

METHODOLOGIC ISSUES

CDC's National Violent Death Reporting System: background and methodology

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Objectives: This paper describes a new surveillance system called the National Violent Death Reporting System (NVDRS), initiated by the United States Centers for Disease Control and Prevention. NVDRS's mission is the collection of detailed, timely information on all violent deaths.

Design: NVDRS is a population based, active surveillance system designed to obtain a complete census of all resident and occurrent violent deaths. Each state collects information on its own deaths from death certificates, medical examiner/coroner files, law enforcement records, and crime laboratories. Deaths occurring in the same incident are linked. Over 270 data elements can be collected on each incident.

Setting: The 13 state health departments of Alaska, Colorado, Georgia, Maryland, Massachusetts, New Jersey, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Virginia, and Wisconsin.

Subjects: Cases consist of violent deaths from suicide, homicide, undetermined intent, legal intervention, and unintentional firearm injury. Information is collected on suspects as well as victims.

Interventions: None.

Outcome measures: The quality of surveillance will be measured in terms of its acceptability, accuracy, sensitivity, timeliness, utility, and cost.

Results: The system has just been started. There are no results as yet.

Conclusions: NVDRS has achieved enough support to begin data collection efforts in selected states. This system will need to overcome the significant barriers to such a large data collection effort. Its success depends on the use of its data to inform and assess violence prevention efforts. If successful, it will open a new chapter in the use of empirical information to guide public policy around violence in the United States.

Violence is a major public health problem. The World Health Organization has estimated that 815 000 suicides and 520 000 homicides occurred in the year 2000 worldwide.¹ Violence against others or oneself is a major public health problem in the United States, taking 50 000 lives each year. It is a particular problem for the young: homicide and suicide were among the top three causes of death for Americans 15–34 years of age in 2000.²

Given the importance of the problem, it is noteworthy that no national surveillance system for violence exists in the United States. In contrast, the federal government has supported extensive data collection efforts for the past three decades to record information about other leading causes of death. For example, the National Highway Traffic Safety Administration has recorded the critical details of fatal motor vehicle crashes, which result in about 40 000 deaths among United States residents annually.² That system, called the Fatality Analysis Reporting System (FARS), has existed since 1975.³ The result of this investment has been a better understanding of the risk factors for motor vehicle deaths, information that has helped to target safety improvements that have led to a significant decline in motor vehicle fatalities since the 1970s. The federal government, through the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program, has also funded national surveillance for cancer. SEER has been operating since 1973 and has been a key component of national cancer control efforts.⁴

Aware of the longstanding gap in information about violence, public health leaders and others have been pressing the need for a national surveillance system for violent deaths since 1989.^{5–7} Local surveillance systems such as Cops and Docs in Atlanta⁸ and the Wisconsin Model Firearm Injury Reporting System⁹ suggested that such a system would be

feasible and useful. In 1999, the Institute of Medicine recommended that the Centers for Disease Control and Prevention (CDC) develop a fatal intentional injury surveillance system modeled after FARS.¹⁰ That same year, six private foundations pooled their funds to demonstrate that data collection about violent deaths was feasible and useful. They established the National Violent Injury Statistics System (NVISS).¹¹ NVISS has been administered by the Harvard Injury Control Research Center since 1999 and includes 12 participating universities, health departments, and medical centers. NVISS has developed many of the tools and methods necessary for multisource surveillance for violent deaths and demonstrated the benefits of the approach.¹²

In 2000, dozens of medical associations, suicide prevention groups, child protection advocates, and family violence prevention organizations joined a coalition whose purpose was to secure federal funding to extend NVISS-like surveillance nationwide. Congress approved \$1.5 million in funding to start the new system, called the National Violent Death Reporting System (NVDRS), in fiscal year 2002. The first awards were made to six state health departments in September 2002, based on the merits of their applications for funding. Funding for seven additional states was awarded in August 2003, with a goal of eventually funding all 50 states. The 13 states funded to date are Alaska, Colorado, Georgia, Maryland, Massachusetts, New Jersey, North

Abbreviations: CDC, Centers for Disease Control and Prevention; FARS, Fatality Analysis Reporting System; FBI, Federal Bureau of Investigation; NVDRS, National Violent Death Reporting System; NVISS, National Violent Injury Statistics System; SEER, Surveillance, Epidemiology, and End Results (program)

Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Virginia, and Wisconsin.

