Center for
Health Statistics

June 2006

DATA
SUMMARY
No. DS06-06001

Deaths and hospitalizations associated with terrorism among Californians are examined in this report.

Highlights

- Between January 2001 and December 2003, a total of 73 terrorist-related incidents occurred in the United States, resulting in 2,990 fatalities and 2,386 injuries.[19]

- During this same time period, a total of 45 deaths and 8 injuries associated with acts of terrorism were reported on California death certificates and hospital discharge records.

- The classification system now in place to identify deaths and injuries from terrorism will allow better assessment of the public health impacts among Californians.

Terrorism-Related Morbidity and Mortality California, 2001-2003

By Jim Sutocky

Background

The terrorist-related events of September 11, 2001 (9/11), presented many unique challenges for public health and vital statistics. In particular, 9/11 and subsequent events highlighted an urgent need for a classification that could be used to characterize and statistically classify, report, and analyze injuries, sequelae of injuries, and deaths associated with terrorism. The United States (U.S.) Centers for Disease Control and Prevention (CDC) responded to these events and needs with a number of actions.[1]

Categories of codes specifically for terrorism were absent from the two major classification systems used for mortality and morbidity statistics in the U.S., respectively the World Health Organization's (WHO) *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (ICD-10) and the U.S. version of the *Clinical Modification of the ICD, Ninth Revision* (ICD-9-CM).[2-3] Without these additional codes, injuries and deaths associated with terrorism could not be separately identified and statistical assessment would be extremely difficult.

The National Center for Health Statistics (NCHS) recognized the public health importance of maintaining accurate statistical classification and presentation of data in light of the events of 9/11, and acknowledged the need to evaluate the adequacy of the statistical classifications in terms of its ability to characterize deaths and illnesses associated with acts of terrorism. Concurrently, NCHS had begun to receive requests from the affected states for a system for classifying injuries and deaths resulting from events on 9/11. States were contacting NCHS for guidance on how to code and classify deaths, and hospitals were contacting NCHS for direction on how to code and classify injuries. A study undertaken by the New York Health Information Management Association had identified no fewer than 15 different external cause of injury codes used by several New York City hospitals that treated victims of the World Trade Center disaster.[4]

In response to these needs, NCHS formed an Ad Hoc Workgroup on the Classification of Death and Injury Resulting from Terrorism.

The Workgroup developed a set of new codes within the framework of the ICD-10 and the ICD-9-CM that would allow the identification of deaths from terrorism reported on death certificates through the National Vital Statistics System as well as for injuries and illnesses from terrorism reported on medical records used for statistical or reimbursement purposes.[5-6]

To classify a death or an injury as terrorist-related, it is necessary for the incident to be designated as such by the Federal Government.[7] Neither a medical examiner nor a coroner who would be completing/certifying the death certificate, nor a nosologist coding the death certificate, nor the health information staff at a hospital who fill-out the medical records would be able to make the determination that an incident is an act of terrorism. Investigation and tracking of terrorism is in the domain of the U.S. Federal Bureau of Investigation (FBI), so the NCHS Ad Hoc Workgroup agreed to use its definition which states that the category includes:

"Injuries resulting from the unlawful use of force or violence against persons or property to intimidate or coerce a Government, the civilian population, or any segment thereof, in furtherance of political or social objectives."[8]

For mortality, the ICD-10 codes developed included *U01-*U02 for terrorism involving an assault (homicide) and *U03 for terrorism involving intentional self-harm (suicide).[9] The asterisk (*) preceding the four-digit code indicates that the code was introduced by the U.S. and is not officially part of the WHO's ICD-10 (Table 1). Codes from the "U" Chapter of ICD-10 were selected because this chapter was specifically reserved for "future additions and changes and for possible interim classifications to solve difficulties arising at the national and international levels between revisions."[6] For morbidity, the ICD-9-CM codes developed for terrorism included E979 (injuries associated with terrorism) and E999 (modified to include code E999.1 for late effect of injury due to terrorism).

