning, or the inadvertent introduction of disease. (It is worthy of note that while product tampering episodes have thus far not been a popular tool of terrorist groups, the method may in the future be an attractive one for those wishing to target commerce or selected commercial enterprises, such as those using animal testing.) California would further benefit from the development of agricultural animal and plant detection systems similar to those created to safeguard human life.

There are areas in which California’s animal and crop security could be enhanced. The FDA is among those that has recommended that background checks be required on workers and other personnel who work in or otherwise have routine access to slaughterhouses, meat packing facilities, produce handling points, or similar locations that would facilitate the introduction of a biological or chemical agent to a large quantity of product. In the interest of early detection and prevention of spread, that organization also recommends having inspectors on site and educating managers of such facilities with regard to agents that could threaten their products and any who would consume them.17

Event Response

Responding to WMD events requires a combination of trained personnel, appropriate equipment, and sufficient supplies and other resources. A recent survey of hospitals in Alaska, Idaho, Washington, and Oregon suggested that many would be inadequately prepared to handle as few as 50 casualties from a biological attack.18 A comprehensive assessment is needed of California hospitals’ ability to respond to a WMD attack, including staff, bed, and key resource (e.g., respirator) availability; medical supplies available at the hospitals (e.g., antibiotics) and promptly from the pharmaceutical community; hospitals’ ability to decontaminate large numbers of people or hold them in quarantine; and the ability of emergency response crews to provide prompt medical care, especially to

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chemical exposure (e.g., to administer atropine as a counter to nerve agent exposure).

Of particular concern has been the development of antibiotic resistant biological agents in recent years. The Soviet Union sought to develop such antibiotic resistance in their biological weapons programs; this is one reason that current policy recommends the use of ciprofloxacin as opposed to penicillin in response to a biological agent attack. Antibiotic resistance has also developed naturally among a range of potential biological agents and other diseases, including anthrax and salmonella. This resistance is in part due to the use of antibiotics in livestock feed, making livestock particularly susceptible to antibiotic resistant strains of various diseases. The potential impact of an antibiotic resistant disease’s spread in California is a motivation for the state to continue its support of studies and policy changes in this realm, to include those related to the development of new antibiotics and the use of antibiotics in general (since their use contributes to antibiotic resistance).

In other than exceptional circumstances, local officials will rely on state resources for much in the way of agent identification, actions at contaminated sites, and decontamination. Currently California’s two certified National Guard Civil Support Teams (CSTs) are manned at their full strength of 22 individuals each. Teams and their equipment can be fully transported on one C5A or two C141 aircraft. One of the two teams is always on alert status and therefore able to respond to a crisis anywhere in the state within a matter of hours. Two caveats are worthy of note. First, 22 personnel are sufficient to complement other emergency services personnel and provide detection, monitoring, and additional capabilities that are otherwise unavailable. However, the limited number of team members (even if both teams were committed) means that their capability to conduct extended, continuous operations will be limited. Additionally, they would be


21 Ibid., 1740.

22 The Role of Veterinary Medicine in Bioterrorism.” Facsimile from Office of the Dean, University of California School of Veterinary Medicine, to Russell W. Glenn, received January 30, 2002.

23 That California is aware of antibiotic resistance issues and has begun to take appropriate steps was evident in discussions with Bennie Osburn. Bennie Osburn (Dean, U.C. Davis School of Veterinary Medicine). Telephone interviews by Russell W. Glenn, January 30, 2002, and February 2, 2002.
unable to handle a truly mass event with hundreds or thousands of casualties. This is especially true should simultaneous WMD events occur at dispersed locations. Second, air transport has proved problematic both during training and in response to real world requests for assistance. CSTs rely largely on the Air Guard for lift. The State of Washington CST was unable to fulfill a request from Arizona authorities to provide support during the 2001 World Series because of a lack of military air transportation. One of California’s crisis response teams eventually moved to Phoenix via ground transport in lieu of the unit from Washington. Such transportation issues remain unresolved.

Other California National Guard assets are on-hand to support a response in the case of an attack, but these too are limited. The California Army National Guard (CAARNG) decontamination capability is limited to a single company of part-time soldiers. Their response time for on-site arrival is estimated at 24–36 hours, a considerable period in a time of crisis. Barring expansion of this unit or bringing them to full-time status (akin to the CST), local or other state assets will have to act to contain contaminants and perform emergency decontamination when it is called for. Fire departments may possess equipment of benefit in this regard, but supplemental training in and equipping to prepare for decontamination and waste containment/disposal would be essential. It should be noted that CAARNG units have no stocks of operational chemical protective suits or filters for protective masks, nor do they have radiological protection gear. Such shortages are not limited to National Guard organizations. Even California’s more sophisticated organizations, such as major urban-area SWAT teams, lack what is needed to conduct rapid and accurate on-site detection and identification of threat agents and thereafter to conduct rescue actions while adequately protected.

An unwillingness on the part of private commercial organizations to report possible attacks could negatively affect the timeliness of event response. Companies may be inhibited by industry fears of negative publicity or law enforcement investigations that could threaten the continued viability of operations in either the short or long terms.

