Enhancing injury mortality surveillance using National Vital Statistics System

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Overview

❑ Injury mortality surveillance and NVSS

❑ Examples of injury mortality surveillance

- Drug poisoning mortality

- Drowning surveillance

- Suicide surveillance

❑ Enhancements and next steps

10 Leading Causes of Death by Age Group, United States – 2009

Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 5,319	Unintentional Injury 1,466	Unintentional Injury 773	Unintentional Injury 916	Unintentional Injury 12,458	Unintentional Injury 14,062	Unintentional Injury 15,102	Malignant Neoplasms 50,616	Malignant Neoplasms 106,829	Heart Disease 479,150	Heart Disease 599,413
2	Short Gestation 4,538	Congenital Anomalies 464	Malignant Neoplasms 477	Malignant Neoplasms 419	Homicide 4,862	Suicide 5,320	Malignant Neoplasms 12,519	Heart Disease 36,927	Heart Disease 67,261	Malignant Neoplasms 391,035	Malignant Neoplasms 567,628
3	SIDS 2,226	Homicide 376	Congenital Anomalies 195	Suicide 259	Suicide 4,371	Homicide 4,222	Heart Disease 11,081	Unintentional Injury 19,974	Chronic Low. Respiratory Disease 14,160	Chronic Low Respiratory Disease 117,098	Chronic Low. Respiratory Disease 137,353
4	Maternal Pregnancy Comp. 1,608	Malignant Neoplasms 350	Homicide 119	Homicide 186	Malignant Neoplasms 1,636	Malignant Neoplasms 3,659	Suicide 6,677	Suicide 8,598	Unintentional Injury 12,933	Cerebro-vascular 109,238	Cerebro-vascular 128,842
5	Unintentional Injury 1,181	Heart Disease 154	Influenza & Pneumonia 106	Congenital Anomalies 169	Heart Disease 1,035	Heart Disease 3,174	Homicide 2,762	Liver Disease 8,377	Diabetes Mellitus 11,361	Alzheimer's Disease 78,168	Unintentional Injury 118,021
6	Placenta Cord. Membranes 1,064	Influenza & Pneumonia 146	Heart Disease 97	Influenza & Pneumonia 122	Congenital Anomalies 457	HIV 881	Liver Disease 2,481	Cerebro-vascular 6,163	Cerebro-vascular 10,523	Diabetes Mellitus 48,944	Alzheimer's Disease 79,003
7	Bacterial Sepsis 652	Septicemia 71	Chronic Low. Respiratory Disease 64	Heart Disease 120	Influenza & Pneumonia 418	Influenza & Pneumonia 807	HIV 2,425	Diabetes Mellitus 5,725	Liver Disease 9,154	Influenza & Pneumonia 43,469	Diabetes Mellitus 68,705
8	Respiratory Distress 595	Chronic Low. Respiratory Disease 66	Benign Neoplasms 40	Chronic Low. Respiratory Disease 59	Complicated Pregnancy 227	Diabetes Mellitus 604	Cerebro-vascular 1,916	Chronic Low. Respiratory Disease 4,664	Suicide 5,808	Nephritis 40,465	Influenza & Pneumonia 53,692
9	Circulatory System Disease 581	Perinatal Period 58	Septicemia 33	Benign Neoplasms 45	Cerebro-vascular 193	Cerebro-vascular 537	Diabetes Mellitus 1,872	HIV 3,388	Nephritis 4,792	Unintentional Injury 39,111	Nephritis 48,935
10	Neonatal Hemorrhage 517	Benign Neoplasms 53	Cerebro-vascular 32	Cerebro-vascular 42	Chronic Low. Respiratory Disease 187	Liver Disease 459	Influenza & Pneumonia 1,314	Influenza & Pneumonia 2,918	Septicemia 4,628	Septicemia 26,763	Suicide 36,909