This paper provides details about the goals and methods of the NVDRS.

GOALS AND RATIONALE

The primary goal of NVDRS is to provide high quality data useful for prevention of all types of violence. The designers of NVDRS knew that the system needed to meet four design goals if it was to function effectively in the public health model. First, the system had to be more timely than existing data sources if it was to identify current risk factors and give useful feedback on the success or failure of new policies. Death certificates are typically available 20 months after the completion of a calendar year. Official publications of national violent death rates—for example, those in *Morbidity and Mortality Weekly Report*, as well as reports from the Federal Bureau of Investigation (FBI), rarely use data that are less than two years old. Public health interventions aimed at a moving target last seen two years ago may well miss the mark. NVDRS designers therefore sought an active system that would collect and publish key facts about violence before the release of official annual reports.

Second, the system had to be able to characterize the perpetrators, including their relationship to the victims. The FBI’s Supplementary Homicides Reports system collects only demographic information about perpetrators.¹³ It also collects information about their relationship to the victim, but the information is often incomplete and is difficult to use in multiperson incidents.¹⁴ The National Center for Health Statistics’ National Vital Statistics System does not collect any information about perpetrators or their relationships to victims.

Third, the system had to be able to characterize *incidents* of violence rather than only the victims of violence if it was to understand the roots of interpersonal violence. Therefore it had to be able to link violent deaths that had some connection, such as homicide-suicides, as well as collect information about perpetrators. This incident based approach is also a key feature of the FBI’s National Incident Based Reporting System.¹⁵ This system, however, to date covers less of the country than the Uniform Crime Reports system, includes only interpersonal violence, and collects only law enforcement information.

Fourth, the system had to flesh out the incidents, especially with respect to why they may have occurred. Death certificates briefly describe who, what, where, and when. Federal homicide statistics go further in that they also include some information about the context of the death—for example, its occurrence in the course of another crime. The lack of information about associated circumstances has made it difficult to identify causal factors, particularly with respect to self directed violence, such as recent life crises. NVDRS was therefore committed to collecting details about

violent incidents from multiple sources and moving our understanding beyond an appreciation of only the gross contours of the problem.

It was apparent early on that a system with these goals had to be limited to violent deaths rather than all violent outcomes. Even though violent deaths are only the “tip of the iceberg” of violence, there were several reasons why it made sense to track them as a way to address the problem. In contrast to non-fatal violent injuries, there is a well established system in place to identify and classify deaths. All fatalities are reported on a standardized death certificate developed by the National Center for Health Statistics, and administrative rules guide the coding of deaths and mandate timely completion of the certificates. Much more detail is collected about violent deaths because of their seriousness than about non-fatal injuries due to violence. The law in every state requires that medical examiners or coroners investigate such deaths. The manner and mechanism of death are much more likely to be established correctly with the added information from autopsy and other forensic tools. Law enforcement agencies conduct further investigation as required. Careful documentation of both medical and legal findings is the norm. The net result is that much more detail about violent deaths is collected in medical examiners or coroners and law enforcement records than is abstracted onto death certificates or FBI records. Finally, ascertainment of violent deaths is much more complete than that for non-fatal violent injuries, where the data systems are less well developed and underreporting is common. Therefore, ascertainment and reporting biases are less significant, and known violent deaths are representative of all violent deaths. Changes in rates over time are less likely to be confused with changes in the completeness of case ascertainment. For all these reasons, the tip of the iceberg that mortality represents can be seen more clearly than the larger part that is below water.