Initial efforts to determine the character of the WMD threat to California’s plant agriculture are under way. The number of crop types and notable efficiency of product transportation systems (products from farms anywhere in the country can be distributed throughout the Continental United States in less than a week) make rapid detection and control of an outbreak very difficult. The situation is further complicated by the quantities of plant products that flow into and through the state from international origins. State authorities understand that gauging the level of threat and developing appropriate responses are areas requiring further investigation.
Command, Control, and Communication

The 2001 anthrax episodes in Florida, Virginia, the District of Columbia, and New York reflect that improper management of terrorist event-related public information is a potential source of confusion and embarrassment. The ubiquitous nature of media coverage makes vetting of releases extremely difficult. Nevertheless, public welfare is better served by educated and validated announcements than inadequately substantiated independent releases. Preparation of standard media packages for different kinds of WMD effects should be done at the state level and coordinated with local, state, and national authorities.

There is currently no state program to fund education for the improvement of California’s WMD readiness. Were such a program adopted, it should include designation of the authority to define training standards, dictate participation in readiness exercises, and coordinate necessary interactions between local, state, and extra-state agencies in conjunction with training and preparatory exercises. Current guidelines regarding the management of agencies during state emergencies are generally appropriate to WMD attack events. However, relationships inherent in these guidelines are in many cases untested and therefore require effectiveness validation.

California needs to have the capability to collect, analyze, and coordinate intelligence and warning activities before an event, respond during an event, and recover and compile lessons after an attack. For example, there should be a mechanism in place to rapidly discern whether available evidence supports a conclusion that an attack has taken place. With such a capability, authorities can speed dissemination of reactive guidance and oversee subsequent actions while not wasting resources on hoaxes. The beginnings of such desirable capabilities already exist in isolated instances, primarily in the form of the several Terrorism Early Warning Groups throughout the state, but they are thus far reliant on voluntary cooperation rather than dictated and practiced procedures.

Summary

The foregoing preparedness enhancements can be thought of in the context of four general functional requirements (CATS):

- Coordinate and cooperate with other agencies during planning, intelligence collection, operational execution, and in disseminating information, intelligence, and lessons learned.
- Advise and educate the public.
- Train emergency response, medical, and other appropriate personnel.
- Supply the equipment, materials, inoculations, and other logistical support crucial to preparation, reaction, and recovery. Support of research (supply of funds) for all areas of concern is critical to
ensure the development and maintenance of California’s preparedness for WMD attack, especially given constant evolution of the threats.

Together these four functions will help California officials to both preclude and react to a WMD attack. Training and education, and the requisite exercises that will evolve as products of both, will themselves bring about better threat understanding and recognition of vulnerabilities or potential targets previously given little if any consideration. These might include small communities (with public service agencies less robustly manned than larger urban areas because of budgetary and personnel constraints) that include veterinary schools, commercial enterprises, or support for recreational vehicle users that make them targets for extremist animal rights or environmental groups. Well-designed exercises will also aid in the identification of second- and higher-order effects of attacks (those akin to the smallpox scare that arose subsequent to the 2001 anthrax attacks, for example) and thereby allow public servants to identify requirements before terrorist events occur. Invulnerability to WMD attacks is not achievable within the construct of the nation’s and California’s concepts of freedom and government. Improving the probability of preliminary discovery, early detection, and appropriate response, however, is a legitimate and viable goal.

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Section 5
Access and Control of Dangerous Biological Materials in California

John Parachini

The threat of an individual or a terrorist group acquiring deadly biological materials from a lab in California and using it to terrorize and kill indiscriminately is a low probability. However, the probability is not zero. Furthermore, the tremendous media attention and governmental mismanagement of the response to and investigation of the anthrax attacks in 2001 may have drawn undesirable attention to comparatively open civilian facilities that handle these materials. Already, many cases of biocrimality, where an individual or individuals use biological materials to kill others, result from materials obtained from hospital or laboratory sources. Thus, there will likely be an increase in the probability that individuals or terrorists will seek biological materials from hospital and laboratory sources for weapons purposes in the future. The stakes are potentially high for California, a state that is home to numerous industries and universities with access to these biomaterials.

As the anthrax exposures in Florida, New York, and Washington, DC, underscored, state and local authorities are the first responders in the evolving crisis stemming from a clandestine biological terrorist attack. Federal government mistakes in the initial phases of the anthrax attacks in Florida and Washington, DC, created considerable problems that local officials needed to contend with long after the federal officials turned their attention to other parts of the problem. When federal authorities become involved in the consequence management of biological terrorist incidents, local and state authorities remain a significant, if not the primary, authority citizens looked to for guidance and reassurance. The challenge for state and local authorities is to make sure they are not totally dependent on federal authorities for guidance and assistance and that state and local capabilities can effectively complement and augment the efforts of federal authorities.

One of the many lessons learned from these incidents is that state and local authorities can improve their effectiveness by having a more comprehensive view of the deadly materials located in their jurisdictions. State and local authorities need to have a much more detailed understanding of the potential weapons materials in their jurisdictions.

