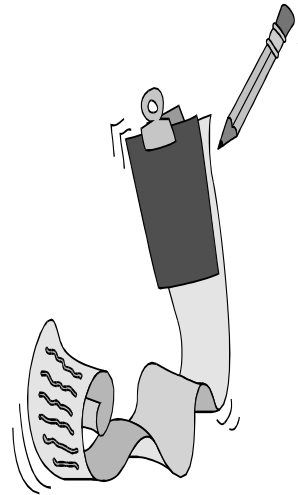


The National Violent Death Reporting System (NVDRS)



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This lecture outlines the National Violent Death Reporting System; an emerging surveillance system in the United States. The slides borrow heavily from the work of Len Paulozzi and Leroy Frazier, Jr. at the CDC and others working on NVDRS in the individual states.

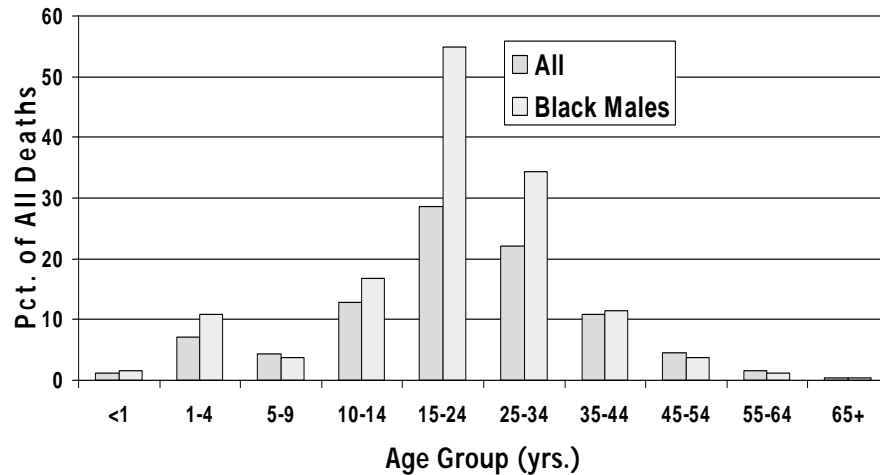
Background

- >50,000 Americans died from violence in 2000
- Violence is a particular scourge of the young:
 - Homicide is the second leading cause of death in the 1-34 yrs age group.
 - Suicide is the third leading cause of death in this age group.

Paulozzi, Frazier

Violence is a significant public health issue in the United States. When all deaths from violence are combined and considered (greater than 50,000 per year), violence is a leading cause of death; surpassing deaths from motor vehicle crashes (@43,000) and HIV infection (@14,000). Interestingly, national surveillance systems currently exist to monitor the frequency of HIV and motor vehicle crash.

Homicide and Suicide as a Percent of All Deaths by Age Group, US, 2000



Paulozzi, Frazier

Violent deaths are particularly prevalent in the young, particularly young African American males. Almost 30% of all deaths in the 15-24 age group are due to violence; 55% among black males 15-24 yrs old.

...But We Don't Know Enough:

- Death certificates don't mention suspects and can't combine deaths in one incident
- Supplementary Homicide Reports cover only homicides and carry little information
- The National Incident Based Reporting System has trouble getting law enforcement buy-in in addition to other deficiencies

Paulozzi, Frazier

While death certificates provide information on the frequency of violent deaths; death certificates generally do not provide a lot of useful information for development interventions for prevention. Other existing surveillance systems (Uniform Crime Reports and NIBRS) also have several weaknesses that limit opportunities for prevention. Thus, there is a need to better information on the circumstances surrounding all violent deaths.

Why Not Just Go to the Original Sources?

- Law enforcement information describes what happened before death
- Medical examiner/coroner files contains information collected after death
- Death certificates describe the person, not what happened.
- In short, we need something new to compile multiple sources to get the full picture.

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Further details on existing violent death data sources are identified on this slide. The data sources have strengths to meet their intended uses, but were not designed for development interventions for prevention. The thinking underlying the NVDRS is that we should look to capitalize on these existing resources, to combine them together, to generate better information about violent death events and identify strategies for their prevention.

The NVDRS

Thus, the NVDRS has come about. How did we get here?