SCOPE AND DEFINITIONS

Once all 50 states are involved, NVDRS will provide a census of violent deaths that occur within the United States to both residents and non-residents. The system will define a death due to violence as one due to “the intentional use of physical force or power against oneself, another person, or against a group or community”,¹ which is similar to the World Health Organization definition of violence. In practice, cases will include suicides, homicides, deaths from legal intervention (a subtype of homicide), deaths from undetermined intent, and unintentional firearm fatalities. Deaths of undetermined intent are included because this category includes some deaths with some evidence of intent but not enough to definitively classify them as purposeful. Unintentional firearm injury deaths, otherwise known as *accidental*, are included to provide a complete count of all firearm injuries. Legal executions, which are considered part of

Table 1 Violent deaths among United States residents by manner of death, 2000

Manner of death	ICD-10* codes	No	%
Intentional self harm (suicide)	X60–84, Y87.0	29350	57.6
Assault (homicide)	X85–X99, Y00–Y09, Y87.1	16765	32.9
Event of undetermined intent	Y10–Y34, Y87.2, Y89.9	3819	7.5
Unintentional exposure to inanimate mechanical forces: firearms	W32–W34, Y86 determined to be due to firearms	776	1.5
Legal intervention excluding execution (Y35.5)	Y35.0–Y35.4, Y35.6–Y35.7, Y89.0	274	0.5
Total		50984	100.0

*International Classification of Diseases, 10th revision. Source: Minino et al.²

deaths from legal intervention, are excluded from NVDRS. Their characteristics are different enough from other homicides as to require a separate system to adequately describe them.

The NVDRS will collect information about deaths that meet this case definition according to the underlying manner of death coded on the death certificate. In other words, the operational definitions of suicide, homicide, legal intervention, undetermined intent, and unintentional firearm injury are those used by the nosologists who code death certificates. These are not the same as the definitions used by some medical examiners and coroners for all scenarios. For example, some medical examiners or coroners will call an unintentional shooting a homicide because they define homicide literally as "the killing of a man".^{16 17} Nosologists will code such deaths as unintentional. NVDRS will use the 10th revision of the *International Classification of Diseases* to code the cause of deaths. The relevant codes are shown in table 1 along with the number of deaths from each manner of death among United States residents in 2000. Special codes used for terrorism (*U01–*U03) will be included in NVDRS, but they were not employed for deaths in 2000. In general, NVDRS codes data elements according to the coding schemes in use by the data sources to make data collection easier.

SYSTEM DESIGN

The system will be coordinated and funded at the federal level but will depend on separate data collection efforts in each state managed by the state health departments. In accordance with the system's design principles, the data will be incident based rather than victim based. The record for an incident will include information about all the victims and suspects in each incident and their relationships.

To fully characterize the incidents, states will collect information about each incident from four primary data sources: death certificates, medical examiner/coroner records, law enforcement records, and crime laboratory records. Most states will find it easiest to begin data collection with death certificates because the state health department itself collects death certificates. Over 270 data elements will be collected on each incident from these four principal sources (table 2).

Over time, additional data sources that are particularly useful for specific kinds of death may be added to the system. In the first year of NVDRS, for example, some of the funded state health departments will be testing the availability and utility of data on deaths under age 18 from child fatality review teams, using a module specially designed to take advantage of the detailed information available from that source. Child fatality review teams examine the deaths of children using information from multiple sources in addition to the primary data sources used by NVDRS.

Data collection can be done either by abstraction from primary sources or by electronic transfer of data from the primary sources, whichever proves to be the more timely way to acquire the necessary detail. Data collection will be staged so that basic demographic information can be published early and more detailed information about potential causal factors can be published later. Death certificates will probably provide the earliest information, but this may not be the case in every state. It is hoped that death certificate information will be available to the health department and entered into the system within six months of death. Data from law enforcement, medical examiners, and coroners are expected to become available within 6–12 months for most cases and within 18 months for the remainder.

Data entry and transmission will initially be done using a distributed software system. Data will be collected at the state health department from the primary sources. After

personal identifiers are removed, data will be uploaded to the CDC via phone/data lines on a weekly basis.

DATA QUALITY

Data collection practices must be consistent across states and over time to produce valid interstate comparisons and time trends. Therefore, uniform protocols for defining different manners of death will be used. All recommended data elements and response options will be defined in a users' manual, and the CDC will organize an annual coding training for staff from funded states.

To reduce the need for recoding and attendant errors of interpretation, the database fields will mimic the variables and response options from source documents, where standardized source documents are available. For example, it will be possible to transfer data without modification from death certificates to NVDRS. Similarly, efforts are underway to match up NVDRS variables relevant to medical examiner/coroner records with developing data standards for these offices.