Knowing the potentially dangerous materials located in a jurisdiction is a critical component for a comprehensive bioterrorism threat assessment. Part of the challenge of preempting attacks before they occur, or mitigating the consequences if terrorists do strike, is to understand the range of weapons materials available to terrorists. While terrorists have employed disease and poison on comparatively few occasions, trends in the 1990s involving mass and indiscriminate casualties and greater attention to unconventional weapons make it critical for state and local authorities to know what materials are located in their jurisdictions and who has access to them.

The inability of federal authorities to define the potential sources of the anthrax material used in the fall 2001 attacks highlights the challenge of addressing this part of the terrorism challenge. On November 12, 2001, the Senate Judiciary subcommittee on Technology, Terrorism and Government Information convened a hearing entitled "Germs, Toxins and Terror: The New Threat to America," chaired by Senator Dianne Feinstein, which explored the issue of the location of deadly biological materials and who might have access to them. Senator Feinstein questioned witnesses from the FBI about the number of laboratories and laboratory personnel that have access to deadly biological agents referred to by the Centers for Disease Control and Prevention (CDC) as "select agents." The FBI indicated that it did not know how many facilities handle select agents, nor did it know how many people have access to such agents at the facilities that possess them.

This section summarizes the current and proposed regulations covering dangerous biological materials, presents findings on the locations and personnel in the state who handle select agents, and recommends some activities state

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2For a list of witness statements see http://judiciary.senate.gov/hr110601st.htm, accessed February 26, 2002.


legislative officials might undertake to increase the state’s ability to prevent and respond to a biological terrorist attack.

Federal Regulations Controlling Select Biological Agents

In 1996, the U.S. Congress passed The Antiterrorism and Effective Death Penalty Act of 1996, which requires the Secretary of the Department of Health and Human Services (DHHS) to regulate the transfer of select agents.\(^5\) Congress crafted this piece of legislation in part because of an incident where a former member of a number of right-wing groups fraudulently ordered a culture of plague (\textit{yersina pestis}) via letter on homemade stationery for purposes still unknown.\(^6\) The Antiterrorism and Effective Death Penalty Act of 1996 designates the Secretary of DHHS or an entity he or she designates as the implementing agent of the act.

The federal government, with the CDC component of DHHS as its agent, is charged with the responsibility of overseeing all aspects of the safe use and transfer of deadly biological agents. The CDC may share information with state and local law enforcement authorities if they request it. Otherwise, information the CDC receives on the location of agents or their transfer is not provided to state and local law enforcement or health authorities. According to the CDC External Affairs Program of the Office of Health and Safety, CDC officials have provided information to state law enforcement officials regarding select agents.\(^7\)

During the period of comment on the regulations implementing the Antiterrorism and Effective Death Penalty Act, some commentators suggested requiring laboratories to file parallel documents with state authorities or for the CDC to routinely inform state authorities. Following the Notice of Proposed Rulemaking, the final regulations state that the “Secretary may provide the forms to state law enforcement authorities under appropriate circumstances.” The CDC determined that it would “not provide state health departments with the transfer forms on a routine basis,” nor would parties transferring a select agent need to “provide a copy of the form to state health departments.”


\(^7\)Interview with CDC official, January 18, 2002.
Current legislative amendments pending before Congress require all facilities that possess select agents to register with the CDC. While establishing a national database on the possession of select materials is a valuable first step, verification will be an important part of ensuring the integrity of this process. Adequate inspection resources will be needed to ensure compliance.

A list of the select agents is provided in Appendix A to Part 72 of the law. On the list are approximately 40 different microorganisms (viruses, bacteria, fungi, and rickettsiae) and toxins. The law provides the means to periodically review this list to add new agents and remove existing agents that over time may prove not to pose a high danger to public health. A laboratory using any of these agents or seeking to acquire any of these agents must be registered with the CDC and notify the CDC when it transfers these agents.

**Exempt Laboratories**

At the November 2001 Senate Judiciary Subcommittee on Technology, Terrorism and Government Information hearing, chair Senator Feinstein questioned witnesses about a category of laboratory that is exempt from the requirements regarding deadly biological materials. The rule “specifically exempts clinical laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA) (42 USC 263a) that utilize select agents for diagnostic, reference, verification, or proficiency testing purposes.” Laboratories that handle human clinical samples are included in this category. These laboratories are the most prevalent and are exempt from the registration and reporting requirements as long as they transfer the samples to appropriate diagnostic facilities within 36 hours.

Several of the legislative amendments currently before the U.S. Congress are designed to eliminate the CLIA exemption. The concern is that a select agent contained in a clinical sample could be diverted for terrorist purposes.

Natural disease outbreaks involving select agents occur periodically in California. For example, anthrax was recently detected in cattle in Santa Clara

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County. Personnel who examined the diseased animals and personnel who examined the clinical samples were all placed on antibiotics. While all accounts suggest that local and state authorities handled this outbreak and the custody of the clinical samples with appropriate care, it is possible to imagine someone exploiting this natural outbreak. The first major biological terrorist incident in the United States entailed the pernicious use of a clinical sample. The agent used in the 1984 intentionally caused outbreak of salmonella in The Dalles, Oregon, came from a sample ordered for calibrating instruments in a privately run clinical laboratory.11

**Gaps in the System**

One gap of unknown proportions concerns all the select agents acquired prior to 1997. New rules put in place after passage of the Antiterrorism and Effective Death Penalty Act of 1996 governed any shipments of select agents, but did not require disclosure of existing agents. Hence, as noted above, facilities and researchers working with select agents prior to 1997 did not need to declare their possession of select agents. The CDC could discover who possessed such agents only if they transfer them to other facilities.