The History of the NVDRS

- Conception: 1999 Institute of Medicine Report recommends the creation of a national fatal intentional injury surveillance system
- Early pilot: 1999 Six foundations start the National Violent Injury Statistics System (NVISS) in academic test tubes

Paulozzi, Frazier

Historically, the NVDRS has its formal origins in the 1999 IOM report; “Reducing the Burden of Injury; Advancing Prevention and Treatment”. In this report, there was national recognition, for the first time, of the importance of working towards learning more about violent deaths. The origins of the NVDRS, though, go much farther back than 1999. The success of the FARS system for monitoring motor vehicle crashes led many in the injury prevention community to argue for something similar for violent deaths.

Work on monitoring violent deaths began small, with support from foundations, to test the feasibility of combining different data sources together. This was conducted in several small sites across the country.

History – Continued

- 2000 NVISS gets under way at 12 sites, mostly universities
- 2000 Harvard and the Joyce Foundation convene an expert meeting that suggests the CDC direct a publicly funded system
- 2000 CDC starts planning

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The feasibility study grew larger in size in 2000, with active monitoring of violent deaths established in 12 centers. The work of these 12 centers showed that it was possible to think about a surveillance system that was national in scope using efficient methods. As a result, the push began to get the CDC to devote more serious resources to such an effort.

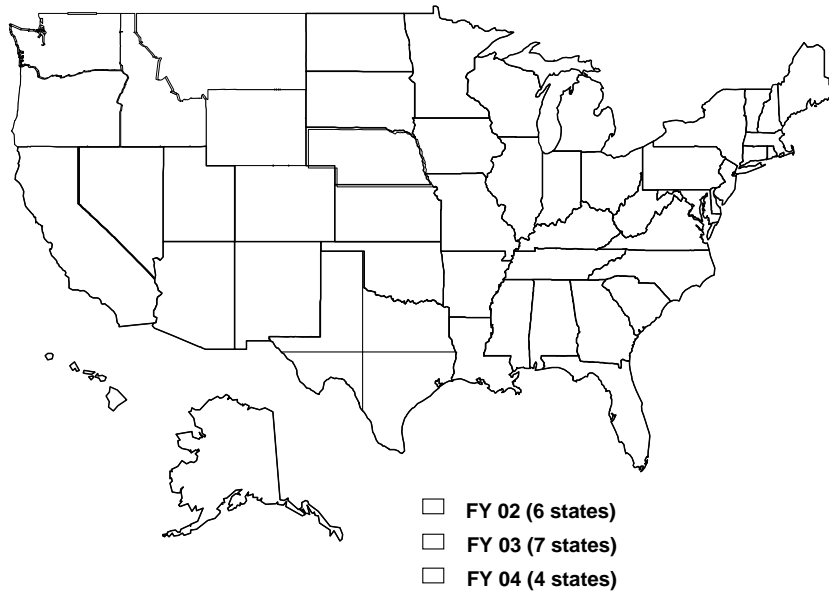
Finally, NVDRS Is Born

- Feb, 2002 Congress's first appropriation (\$1.5 million)
- Sept, 2002 CDC funds 6 of 17 applying: MA,MD, NJ, OR, SC, and VA
- Feb, 2003 Second appropriation
- Aug., 2003 CDC funds 7 of 16 applying: AK, CO, GA, NC, OK, RI, WI

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The first serious funding for state-based efforts began in 2002.

NVDRS States as of 2005



In FY02, 6 states were funded - Alaska, Colorado, Georgia, North Carolina, Oklahoma, Rhode Island, and Wisconsin.

In FY03, 7 additional states were funded - Maryland, Massachusetts, New Jersey, Oregon, South Carolina, and Virginia

In FY04, 4 additional states were included – Kentucky, Utah, New Mexico, and parts of California (4 counties).

It is planned to add more states as more funding becomes available to devote to this effort. However, the current rate limiting factor is a tight squeeze on funding.

The NVDRS is a multi-source violent death surveillance system

The NVDRS is a surveillance system built upon gathering information from multiple sources. This level of complexity is higher than exists for most surveillance systems in general.

Conceptual Definition of a “Violent Death”

- “A death that results from intentional use of force or power, threatened or actual, against oneself, another person, or a group or community.”
- Source: Krug EG et al., eds. *World report on violence and health*. Geneva, WHO, 2002.