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC using WISQARS™.
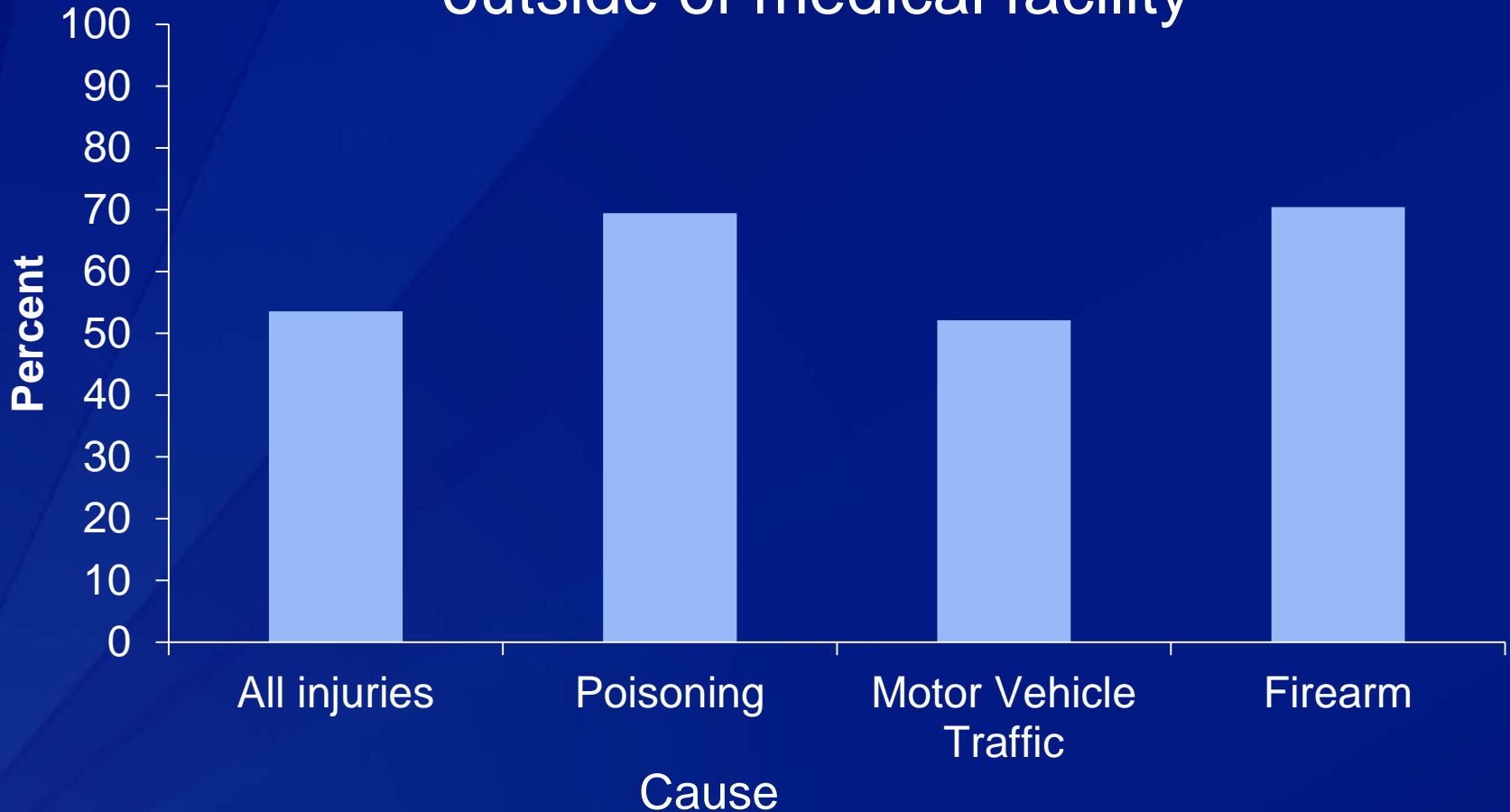
Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

CS230409

Why injury?