Another potential imperfection in the existing federal regulations pertains to facility inspection. The CDC is required to inspect a facility slated to obtain a select agent within three years of the facility registering that it plans to receive select agents. But the inspection is not required to occur before the facility acquires the agent. Therefore, a facility can register with the CDC without being inspected prior to receipt of select agent material. At the time of the Notice of Proposed Rulemaking, the CDC estimated that approximately 1,000 facilities would file registration papers, implying that 1,000 inspections would need to be conducted. When asked about the number of registration inspections and the number of inspectors available to undertake these inspections, a CDC official indicated that she thought the original estimates were high; however, she would not reveal how

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many inspections were conducted, the number of inspectors available to conduct them or the amount of money the CDC budgeted for such inspections.\textsuperscript{12}

In the current investigation of the anthrax letters mailed in 2001, the CDC has discovered that it was not aware of some federal facilities that had possession of anthrax. The CIA, which was not on the CDC’s list of facilities possessing anthrax, recently revealed that it possesses Ames-strain anthrax spores.\textsuperscript{13} CIA possession may have eluded CDC notice because it acquired the material prior to 1997. Alternatively, for security reasons, the CIA may not have informed the CDC that it possessed anthrax for the purpose of highly classified defense research. Only within the last few years has the number of CDC officials with security clearances been increased to cover positions in a variety of offices relevant to the prevention of biological terrorism.

**Locations of Select Biological Agents in California**

After the 2001 discovery of an anthrax exposure in Florida, Governor Gray Davis issued Executive Order D-47-01, which calls upon the State Strategic Committee on Terrorism to set up a series of subcommittees including one entitled “Protection of the Public Health.”\textsuperscript{14} The subcommittee—chaired by Dr. Diana Bonta, director of the California Department of Health Services, and Dr. Michael Drake, vice president of Health Affairs, University of California—submitted a confidential report to the governor on October 25, 2001. The Executive Order also called upon Dallas Jones, director of the governor’s Office of Emergency Services and chair of the State Strategic Committee on Terrorism, to report the committee’s initial recommendations by October 30, 2001. Among the topics Governor Davis requested the committee to examine were the “facilities and systems for manufacturing, processing, transporting, disposing of and storing potential dangerous substances.”\textsuperscript{15} Legislative officials should examine this report as a first step in assessing the threat of biological materials located in the state.

Federal, state, and university officials were all very guarded when discussing the issues of facilities and personnel that handled select agents in California. Without a doubt, part of this reluctance stems from heightened security

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\textsuperscript{12}Interview with CDC official, January 18, 2002.


\textsuperscript{14}Governor of the State of California, Executive Department, Executive Order D-47-01, October 10, 2001.

\textsuperscript{15}Ibid.
since the fall 2001 anthrax incidents. However, federal and state officials interviewed agreed that it is not possible at this time to come up with a comprehensive and complete accounting of the laboratories and personnel in California that handle select agents.

Several explanations account for this lack of a complete and comprehensive view. First, prior to 1997, facilities were not required to notify the CDC of their possession or transfer of dangerous biological materials, described in the federal regulations as “select agents.” After implementation of the 1997 regulations, facilities needed to notify the CDC only when they transferred agents. It is possible that there are a number of facilities and researchers who have agents from before the law went into effect. Second, the diversity of laboratories makes it very difficult to get a single comprehensive assessment of those that are in the state.

Additionally, the State of California is home to a variety of federal, state, county, and university health and research facilities. There are also commercial and veterinary laboratories. Any of these different types of laboratories may from time to time work with select agents. Different regulatory bodies supervise these different types of laboratories. Similarly, among those involved in each of these different types of facilities, no single individual or association has a complete and comprehensive view.

Public Health Laboratories

The overwhelming majority of the laboratories in the State of California do not handle select agents. However, state authorities interviewed do not know the precise number of facilities or personnel who have access to these agents. In the state, there are over 4,000 laboratories capable of moderate- to high-complexity testing.\textsuperscript{16} Approximately 1,900 of these laboratories are licensed in some fashion. There are approximately 650 hospital laboratories and another 600 large laboratories. One state health official indicated to me that there are 47 public health laboratories in the state.\textsuperscript{17} Another state health official indicated to me that there are only five biological safety level-2 (BSL-2) facilities and two BSL-3 facilities in California.\textsuperscript{18} Select agents are known to be handled safely in BSL-3 or BSL-4 facilities.

\textsuperscript{16} Interview with official from the California Department of Health Service, Division of Laboratory Services, December 5, 2001.

\textsuperscript{17} Interview with California Department of Health Services official, January 17, 2001.

\textsuperscript{18} Interview with California Department of Health Services official, December 5, 2001.
University, National, and Veterinary Laboratories

The University of California operates three national laboratories, two of which are in the state; five teaching hospitals; and a number of other relevant laboratories on its current nine and soon to be ten campuses. A university research official whom I interviewed thought that each one of these locations could have at least one facility that handled select agents. After September 11, the university’s inspector general prepared a report on the security at university facilities. This report has not been made public.