Paulozzi, Frazier

Every surveillance system needs a case definition to identify who is eligible for registration in the system. In the NVDRS, the foundational case definition is based upon an accepted global standard; intentional death. This includes primarily homicides and suicides.

For Surveillance, the Operational Definition of a Violent Death

- Underlying cause of death must be coded to homicide, suicide, undetermined intent, legal intervention, unintentional firearm injury, or terrorism.
- Deaths prior to birth due to violence, ie, fetal deaths, are not included. In other words, the victim must have a standard death certificate, not a fetal death certificate.

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The operational case definition for NVDRS arises from the data available in the multiple data systems examined. Specifically, recorded events in the NVDRS are based upon the underlying cause of death statement in the death certificate. This statement must be coded in the ICD system to reflect homicide, suicide, deaths of undetermined intent, or deaths by legal intervention and terrorism. Another category, unintentional injury deaths from firearms, was also added to identify accidental deaths with firearms.

ICD-10 Codes that Define NVDRS Cases

Underlying Cause of Death	Death <1 yr after Injury	Death \geq 1 yr after Injury
Intentional self harm	X60-84	Y87.0
Assault	X85-99, Y00-09	Y87.1
Undetermined intent	Y10-34	Y87.2, Y89.9
Unintentional firearm	W32-34	Y86 (guns)
Legal intervention	Y35.0-Y35.7 except Y35.5	Y89.0
Terrorism	*U01, *U03	*U02

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The specific ICD-10 codes that are included in the NVDRS are outlined on this slide.

Violent Deaths in US Residents in 2000

Manner of Death	No.	Pct.
Suicide	29,350	57.6
Homicide	16,765	32.9
Undetermined	3,819	7.5
Unintentional Firearm Injury	776	1.5
Legal Intervention exc. Executions	274	0.5
Terrorism	NA	NA
TOTAL	50,984	100.0

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What is likely to be captured in the NVDRS. Well, looking at cause of death data from 2000, we start to get a picture of what the NVDRS will be capturing. The vast majority of deaths are due to suicide. This is counter to what many individuals believe; where it is often viewed that homicides are more frequent than suicides. However, homicides get much more media attention than suicides. This is one large reason for the misperception. A large number of deaths are also coded as undetermined intent. The NVDRS, with a more detailed focus, may help to start to shed light on the factors underlying these deaths.

A State's Scope includes Both Resident and Occurrent Deaths

- Resident deaths are needed for population-based rates.
- Occurrent deaths allow mapping of where violence is occurring, not where victims of violence live.
- If a victim lives in one state and dies in another, and resident and occurrent states are both NVDRS states, the occurrent state is responsible for collecting the death.

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The NVDRS is based largely on data collected at the state level. In operation, the NVDRS is conducted by the individual states, and then the information is sent to the CDC. The case definition of which deaths are included in a review by a state is shown on this slide. Primarily the states are looking at deaths among their residents. There will be some situations where this will not be the case (a person dies in another state), but these are expected to be few.

Incident-based System

- Unlike most public health surveillance systems, NVDRS uses the “incident” as the unit of surveillance.
 - A single violent death, e.g., a suicide, constitutes an incident.
 - Multiple people who are victims or suspects in violent deaths also constitute an incident if they are connected and the injuries occur within a 24-hour period.
- This allows capture of causal relationships among deaths and description of the social relationships involved.
- It still allows each death to be used as a unit of analysis, e.g., in death rates.