A full complement of data edits will operate at the point of data entry or importation. Data edits will include completeness and range edits and logic edits to detect inconsistencies between variables. Additional edits and duplication checks will be applied at the central information collection point. States will be notified immediately of errors and will be responsible for correcting them. States will be asked to have a second abstractor independently reabstract 10% of records. Program managers will be asked to review the results of such reliability checks to identify and correct problems associated with data items, incident scenarios, and abstractors.

Standardized quality measures will be calculated for each state and system-wide. They will include the percent of cases that have records available from each primary data source, the percent complete for individual variables, and measures of timeliness such as the median interval between the date of death and the date of case submission.

Data will be transmitted weekly to the CDC. Epidemiologists will review a sample of incidents routinely to identify systematic errors or inconsistencies in the data. The CDC and individual states will evaluate the national and state systems annually for sensitivity, accuracy, timeliness, acceptability, cost, and utility.

CONFIDENTIALITY PROTECTIONS

Data collected under the auspices of the NVDRS are part of public health practice rather than research. However, local law or practice may dictate that individual states obtain state Institutional Review Board approval. Local law or regulation may also prohibit the release of identifiers to federal agencies. Therefore, personal identifiers are not sent to the CDC. Data published by the CDC and by states will be aggregated so that individuals cannot be identified.

DISSEMINATION

NVDRS will put a strong emphasis on the timely collection and dissemination of surveillance results. State NVDRS offices will distribute state information to their local reporting sources and answer requests for state specific information. The CDC will actively disseminate NVDRS findings to national organizations representing the key reporting sources—for example, the National Association of Medical Examiners. States will disseminate information to their local sources such as medical examiners and coroners, law enforcement, and policy makers who need objective information to inform their decisions.

A great deal of information will be available in aggregate to the general public. An annual report will be published on the worldwide web and be available in hard copy. Plans