California is home to a number of other private universities—such as Stanford University, the University of Southern California, and the California Institute of Technology—with advanced laboratory facilities. Laboratories and hospitals at these private universities undoubtedly also host facilities and personnel that handle select agents.

Educational authorities always underscore the quality of their security programs, while at the same time guarding against additional regulation of laboratory facilities. In fact, universities have led the fight against additional regulation of such facilities and personnel. In addition, seeking to minimize regulatory burden and protect as much research freedom as possible, university research leaders have actively contributed to the regulatory process. For example, Michael V. Drake, MD, the vice president for Health Affairs of the University of California, testified before the U.S. Senate Judiciary Subcommittee on Technology, Terrorism, and Government Information, Hearing on Germs and Toxins as Domestic Terrorist Threats on November 6, 2001; conspicuous by its absence was any mention of facilities handling select agents at university facilities. Universities generally do not perceive themselves as sources for weapons materials. This is a benign view of a potential danger, given the inadequate security precautions at certain facilities.

The California Animal Health & Food Safety Laboratory System is administered by the School of Veterinary Medicine, University of California, Davis. Laboratories are located in Davis, Fresno, San Bernardino, Tulare, and Turlock. San Diego County is the one county that still maintains its own veterinary laboratory, while the other counties plug into a statewide system administered from the U.C. Davis School of Veterinary Medicine. Based on an interview with a senior official in the California Animal Health & Food Safety Laboratory System, the U.C. Davis School of Veterinary Medicine maintains a robust security system.

19 Interview with University of California research lab official, January 17, 2001.
for select agents in its possession. The official was the only person interviewed throughout the state who, without in any way compromising security, provided a transparent and convincing description of safety and control measures covering select agents.

The Biotechnology Industry

The State of California hosts a large and diverse biotechnology industry. The companies that manufacture vaccines are the private companies that are most likely to work with select agents, but even these companies generally conduct research with attenuated strains or surrogate agents. Furthermore, according to one state health official, biotechnology companies probably do not work with virulent agents because the liability of such work would cause them to need to spend a considerable amount on insurance coverage. Thus, while it is possible to imagine that some companies may take great risks, the available alternatives make such risks unnecessary in most cases.

If state or federal authorities sought to determine with precision the safety practices of the biotechnology sector’s handling of dangerous biological material, they would face a formidable task. According to a 1998 report on California’s biomedical research and development industry sponsored by the California Health Care Institute, there are over 210,000 biotechnology companies in the state. The task of assessing commercial access to select agents is formidable because of the number of small companies. In Northern California alone, more than 60 percent of the 500 bioscience companies employ fewer than 49 people.20

In addition, the Biotechnology Industry Organization surveyed its membership shortly after the September 2001 attacks. The survey, conducted with the condition that it remained confidential, covered a wide range of issues relevant to the industry’s work and countering terrorism. While most of the Biotechnology Industry Organization’s membership is in California, representatives of the organization did not know the number of commercial laboratories or personnel who handle select agents, nor did they know where to obtain this information.21

Recommendations for State Assembly Activities

While the federal government has primary responsibility for regulating dangerous biological agents, state and local authorities will likely be the first line


of response after a malicious use of such agents. State authorities should develop their own understanding of the facilities, personnel, and security procedures for handling select agents in the state. Recent developments in the ongoing anthrax investigation suggest that federal authorities are facing serious charges of poor security, inept investigation practices, and lack of knowledge about activities at federal facilities.\textsuperscript{22}

State legislative authorities should examine the confidential report of the State Strategic Committee on Terrorism’s Subcommittee on the Protection of the Public Health if they have not already done so. The Executive Order charged the subcommittee to consult with “representatives from the University of California, medical and health associations, public health organizations, law enforcement, and state agencies and departments,” as well as “leaders of private industry who have knowledge and experience in security practices.” Given the wide range of Californians involved in this process, it seem appropriate for state legislative authorities to also be informed of the results of this effort.

Oversight hearings in both public and executive session with federal officials and the appropriate state law enforcement and health authorities will help ensure that the protocols for information sharing are in place and that potential gaps in information are identified and closed. While much of the responsibility for oversight lies in federal hands, the state of California should also be involved in the process, providing federal authorities with as much assistance as possible.

It is noteworthy that my recent attempt to reach the CDC office charged to handle irregularities in the transfer of select agents revealed that the phone number on its web page directed callers to a security office that had no knowledge about select agents and suggested calling back the next day. When asked about this experience, a CDC official explained that if the caller had identified himself as a law enforcement official or explained that there was an emergency, the security office would have known what to do. The official suggested that the security office must have viewed the call as an information request.\textsuperscript{23} While the CDC official’s explanation may be correct, the security office’s apparent failure to understand the term “select agents” raises questions about the adequacy of standard operating procedures.

State legislators can also contribute to the integrity of the security of these select agents by making sure that state law enforcement and health authorities are


\textsuperscript{23}Interview with CDC official, January 18, 2002.
exercising the state’s right to information when appropriate. As many training exercises have revealed, law enforcement and health authorities often meet one another for the first time during a mock crisis. Oversight hearings will also force coordination in advance of a real crisis.