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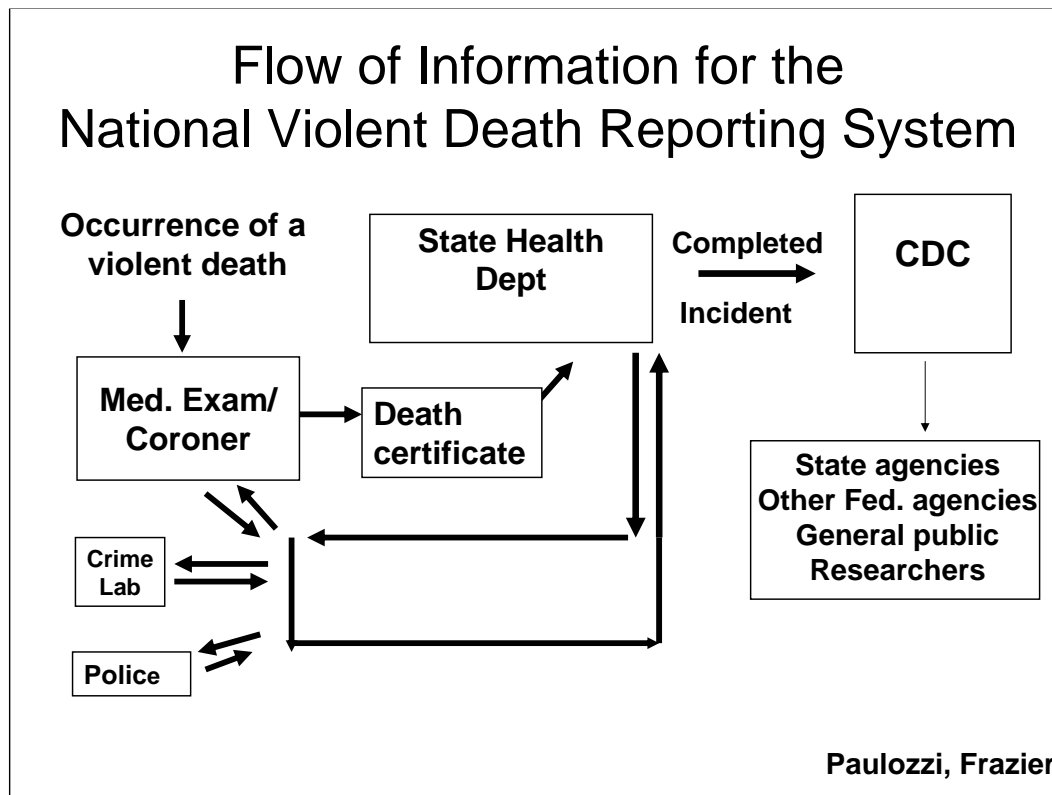
The NVDRS is also unique as a surveillance system in that it will focus on the violent death incident; rather than the death itself. This is similar only to the NIBRS system in the FBI. The focus on incidents allow investigators to more closely identify prevention strategies, by considering incidents with multiple deaths as unique incidents, and keeping them separate (if intended) from single violent death incidents. The dynamics underlying multiple death incidents (e.g. school shootings) are likely to be very different from the dynamics for single death incidents.

Four Principal Data Sources

- Death certificates
- Police reports including Supplementary Homicide Reports (SHRs) or National Incident-Based Reporting System (NIBRS) records
- Coroner and medical examiner records
- Crime lab reports

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The primary data sources in the NVDRS are shown here.



This flow chart roughly outlines how the NVDRS system works in each state. In the top left, note that the violent death occurs. This will then usually be examined by a medical examiner/coroner, and will have a police report associated with it in most regards. The medical examiner will complete the death certificate. At this point the death certificate is filed with the state authorities. Individuals in the state health department will then be aware of a violent death that is potentially eligible for the NVDRS system. They (health department officials) will abstract information from the death certificate, and then seek to link this death certificate with information from the medical examiner record, police record, and crime lab data. The major identifiers that links the data together across these sources is the person's name and date of death.

The Death Certificate Typically Starts the Case-finding Process

- Deaths meeting the case definition are identified from those received at the state DOH

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The details that relate to the flow chart in slide 19 are now presented in slides 20-27. Here it is noted that the state will only become aware of the violent death after it is identified from a review of death certificates.

Information Collected from the Death Certificate

- Information taken verbatim from the certificate
- Elements collected from 2003 certificate include:
 - Names, residence, and other identifiers
 - Demographics
 - C/ME information:
 - Manner, time of injury and death, causes of death, pregnancy status
 - Most information collected by the funeral director:
 - Education, occupation, marital, and veteran status

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Several bits of information are then abstracted from the death certificate for the NVDRS system.

Coroner/Medical Examiner information is an important second source

- C/ME data is not standardized. Some offices are computerized with commercial software, but most use paper.
- The files are mostly narrative plus toxicology and autopsy reports.
- Relatively little about suspects

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Medical examiner records are sought after to supplement the information from the death certificate. In practice, this is a difficult task, as many offices do not have their information readily available, or accessible in a format that translates quickly to a new data system. Much of the coroner's report, for example, is narrative in format. This requires time intensive abstract processes.