Table 2 List of variables included in NVDRS

Incident information	Firearm serial number	Bullet ricochet
Incident ID number	Firearm stolen	Gun defect or malfunction
Incident status	Relationship to gun owner	Fired while holstering/unholstering
Incident narrative	Gun stored locked; loaded	Dropped gun
Number of non-fatally shot persons in incident	Poison variables:	Fired while operating safety/lock
Number of persons, weapons	Type of poison	Gun mistaken for toy
Person information	Poison code	Other
Person type (victim or suspect)	Patient drug obtained for	Child fatality review (CFR) module
Name	Size of pill (mg)	Incident variables
Social security number	Number of pills (upper, lower bound)	Scene investigation by law enforcement; coroners/medical examiners
Age, date of birth	Estimated amount of liquid poison ingested (ml)	Witnesses to incident; child witnesses
Sex	Carbon monoxide source, if carbon monoxide	Victim variables
Race categories	Weapon-person table	CFR records available on victim
Ethnicity	(Identifies which weapon killed the victim and which suspect used the weapon)	Household information:
Residential address	Suicide circumstances	Type of residence
Person information (victim only)	Mental health variables:	New placement
Death certificate variables:	Current depressed mood	Adults in household (relationship to victim)
Birth place	Current mental health problem	Other children in household
Veteran status	Diagnoses	Intimate partner violence in household
Marital status	Treatment for mental illness (current, ever)	Substance abuse in household
Place of death	Alcohol problem, substance problem	Primary caregivers (information collected on up to two parents or caregivers):
Date of death	Disclosed intent	Victim or suspect in this incident
State of death	History of suicide attempts	Relationship to victim
Cause of death (text)	Precipitating circumstance:	Age, sex
Underlying cause of death (ICD-10* code)	Physical health problem	Legal custody of victim
Multiple condition codes	Intimate partner problem	History of child maltreatment as perpetrator
Autopsy performed	Other relationship problem	Previous child death
Pregnant	Job problem	Supervision at the time of incident:
Manner of death	School problem	Supervisor relationship to victim
Date, time of injury	Financial problem	Supervisor age, sex
Type of location of incident	Recent suicide of friend or family	Quality of supervision contributed to child death
Injured at work	Other death of friend or family	Contributory factors
Injury address	Recent criminal problem	Victim health information:
Survival time	Other legal problems	Physical illness
Education	Perpetrator of interpersonal violence	Disability (physical, developmental, sensory)
Usual occupation, industry	Victim of interpersonal violence	Prenatal care (infants)
Toxicology variables (victim only)	Crisis in past two weeks	Prenatal drug, alcohol, tobacco use (infants)
Date, time specimens collected	Other	Child protective services contacts:
Alcohol testing	Homicide circumstances	Report ever filed on victim's household
Blood alcohol level	Argument over money/property	If so, on whom?
Drug testing:	Jealousy (lovers' triangle)	Any report substantiated?
Amphetamines	Intimate partner violence related	If yes, type: physical, sexual, and/or neglect
Antidepressants	Other argument, abuse, conflict	Case opened on other children?
Cocaine	Drug related	Additional suicide circumstances:
Marijuana	Gang related	History of inpatient psychiatric treatment
Opiates	Associated with another crime	Taking psychiatric medication
Other drugs	Type of crime; crime in progress?	Barriers to accessing mental health care
Other victim variables	Justifiable homicide	Suspect information:
Number of wounds, bullets	Hate crime	Suspect identified by name
Location of wounds	Brawl (mutual physical fight)	Arrested as perpetrator in this death
At person's home	Terrorist attack	Charged
Homeless status	Victim was a bystander	Prosecuted
Victim in custody when injured	Victim was a police officer on duty	Convicted
Intoxication suspected	Victim used weapon	Child protective services report ever filed on the suspect
Death type	Intervener assisting crime victim	Ever charged with prior homicide
Supplementary Homicide Report (SHR)	Mercy killing	Other prior system contacts by victim:
SHR circumstance	Other	Police, juvenile justice, healthcare system, mental health, social services, welfare, Women, Infants, and Children, Medicaid
SHR situation	Unintentional circumstance (firearm death)	Data sources used by CFR:
SHR homicide type	Context:	Coroner/medical examiner, social services/child protective services, law enforcement, school, emergency medical service, medical, public health, mental health, juvenile justice, death certificate
SHR justifiable homicide circumstance	Hunting	CFR committee decisions:
SHR victim-suspect relationship	Target shooting	CFR manner matches official manner of death
Victim-suspect relationship	Self defensive shooting	CFR manner of death
Victim-suspect relationship	Celebratory firing	Action taken to change official manner?
Suspect was caretaker of victim	Loading/unloading gun	Result of action
Evidence of ongoing abuse	Cleaning gun	Preventable death
Weapon variables	Showing gun to others	
Weapon type	Playing with gun	
Firearm variables:	Other	
Firearm information known	Mechanism:	
Evidence recovered (gun, bullet, casing)	Thought safety was engaged	
Firearm type	Thought unloaded: magazine disengaged	
Make, model	Thought gun was unloaded, other	
Cartridge specification	Unintentionally pulled trigger	
Caliber, gauge		

*International Classification of Diseases, 10th revision.

eventually call for a web based, interactive system to create basic queries of aggregate data. Deaths and death rates will be available by type of violent death, type of weapon, age, sex, race, Hispanic origin, year, and state, at a minimum. For homicides, victim-suspect relationship information will also be available. Researchers and members of the general public will be given access to public use data files for investigating their topics of interest. Major NVDRS findings will also be presented at state and national forums and at an annual NVDRS scientific meeting.

CHALLENGES FACED BY NVDRS

Despite the importance of the problem and the wide base of support for collecting more information about it, violent death surveillance faces challenges that are in some ways unique among public health surveillance systems. As mentioned previously, there is a fundamental difficulty with the use of different case definitions: the same death may be called unintentional on a law enforcement record, homicide by a medical examiner, and undetermined on the death certificate. Different case definitions may be used even within one professional community, such as that of medical examiners.¹⁸ To address this problem, NVDRS abstractors will be trained to use standard conceptual definitions for different types of violent death.

There are also more legal issues associated with violent deaths than with deaths from natural causes. The integrity of a death investigation is important, and access to law enforcement and medical examiner/coroner files may be restricted or delayed while investigations are still under way.

In addition, the sources of information on violent deaths are not traditional ones for public health surveillance systems. The sources of information for maternal mortality surveillance, for example, are almost exclusively health care institutions, organizations with which health departments typically have well established relationships. In contrast, although the situation is improving gradually, health departments typically have little experience working with law enforcement departments or medical examiners/coroners. The lack of such relationships may make data access more difficult or less timely.