Finally, thus far, congressional action to bolster current law on the control of select agent material seems well intended and constructive. However, given California’s sizeable number of clinical and research laboratories, the state should make sure that proposed federal legislative action enhances security without unduly and unnecessarily burdening legitimate scientific and commercial work. State legislators can valuably serve the state’s interests by making sure that federal efforts strike the right balance. Regulations made in the midst of a crisis often overcompensate for the problem of the moment.
Section 6
Addressing the Psychological Effects of Terrorism: Testing and Improving California’s Capabilities

Jamison Jo Medby, Scott Gerwehr, and K. Jack Riley

On November 1, 2001, Governor Gray Davis made what many considered a controversial decision by publicly announcing that a “credible threat” of terrorism existed for California’s major bridges. The response of federal officials, state and local law enforcement representatives, and California residents to this warning was mixed; the director of Homeland Security, Tom Ridge, did not support it. President Bush stated, “I think any governor should be able to conduct their business the way they see fit.”\(^1\) The residents of California had diverse reactions. Many took a “better safe than sorry” approach, others accused the governor of “crying wolf,” still others seemed to wonder how to further increase an already heightened state of alertness. These reactions came at a time when, over 2,000 miles away, Mayor Rudolph Giuliani was receiving unprecedented praise and support for his handling of the terrorist attacks that struck New York City. He was frequently complimented on how he handled the press, and how “in-touch” he was with the sentiment of his city’s residents.

Does the public response to the terrorist and his message matter? Arguably, it does. Terrorism, and the threat of it, can have specific and immediate effects on consumer and business behavior. New York has already felt the effects of businesses relocating to other cities that are often cheaper and are considered safer. It has been noted that without Giuliani’s delicate handling of the situation, the flight might have been much worse. It can be argued that most of these economic effects are the direct result of the psychological impacts of terrorism.\(^2\) Many people, feeling frightened and insecure, change economic behavior and look for someone to clarify the uncertainty; a role that a public official is presumably supposed to fill.

While not an illustration of terrorism per se, the difference in outcomes between the 1992 Los Angeles riots and San Diego’s BIO 2001 (a biotech convention) highlights the critical importance of monitoring and managing the psychological state of groups and communities. In the former case, catastrophic consequences occurred at least in part because of a failure by municipal authorities

\(^1\)“Davis Defends Public Warning About California Bridges.” CNN.com.

and law enforcement to accurately predict and manage the attitudes and perceptions of the city population (or parts of it). The specific failures during the LA riots include the failure to develop proactive intelligence that identified social fault lines and potential lines of communication; a narrow focus on criminals (such as gang members) instead of more general preparation for wider social unrest; unclear rules of engagement that emboldened certain criminal elements; and mixed (and even contradictory) voices from civic authorities.3

In the more recent San Diego case, the intentions of Black Bloc members (to shut down the conference and discredit authorities) were completely thwarted at least in part by a carefully crafted and executed effort to model and influence public opinion citywide. San Diego law enforcement used what Zimbardo & Leippe (1991) call persuasion and mass-media settings—aimed at groups and not individuals—for weeks before the conference, delivering a message effectively marginalizing the Black Bloc and immunizing the San Diego public from adversary persuasion. The Black Bloc were portrayed as outside agitators whose goal was widespread disruption and havoc. Law enforcement invoked proven principles for social influence from social psychology: ingroup/outgroup dynamics (Allport, 1954; Hamilton, 1981; Judd & Park, 1988).4 San Diego law enforcement repeatedly transmitted the message that all San Diegos were united (the ingroup) in their effort to resist the Black Bloc invaders (the outgroup); this significantly lessened the local support the Black Bloc received and allowed for even draconian law enforcement tactics to be accepted by locals. In essence, San Diego authorities effectively countered Black Bloc psychology with their own psychological strategy.

The cases listed above raise several questions regarding what type of terrorist threat information should be shared with the public, when it should be shared, and how this information should be communicated. Suggesting specific strategies for appropriately addressing all of these issues requires extensive research and is beyond the scope of this section. What this work will attempt to do, instead, is identify the relevant resources California officials have at their disposal to begin addressing these issues. We then postulate where some of the gaps are between resources and practice. All of this is in an effort to highlight where state officials might want to focus their limited resources in order to effectively communicate terrorism preparedness and response with the people of California.

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California’s Resources and Capabilities

California has an enormous pool of local, state, and federal agencies from which to pull in case of disasters or emergencies. The state is also well practiced in the art of integrating these agencies effectively when disaster strikes. In fact, the state’s history of natural disasters has created such a robust and tested emergency infrastructure and response capability that it led the California Office of Emergency Services (OES) to boast that “because of our experience with a broad spectrum of emergencies and disasters, California is actually the ‘Emergency-Ready State.’ Practice does make perfect [emphasis in original].”