Types of Information Recorded from C/ME Records into NVDRS

- A brief narrative of the incident
- Identifiers and demographics
- Toxicology test results, including victim BAC
- Wound locations
- Circumstances associated with suicides, homicides, and unintentional firearm deaths
- Weapon information
- Relationships among involved persons (if available)

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There are bits of useful information available from medical examiners records. The major information pieces are listed here. There are excellent details on the medical processes underlying the injury outcome, as well as toxicology and alcohol reports.

Law Enforcement Records are another source of information in NVDRS

- Information stored in ways ranging from almost entirely coded forms to almost entirely narratives.
- Some national standards exist for some information, eg, Supplementary Homicide Reports, and National Incident Based Reporting Systems
- Less recorded on suicides than homicides
- More on suspects and weapons than in C/ME files

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A third source of information on violent deaths are police records. This information is not originally collected for public health purposes, but for criminal justice purposes. Thus, the information available that is most useful for NVDRS includes narrative information on the circumstances of the violent death, information on any weapons involved and information on suspects in criminal deaths. This information is generally much better and more complete for homicide deaths as compared to suicide deaths.

Types of Information Recorded from Law Enforcement Records into NVDRS

- A brief narrative of the incident
- Identifiers and demographics
- Suspicion of intoxication
- Wound locations
- Circumstances associated with suicides, homicides, and unintentional firearm deaths
- Weapon information
- Relationships among involved persons

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Specific information abstracted from police records include those listed here. The narrative offers details of the circumstances in the death, and the opportunity to identify relationships between the perpetrator and victim. This type of information is not available from the other sources. It is, however, not known for every violent death.

Information Collected from Crime Labs

- Firearm information only
- Not obtained by law enforcement for every firearm
- Reports found in C/ME or Police files or obtained separately.
- Information includes:
 - Type, make, and model
 - Caliber or gauge
 - Serial number
 - Importer's name and address

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A fourth source, and one that is not always available for all sites, is crime lab data. This information is used to get detailed information on the weapons involved in violent deaths.

Data Elements in NVDRS

- Victim demographics
- Information on the incident
 - (where, when, who)
- Weapon type
- Autopsy results
- Current judicial standing
- Circumstance elements
- Narrative describing the incident

Thus, the key data elements of NVDRS gathered from the 4 sources are shown here. The establishment of the NVDRS will allow for detailed reports on these issues for violent deaths in the United States.

Data Elements Overlap

- Data is kept sorted by source
- Elements are not unique to one source, that is, same information can be available from >1 source
- Number of unique data elements is < 250.

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Overall, there are a couple of hundred data elements. Several of the data elements overlap between the sources.

Circumstances surrounding violent deaths are often not reported

- Only 40% of violent deaths have circumstance data from both ME and police
- Nearly 26% had no circumstance information
- Only ~6% had information only from police
- Suicides (87%) and undetermined deaths (79%) more likely to have circumstance information than homicides (49%)
- Circumstance information critical for developing effective prevention programs

It is important to note, though, that the establishment of the NVDRS system is not without its potential problems. The information that goes into the NVDRS, for example, is only as good as the information that currently exists in the 4 primary data sources. An example of this issue is shown on this slide. Information on the circumstances surrounding the violent death are not always available. 40% of the records have this information from both police and medical examiner sources, and 26% of the NVDRS records don't have any circumstances information at all.

A Fifth Data Source Under Development: Child Fatality Review Teams (CFRT)

- CFRTs merge data on child deaths from the 4 primary sources and multiple others
- They have a particular interest in uncovering violent deaths
- They offer unique information on the victim's household, caregivers, supervision, and previous contacts with the system

Paulozzi, Frazier

In some states, the information from the 4 primary sources is being supplemented with a module coming from the Child Fatality Review Team information. This source is not used in all states... but it is another source that adds additional details for the violent deaths occurring among children. Of value is rich data on the victim's relationship with the perpetrator.