Table 1. International Classification of Diseases (ICD) Codes for Mortality and Morbidity Associated with Terrorism

MORTALITY (ICD-10)		MORBIDITY (ICD-9-CM)	
Code	Description	Code	Description
*U01	Homicide associated with terrorism	E979	Injuries associated with terrorism
*U01.0	involving explosion of marine weapons	E979.0	involving explosion of marine weapons
*U01.1	involving destruction of aircraft	E979.1	involving destruction of aircraft
*U01.2	involving other explosions and fragments	E979.2	involving other explosions and fragments
*U01.3	involving fires, conflagration, and hot substances	E979.3	involving fires, conflagration, and hot substances
*U01.4	involving firearms	E979.4	involving firearms
*U01.5	involving nuclear weapons	E979.5	involving nuclear weapons
*U01.6	involving biological weapons	E979.6	involving biological weapons
*U01.7	involving chemical weapons	E979.7	involving chemical weapons
*U01.8	involving other specified means	E979.8	involving other means
*U01.9	involving unspecified means	E979.9	involving secondary effects
*U02	Sequelae of terrorism	E999	Late effects of injuries
		E999.1	due to terrorism
*U03	Suicide associated with terrorism		
*U03.0	involving explosions and fragments		
*U03.9	involving other and unspecified means		

SOURCES: International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (WHO, 1992);
International Classification of Diseases, Ninth Revision, Clinical Modification (PMIC, 2006);
National Center for Health Statistics, Classification of Death and Injury Resulting from Terrorism, available from http://www.cdc.gov/nchs/about/otheract/icd9/terrorism_code.htm

Methods

Data Sources

Numerator data used to examine terrorism-related mortality among Californians for this report were extracted from the Multiple Cause-of-Death (MCOD) files developed by the NCHS.[10] The underlying and contributing causes of death associated with terrorism reported in the MCOD files are based on the ICD-10 codes described in Table 1. The underlying cause of death represents the disease or condition that initiated the train of morbid events leading directly to death, and up to 20 contributing (or non-underlying) causes are listed in the record axis fields of the MCOD files. The latest MCOD file available at the time of this reporting was for 2003.

Numerator data used to examine terrorism-related morbidity were extracted from hospital discharge records developed by the California Office of Statewide Health Planning and Development (OSHPD).[11] The Patient Discharge Data (PDD) files contain a field for the principal diagnosis, defined as the condition established to be the chief cause of the admission of the patient, and a field for the principal E-code (external cause of injury code), as well as fields for up to 24 other diagnoses and four other E-codes used to describe conditions that coexist at the time of admission, develop subsequent to the hospital stay, affect treatment received, or affect the length of stay. The ICD-9-CM E-codes associated with terrorism are shown in Table 1. The latest PDD file available at the time of this reporting was for 2003.

Denominator data used in the calculation of population-based mortality and morbidity rates for this report were provided by the California Department of Finance's Demographic Research Unit.[12]

Statistical Methods

Mortality and morbidity rates based on small numbers of events create statistical problems concerning the accuracy and reliability of the rates, as well as confidentiality issues regarding individual privacy. Guidelines for addressing both confidentiality and statistical issues associated with small numbers are published elsewhere and are not examined in detail here.[13-15] In general, when the number of events is small and the probability of such an event is small, considerable caution must be observed in interpreting the data. Estimates of relative standard errors (RSE), 95 percent confidence intervals (95% C.I.), and tests of statistical significance are provided to assist in the interpretation of the data on terrorism-related deaths and injuries among Californians presented in this report.[16]

Results

Mortality

During the time period 2001-2003, a total of 45 deaths among California residents were attributed to terrorism-related events (Table 2). All of these deaths occurred in 2001, and the age-adjusted mortality rate was 0.13 per 100,000 population (95% C.I.=0.09-0.17, RSE=15.0).

A total of 29 terrorism-related deaths were among males, at a rate of 0.17 per 100,000 population (95% C.I.=0.11-0.23, RSE=18.6). A total of 16 terrorism-related deaths were reported for females, and a reliable mortality rate could not be calculated due to the small number of deaths (RSE > 23 percent).

Data by race and ethnicity show the only reliable rate was for Whites, who experienced a total of 37 terrorism-related deaths at a rate of 0.22 per 100,000 population (95% C.I. 0.15-0.29, RSE=16.6).

Morbidity

During the 2001-2003 time period examined, a total of eight hospital discharge records having one of the E-codes associated with injuries due to terrorism were found, four records for males and four for females (Table 3). One record was found in the 2002 OSHPD PDD file, and the remaining seven in the 2003 file. Ages of patients ranged from 15 years to 79 years. Tabulated by race/ethnicity, five records were for Whites, and one record each for Hispanic/Latino, Asian/Pacific Islander, and Other/Unknown.