There seems to be no doubt that the state’s emergency response infrastructure will perform well in any type of emergency, including one caused by an act of terror. Does this response include a polished approach to handling the information requirements of a disaster? Can the communication mechanisms currently in place mitigate the message of a terrorist act and suppress its negative psychological consequences? A review of the incidents mentioned at the beginning of this section suggests that the answer to these questions is mixed: The state likely has the resources and the capabilities at hand to effectively quell negative public responses, but it might lack the know-how to effectively use these resources. Provided below is a preliminary listing of the current communications resources available to the state. The subsequent subsection will address some of the issues associated with successful use of these resources.

Procedures and Information for Emergency Responders and Public Officials

The California Office of Emergency Services coordinates the availability of disaster and emergency services and assets through SEMS (Standardized Emergency Management System). SEMS is a communication network designed to ensure that all participating emergency services can respond to any disaster in a coordinated manner. It helps to avoid duplication of effort and also serves as a way to monitor the use of assets and personnel for each type of disaster in each part of the state. The up-to-the-minute coordination of information also allows those responsible for disaster response to focus on the task at hand. Although this system is intended exclusively for responding to the immediate physical needs caused by a disaster, this network can be used by public officials responsible for communicating disaster-related information to the public.


California Office of Emergency Services, California Terrorism Readiness, www.oes.ca.gov/oeshomep.nsf/10884826d3b7edaa882565f0005adc7f/e30e8028495f17a388256adf0058217c?opendocument.
In addition to SEMS, the OES has developed written procedures for coordinating response, including: (1) *Unified Command and SEMS: A Guide for State & Local Government*, (2) *Emergency Planning Guidance for Local Government*, and (3) specifically to address acts of terrorism, *Local Planning Guidance on Terrorism Response (LPGTR)*. Each of these publications outlines response plans for emergencies, including who should respond and how response should be integrated. The focus of each of these publications is communication among responding groups; no mention is made of how to make any of the information related to the event available to the public, or how to coordinate a unified message regarding the handling and effects of the emergency.

The California OES also has a report that addresses the need for specific responses for at-risk populations. *Meeting the Needs of Vulnerable People in Times of Disaster: A Guide for Emergency Managers* articulates how and why emergency response organizations can partner with community-based organizations to help mitigate the risk to vulnerable groups and effectively respond to their special needs. As with the reports previously mentioned, this publication focuses on communication among public service organizations. Little attention is given to articulating a message to the at-risk group.

Significantly, the OES has a publication devoted to risk communication. The *Risk Communication Guide for State and Local Agencies* includes discussions of risk perception among population groups, the need for credibility and trust when delivering a message, effective vehicles for risk communication, available resources for communicating risk, and methods of explaining risk. The publication is ideally suited for constructing and managing the public message in response to a disaster or an act of terror. It discusses the idea that understanding the audience is imperative to successfully communicating the desired message.

Created in November 2001, the California Anti-terrorism Information Center (CAIC) was established as an information-sharing resource to ensure that all terrorism-related information is shared among all levels of law enforcement and government. It houses a database of critical terrorism and crime-related information to help all agencies involved in counterterrorism and terrorist response predict, analyze, and coordinate crime and terrorism prediction and response. In this regard, the CAIC provides a hub for all terrorism communication throughout the state that can be used by public officials to help deliver credible information to the public.

The state also has one of the most advanced networks of law enforcement agencies devoted to terrorism in the country. Cited as a model in the second Gilmore Commission report, the Los Angeles County Terrorism Early Warning group and its statewide corollary, the Terrorism Early Warning Network, actively
and routinely investigate terrorist organizations and incidents. The Los Angeles group also plans for responding to local terrorist attacks. The most salient feature of this group is its composition, which includes representatives from all of the law enforcement and emergency response groups in the area, as well as representatives from private industry and academia. The group’s diversity allows it to approach the topic of terrorism from a broad base of resources. This organization also ensures that in the event of a terrorist incident, there is a built-in communication network of trusted participants.

Information for the Public

The California OES has several brochures and web pages providing information regarding how to prepare for and respond to acts of terrorism. Part of this literature includes a web page called California Terrorism Readiness that includes information regarding antiterrorism planning, how the state is prepared for terrorism-related emergencies, bioterrorism questions and answers, and hotlinks to other sources of information. Numerous brochures are also available from the OES, CAIC, and the various emergency responders themselves.

With all of these aforementioned resources, it would appear that California officials have the capabilities and assets to appropriately articulate a coherent and credible message of preparedness and security to the residents of the state. Yet, as is apparent in the mixed response to the governor’s November warning, even the most well-intentioned public statement can miss its intended mark. What are some of the probable causes of the gap between resources and their intended effects? In the next two subsections we review both some of the potential stumbling blocks and some building blocks to communicating effectively with Californians about terrorism. Future research in this area is needed to help discern the real dilemmas.

California’s Unique Challenges

The size and diversity of California’s physical, cultural, and economic landscapes create unique challenges for communicating risk. Some of these challenges are the following:

- **Language differences**—the number of different languages spoken in California requires a multilingual response to any emergency or act of terror.

- **Cultural differences**—the state’s size and heterogeneity might diffuse the psychological reaction in the state. For instance, if one segment of the population was targeted by an attack, the state’s heterogeneity might prevent a sense of collective victimization from developing. Alternatively, the cleavages that exist between cultures might be widened and aggravated if an act of terror has a psychological component that promotes a wave of cultural division. September 11, for example, has prompted numerous attacks on
mosques and other Islamic icons. Cultural diversity might create the need for a variety of different, well-targeted responses.