Preliminary NVDRS Results

Frequency	2004	*2005
# of States included in analysis	13	17
# of Incidents	13845	13459
# of Deaths	14215	13777
# of Live Suspects	3779	2310

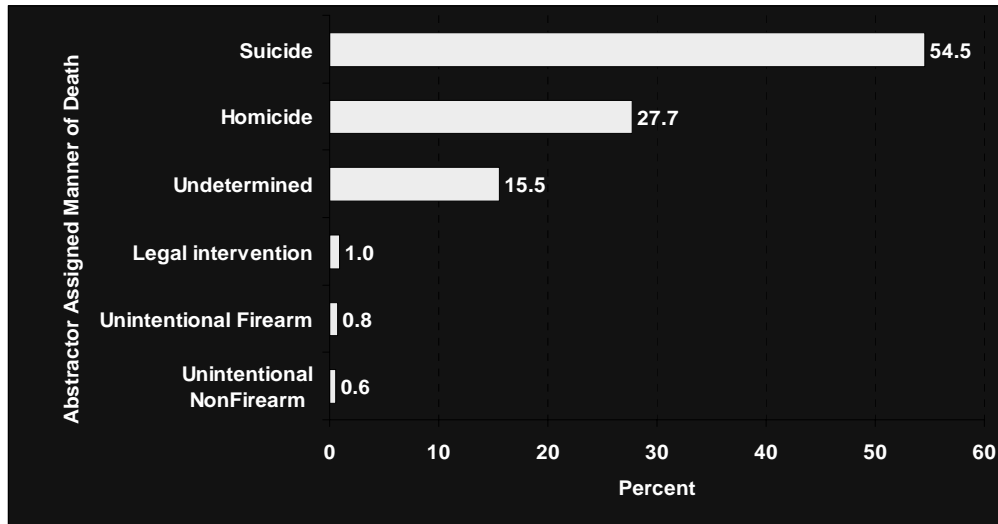
(NVDRS, as of March 2006)

**Approximately ¾ of preliminary data for 2005 has been entered*

Frazier

Some preliminary data from the NVDRS is now starting to emerge. The next set of slides outlines some of the basic information that we are learning about now.

Preliminary NVDRS Results: Manner of Death; 13 states, 2004, N=13



For 44 cases Abstractor Assigned Manner of death is missing, mostly pending cases.

(NVDRS, as of March 2006)

Frazier

For example, as expected, the vast majority of the deaths in the NVDRS system are accounted for by suicides (over one-half of all deaths). Homicides make up about one-quarter of all deaths in the NVDRS.

Preliminary Homicide Results: Injury event; 2004, 13 states

Data element and categories		All Cases (N=14,215)	Homicide (N=3,924)
Place of injury (CDC)	House/apartment	65.1%	50.0%
	Street/road	9.4%	24.1%
	Natural area	3.3%	2.0%
	Motor vehicle	4.3%	6.1%
	Other	12.7%	14.9%
	Unknown	5.3%	3.0%
At/during work (CDC)	Yes	1.3%	2.8%
Alcohol use suspected (CME)	Yes	27.5%	27.7%
CME Circumstances known	Yes	73.6%	55.5%

(NVDRS, as of March 2006)

Frazier

In this slide, we get a quick glimpse on the distribution of violent deaths by place of injury, work involvement, and alcohol use.

Additional preliminary evidence is available from the following publications:

- Homicides and Suicides; NVDRS, United States 2003-4. MMWR 55(26):721-24, July 2006. Available at <http://www.cdc.gov/MMWR/preview/mmwrhtml/mm5526a1.htm>
- Karch DL, Lubell KM, Friday J, Patel N, Williams DD; Centers for Disease Control and Prevention (CDC).

Surveillance for violent deaths--National Violent Death Reporting System, 16 states, 2005. MMWR Surveill Summ. 2008 Apr 11;57(3):1-45. Erratum in: MMWR Morb Mortal Wkly Rep. 2008 Apr 25;57(16):436.

The Future for NVDRS

- Data availability to the public
- Basic surveillance publications
- Eventually all 50 states will be incorporated, assuming funding is available

The future of NVDRS is not clear at this point in time. In general, it all depends upon the availability of funding resources from the federal government to support it. Eventually, the goal is to expand the system to include all 50 states to mirror what exists with the FARS system. The timeframe in which this will occur, though, is not known with certainty.