An additional barrier is that many of the sources of information on violent deaths are non-centralized. Only 19 states have statewide medical examiner systems with centralized records; the remainder have county medical examiners and/or coroners.¹⁹ A given state may have dozens of local law enforcement departments with which to set up data sharing agreements. Moreover, information from medical examiners/coroners and law enforcement is not standardized and may not be computerized. Time consuming abstraction from primary sources by trained abstractors will probably therefore be required. Eventually efforts to develop an electronic death certificate and efforts by the Department of Justice to develop the National Incident Based Reporting System for law enforcement information may dramatically reduce the need for data abstraction.

It is therefore unlikely that all 50 states will be able to implement NVDRS in the very near future. The hope is for incremental growth in state capacity and involvement in NVDRS over a period of years, assuming federal funding continues. One key to its continued growth will be timely demonstration of the utility of the information generated by the first states funded. Eventually, what is learned from the implementation of the NVDRS in the United States will also be useful in informing the development of violence surveillance systems in other countries as is called for by World Health Organization in the *World Report on Violence and Health*.¹ CDC is committed to the development of NVDRS and its

Key points

- The United States Centers for Disease Control and Prevention is initiating the country's first violent death reporting system. It is based in state health departments.
- Violent deaths for this system are defined as suicides, homicides, deaths from legal intervention, deaths of undetermined intent, and unintentional firearm deaths. Deaths from terrorism will be included.
- The system is incident based rather than person based, unlike most public health surveillance systems.
- The system will link information from death certificates, coroners/medical examiners, law enforcement, and crime laboratories.
- Inclusion of toxicological studies done on decedents will be a major innovation of the system.
- The state health departments will have the option of collecting information from child fatality review committees for violent deaths in children.

potential to become an indispensable component in violence prevention.

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We would like to acknowledge the contribution of numerous individuals outside the CDC to the conception and development of NVDRS. Investigators at the National Violent Injury Statistics System worked for years on the methods and tools of fatal violent injury surveillance. Their work gave the CDC an invaluable head start once funding for a national system became available. In particular, we would like to acknowledge the staff of the NVISS Coordinating Center at the Harvard Injury Control Research Center, especially Cathy Barber, Deb Azrael, and Mallory O'Brien.

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REFERENCES

- 1 Krug E, Dahlberg L, Mercy J, *et al*, eds. *World report on violence and health*. Geneva: World Health Organization, 2002.
- 2 Minino A, Arias E, Kochanek K, *et al*. Deaths: final data for 2000. *National Vital Statistics Reports* 2002;50:28-31.
- 3 National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Available at: <http://www-nrd.nhtsa.dot.gov/departments/nrd-30/nscsa/fars.html> (accessed on 27 February 2003).
- 4 Hankey B, Ries L, Edwards B. The Surveillance, Epidemiology, and End Results Program: a national resource. *Cancer Epidemiol Biomarkers Prev* 1999;12:1117-21.
- 5 Rice D, Mackenzie E. *Cost of injury in the United States: a report to Congress*. San Francisco, CA: Institute for Health and Aging, University of California, and the Johns Hopkins University Injury Prevention Center, 1989.
- 6 Teret S, Wintemute G, Beilenson P. The firearm fatality reporting system: a proposal. *JAMA* 1992;267:3073-4.
- 7 Barber C, Hemenway D, Hargarten S, *et al*. A "call to arms" for a national reporting system on firearm injuries. *Am J Public Health* 2000;90:1191-3.
- 8 Kellermann A, Bartolomeos K. Firearm injury surveillance at the local level. *Am J Prev Med* 1998;15(3S):109-12.
- 9 Withers R, Mercy J, Hargarten S. Public health: a successful paradigm applied to firearm injuries. *Wisc Med J* 2000;99:48-9.
- 10 Bonnie R, Fulco C, Liverman C, eds. *Reducing the burden of injury: advancing prevention and treatment*. Washington, DC: National Academy Press, 1999:73-4.
- 11 Harvard School of Public Health. Available: www.hsph.harvard.edu/hicrc/nviss/index.htm (accessed on 19 November 2002).
- 12 Azrael D, Barber C, Hemenway D, *et al*. Data on violent injury. In: Ludwig J, Cook P, eds. *Evaluating gun policy: effects on crime and violence*. New York: Brookings, 2002:412-38.
- 13 Federal Bureau of Investigation. *Uniform crime reporting handbook*. Washington, DC: US Government Printing Office, 1984.