- **Economic differences**—the state’s economic diversity makes it resilient to many threats. Nevertheless, the industries that serve to define California—trade, tourism, entertainment, agriculture, and technology—also serve as potential targets for terrorists. In the event of a terrorist attack, the appropriate communication strategy will vary, depending on the industry segment that is attacked and perhaps on the method of attack.

- **Education and level of interest differences**—only a limited number of Californians rely on printed sources for terrorism or disaster-related information. Many probably rely on television for news. Public officials need to understand the preferences of different constituencies to ensure that a consistent message is passed along to all levels of interest and education.

**California’s Unique Strengths**

While there are factors that complicate the task of crisis communication in California, the state also has important untapped strengths. Two of the more significant are:

- The ability to utilize the entertainment industry to help spread messages and inoculate the public against the negative psychological impacts of terror. The computer industry might be similarly positioned to exert positive influence during a crisis.

- The fact that California is experienced in all types of natural disasters makes it uniquely prepared to respond and plan for terrorism. Law enforcement agencies across the state are familiar with how to respond to disasters and have established useful networks for sharing information. This type of professionalism might promote a sense of confidence in the population that is missing from other, less experienced state and local governments.

**Conclusions and Recommendations**

It seems clear that there are areas in which the state’s current capabilities might be enhanced to ensure that the psychological and sociological dimensions of terrorism are managed effectively. Historical precedent (in America and elsewhere) suggests that mismanagement of these issues can have dire consequences.

The authors recommend that in much the same way that agencies test their capabilities to physically respond to crisis incidents (e.g., in the speedy delivery of medical care), state authorities should review and systematically exercise the capacity to respond to the psychological/sociological dimension of a terrorist attack. We found numerous examples of state exercises that tested the ability to move relief supplies or communicate between agencies during a simulated crisis. However, we found no evidence that state agencies simulate the need to communicate with the public during crisis conditions despite the explicit recognition that it is necessary (California OFS, *Risk Communication Guide*, 2001).
Moreover, because such exercises do not occur with any regularity, the knowledge needed to craft and deliver effective responses is either not possessed or not readily available. By regularly testing, evaluating, and modifying communication response capabilities, state authorities can more effectively manage public perceptions during crises (e.g., perceptions of risk and confidence in authorities), and develop appropriate programs (and operational budgets). Among the questions to be asked in such testing are the following, all of which are critical to effective risk communication in the event of a terrorist attack:

- What are the demographic segments whose perceptions are critical to the large-scale psychological outcomes of a terrorist attack?
- Who are the most credible local/state officials in the eyes of those key demographic segments of California’s population?
- What makes credibility wax or wane in the eyes of those demographic segments? What does this prescribe as a means of building credibility before a crisis looms?
- What are the most credible media outlets or vehicles for communicating with key demographic segments? What is the current strategy for gathering the most reliable and authoritative media personnel and providing them with an accurate and persuasive message to broadcast?
- What is the timetable for perception forming among the population segments? (This knowledge dictates who must be addressed first and for how long).
- What should be done to reduce sensationalism and inaccuracy in reporting? What should be done to counter perpetrators (e.g., terrorists) who are attempting to exploit media reporting with the intention of managing public perceptions to their own ends?
- How does information pass through and between demographic segments? How do competing stories or contradictory indicators play out?

Clearly, this list merely scratches the surface of what needs to be investigated by experiment and analysis. We cannot answer these questions, but our recommendation is that they must be asked, and the answers given to every operational agency throughout the state. Much of what is required is cultural and psychological intelligence, which is to say up-to-date, nuanced profiles of individuals, groups, and populations in California whose perceptions may be targeted by terrorists and/or whose perceptions may play a vital role in the effort by authorities in mitigating the effects of terrorism. Cultural/psychological intelligence must be gathered and analyzed; each operational agency should have access to a storehouse of relevant cultural/psychological intelligence for the audiences they serve. Lacking such knowledge could be disastrous: For example, a terrorist group may intentionally frame migrant workers as being responsible for some heinous act as a means of stirring up anti-immigrant fear and draconian state responses. This may have the effect of setting Hispanics against Caucasians throughout the state, may discredit the authorities’ border control policies, etc.
Local and state officials should know well in advance whom to set out front, where and when they should speak, whom they should speak to, and what message they should bear—all to prevent or ameliorate the negative effects intended by the adversary. Improvisation and speaking with many different voices is a sure way to mismanage the outcome; moreover, intuition ("I know these people") is a hit-or-miss proposition at best.

Much of the intended effect of terrorism is psychological. Other fields with similar needs to manage the perceptions (and thus actions) of target audiences echo this exhortation: Accurate intelligence products and regular capability testing are critical in advertising campaigns [part of "situational analysis" (see Russell & Lane, 2002)] and military psychological operations campaigns [part of intelligence preparation of the battlefield (see Goldstein, 1996)] alike. It follows that authorities need to carefully consider investment in collection and analysis of cultural/psychological intelligence and in designing and regularly testing effective risk communication strategies.

References


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