Two records had a principal E-code of E999.1 for late effect of injury due to terrorism, three records were coded E979.7 for injuries due to terrorism involving chemical weapons, and three records were coded E979.8 for injuries due to terrorism involving other means such as drowning or submersion, lasers, and piercing or stabbing instruments.

Due to the small number of injury events and subsequent statistical unreliability (RSE of 23 percent or greater), population-based rates are not reported for terrorism-related morbidity among Californians.

Discussion

California has been fortunate to have experienced so few deaths and injuries resulting from acts of domestic or international terrorism. Of the 45 terrorism-related deaths reported among California residents, all occurred in 2001 as a result of the acts of international terrorism on 9/11 in New York, Pennsylvania, and Virginia. The CDC initially reported a total of 29 deaths among California residents from the attack on the World Trade Center in New York City on 9/11, compared with 1,762 deaths among New York residents and 674 among residents of New Jersey.[17] Other sources have reported various revised figures subsequent to the 2002 CDC report, including victim lists developed by CNN and terrorist incident reports developed by RAND and the Oklahoma City National Memorial Institute for the Prevention of Terrorism (MIPT).[18-19] The MIPT data indicate a total of 73 terrorist incidents occurring in the U.S. between January 2001 and December 2003, involving a total of 2,990 fatalities and 2,386 injuries. The FBI reported 14 terrorist incidents and two terrorist preventions in the U.S. and its territories during 2001, with 12 of the 14 incidents being carried out by domestic terrorists.[7]

A collection of issue papers on terrorism research published by RAND focuses on California, with the "lessons learned" drawn from experiences in various parts of the U.S. and other countries.[21] Three papers focus on the economy, including the effects of 9/11 on the travel and tourism industry in California and on the U.S. airline industry in relation to the California economy. Others address California's preparedness for terrorist attacks with weapons of mass destruction, access to and control of dangerous biological materials, and California's capabilities for coping with the psychological effects of terrorism.

The data presented in this *Data Summary* and in other published reports on terrorist incidents in the U.S. provide compelling illustrations that much work needs to be done to improve the collection and reporting of mortality and morbidity associated with terrorism that will enhance our understanding of terrorism's longer-term effects on California. Public health and vital statistics research will continue to play a leading role in shaping the development of appropriate emergency preparedness policy and response plans to protect and improve the health of all Californians.[21-22]

Table 2. Deaths and Mortality Rates Associated with Terrorism, California 2001-2003

	Deaths[1]	Rate[2]	95% C.I.	RSE
Total	45	0.13	0.09 - 0.17	15.0
Male	29	0.17	0.11 - 0.23	18.6
Female	16	DSU	---	---
White	37	0.22	0.15 - 0.29	16.6
Asian/PI	5	DSU	---	---
Hispanic	2	DSU	---	---
Black	1	DSU	---	---
AI/AN	0	0.0	---	---

SOURCES: California Department of Health Services, Multiple Cause-of-Death files; California Department of Finance, Demographic Research Unit, *Population projections by race/ethnicity for California and it's counties 2000-2050*, May 2004.

NOTES: DSU Data Statistically Unreliable, RSE greater than 23 percent.

[1] ICD-10 codes *U01-*U03

[2] Age-adjusted rate per 100,000 population

Table 3. Injuries and Morbidity Rates Associated with Terrorism, California 2001-2003

	Injuries[1]	Rate[2]	95% C.I.	RSE
Total	8	DSU	---	---
Male	4	DSU	---	---
Female	4	DSU	---	---
White	5	DSU	---	---
Asian/PI	1	DSU	---	---
Hispanic	1	DSU	---	---
Black	0	0.0	---	---
AI/AN	0	0.0	---	---
Other/Unk	1	DSU	---	---

SOURCES: California Office of Statewide Health Planning and Development, Patient Discharge Data files, 2001-2003; California Department of Finance, Demographic Research Unit, *Population projections by race/ethnicity for California and it's counties 2000-2050,* May 2004.

NOTES: DSU Data Statistically Unreliable, RSE greater than 23 percent.

[1] ICD-9-CM codes E979 and E999.1

[2] Age-adjusted rate per 100,000 population

References

1. Centers for Disease Control and Prevention. New York City Department of Health response to terrorist attack, September 11, 2001. *Morbidity and Mortality Weekly Report*. Vol. 50, No. 38., September 28, 2001, 821-822.