- 14 **Maltz M.** *Bridging the gaps in police crime reporting.* NCJ 176365, 1999. Available at: <http://www.ojp.usdoj.gov/bjs/pub/ascii/bgpcd.txt> (accessed on 6 March 2003).
- 15 **Federal Bureau of Investigation.** Available at: <http://www.fbi.gov/ucr/nibrs/manuals/v1all.pdf> (accessed on 6 March 2003).
- 16 **Barber C,** Hemenway D, Hochstadt J, *et al.* Underestimates of unintentional firearm fatalities: comparing Supplementary Homicide Report data with the National Vital Statistics System. *Inj Prev* 2002;**8**:252–6.
- 17 **Schaechter J,** Duran I, De Marchema J, *et al.* Are “accidental” gun deaths as rare as they seem? A comparison of medical examiner manner of death coding with an intent-based classification approach. *Pediatrics* 2003;**111**(4 pt 1):741–4.
- 18 **Goodin J,** Hanzlick R. Mind your manners: part II: general results from the National Association of Medical Examiners Manner of Death Questionnaire, 1995. *Am J Forensic Med Pathol* 1997;**18**:224–7.
- 19 **Centers for Disease Control and Prevention.** Available at: www.cdc.gov/epo/dphsi/mecisp/index.htm (accessed on 25 February 2003).

LACUNAE

Glow in the dark camels for desert

Israel is lighting up its camels in an attempt to stop fatal collisions between the traditional ship of the desert and motorised ones, an official said in July. Israeli police are sticking phosphorescent strips on the bodies of the camels to serve as warning lights for desert drivers, because of growing numbers of crashes in which both people and camels have died. The Bedouin population of Israel’s southern Negev desert uses both forms of transportation—camels and pickup trucks—and the mix has often been fatal when the two collide in the night. “The camel safety problem is a serious one here”, said Yossi Golan, commander of the Dimona police district in the eastern Negev. “In the last two years, 10 people have died in camel related traffic accidents and more than 50 have been injured seriously”, he said. Golan estimated that there are 5000 camels in the Negev desert. To protect them and their riders, he said, he called a desert-style council of wise people to come up with a solution. “We brought together Bedouin elders, the Transport Ministry, the Nature Reserves Authority, and camel herd owners—and the phosphorescent strip idea was born”, he said. “We see it as a useful adjunct to the camel safety measures we already have in place—warning signs and guard rails at particularly dangerous road crossings”. Golan said that the first 40 Negev camels were fitted with phosphorescent strips yesterday, and expressed hope that over the next several months as many of 1000 more could be lit up. “We’re very serious about this operation”, he said. “If only one life is saved in the process, the whole thing will have been worthwhile” (contributed by Peter Jacobsen; from Associated Press).

With this article, Peter Jacobsen noted that Cochrane reports no evidence of benefit from increasing pedestrian/cyclist visibility (Kwan I, Mapstone J, Roberts I. Interventions for increasing pedestrian and cyclist visibility for the prevention of death and injuries (Cochrane Review). The Cochrane Library, issue 2, 2002. Oxford: Update Software).

Benefits of driving

A group of seniors were sitting around talking about all their ailments.

“My arms have gotten so weak I can hardly lift this cup of coffee”, said one.

“Yes, I know”, said another. “My cataracts are so bad; I can’t even see my coffee”.

“I couldn’t even mark an “X” at election time, my hands are so crippled”, volunteered a third.

“What? Speak up! What? I can’t hear you!”

“I can’t turn my head because of the arthritis in my neck”, said a fourth, to which several nodded weakly in agreement.

“My blood pressure pills make me so dizzy!” exclaimed another.

“I forget where I am, and where I’m going”, said another.

“I guess that’s the price we pay for getting old”, winced an old man as he slowly shook his head. The others nodded in agreement.

“Well, count your blessings”, said a woman cheerfully “and thank God we can all still drive” (contributed by Peter Jacobsen; source not known).