2. World Health Organization. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva: World Health Organization, 1992.

3. Practice Management Information Corporation. International Classification of Diseases, Ninth Revision, Clinical Modification, Sixth Edition. Los Angeles, CA: PMIC, 2006.

4. Micallef, P.P. Terrorist attacks and use of E-codes. *Perspectives*, NYHIMA's Bimonthly Newsletter. December 2001.

5. National Center for Health Statistics. Classification of death and injury resulting from terrorism. Available at: http://www.cdc.gov/nchs/about/otheract/icd9/terrorism_code.htm

6. Centers for Disease Control and Prevention. Notice to readers: New classification for deaths and injuries involving terrorism. *Morbidity and Mortality Weekly Report*. Vol. 51, No. 36(Special Issue), September 11, 2002, 18-19.

7. Federal Bureau of Investigation. Terrorism 2000/2001. FBI Publication #0308. Available at: http://www.fbi.gov/publications/terror/terror2000_2001.pdf

8. Federal Bureau of Investigation. Terrorism in the United States 1999, FBI Counterterrorism, Threat Assessment and Warning Unit, Counterterrorism Division. Available at http://www.fbi.gov/publications/terror/terror99.pdf

9. National Center for Health Statistics. Classification of death and injury resulting from terrorism, Appendix I. Available at: http://www.cdc.gov/nchs/about/otheract/icd9/appendix1.htm

10. National Center for Health Statistics. Mortality Data, Multiple Cause-of-Death Public-Use Data Files. Available at: http://www.cdc.gov/nchs/products/elec_prods/subject/mortmcd.htm

11. Office of Statewide Health Planning and Development. Patient Discharge Data File Documentation. Available at: http://www.oshpd.ca.gov/HQAD/PatientLevel/data/PDDPublic04doc.pdf

12. California Department of Finance. Population Projections by Race/Ethnicity, Gender and Age for California and Its Counties 2000-2050. Sacramento, CA, May 2004. Available at: http://www.dof.ca.gov/HTML/DEMOGRAP/DRU_Publications/Projections/P3/P3.htm

13. Klein, R.J., et al. Healthy People 2010 criteria for data suppression. Hyattsville, MD: National Center for Health Statistics, *Statistical Notes*, No. 24, July 2002. Available at: http://www.cdc.gov/nchs/data/statnt/statnt24.pdf

14. Washington State Department of Health. Guidelines for working with small numbers. Available at: http://www.doh.wa.gov/Data/Guidelines/SmallNumbers.htm

15. Buescher, P.A. Problems with rates based on small numbers. Raleigh, NC: State Center for Health Statistics, *Statistical Primer*, No. 12, April 1997. Available at: http://www.schs.state.nc.us/SCHS/pdf/primer12.pdf

16. Armitage, P. and Berry, G. Statistical Methods in Medical Research, Second Edition. Boston, MA: Blackwell Scientific Publications, 1990.

17. Centers for Disease Control and Prevention. Deaths in World Trade Center terrorist attacks --- New York City, 2001. *Morbidity and Mortality Weekly Report*. Vol. 51, Special Issue, September 11, 2002; 16-18.

18. Cable Network News. CNN.com In-Depth Special: War Against Terror. Available at: http://www.cnn.com/SPECIALS/2001/trade.center/victims/main.html

19. RAND and the National Memorial Institute for the Prevention of Terrorism. MIPT Terrorism Knowledge Base. Available at: http://www.tkb.org/Home.jsp

20. Riley, K.J., et al. The implications of the September 11 terrorist attacks for California: A collection of issue papers. Santa Monica, CA: RAND, 2002. Available at: http://www.rand.org/pubs/issue_papers/IP223/

21. California Department of Health Services. Leadership for a Healthy California: A Strategic Plan for the California Department of Health Services. Sacramento, CA: CDHS, March 2002. Available at: http://dhs.ca.gov/home/aboutcdhs/strategicplan.htm

22. California Department of Health Services. California Bioterrorism Surveillance and Epidemiologic Response Plan. Sacramento, CA: Bioterrorism Epidemiology Section, January 2002. Available at: http://www.dhs.ca.gov/ps/dcdc/bt/pdf/CA_BT_Surv_Epi_Plan-2002b.pdf