## Percent of deaths pronounced outside of medical facility

SOURCE: CDC/NCHS, National Vital Statistics System

Data source

❑ National Vital Statistics System, Multiple cause of death file

❑ Data from death certificates which is compiled by state vital statistics offices

❑ States provide vital statistics data to NCHS though the Vital Statistics Cooperative Agreement

❑ Includes up to 20 causes of death coded using the International Classification of Diseases, 10th Revision (ICD-10)

Example:
Drug poisoning deaths

Motor vehicle traffic, poisoning and drug poisoning death rates
United States, 1999--2009

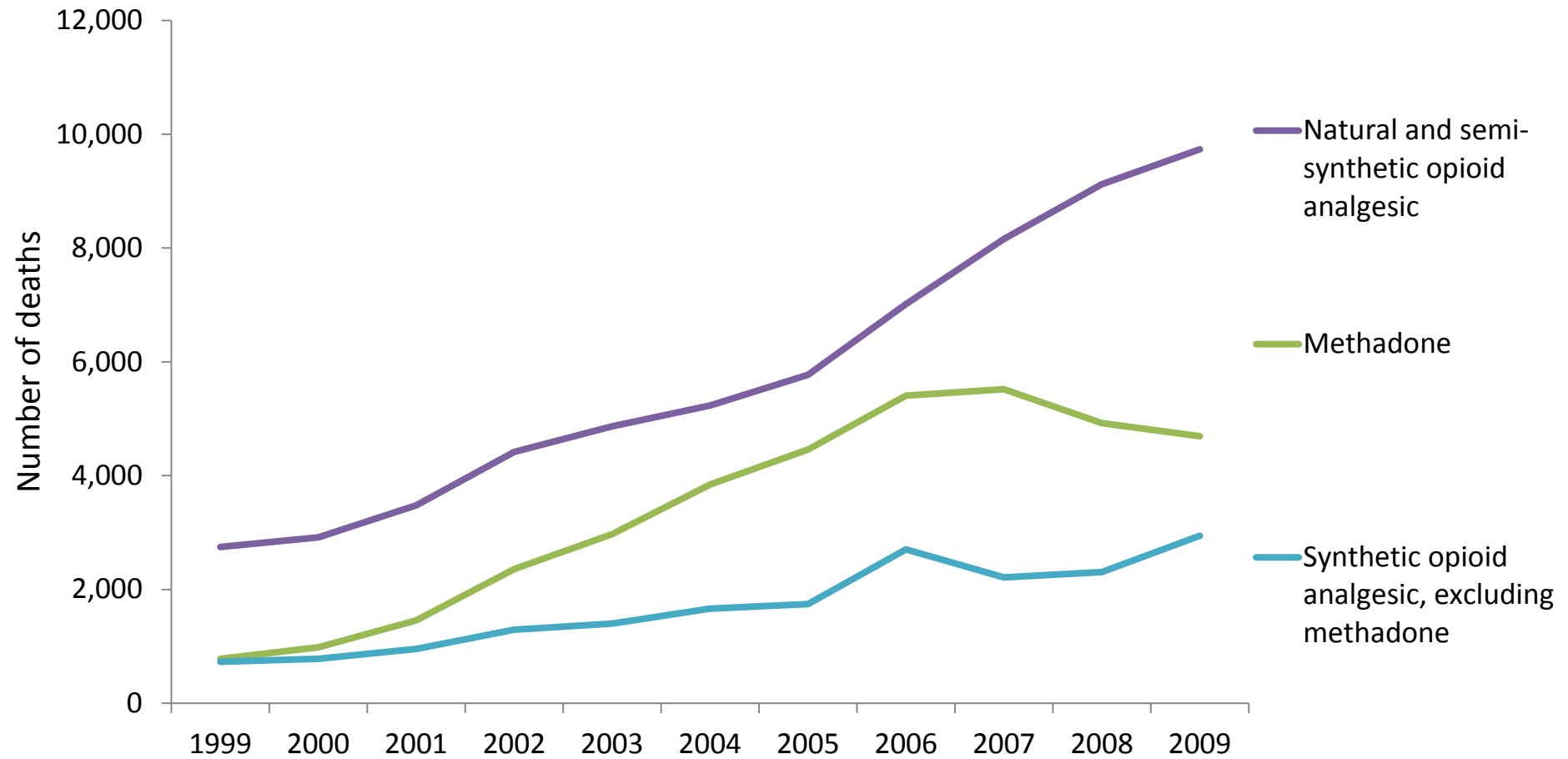SOURCE: CDC/NCHS, National Vital Statistics System
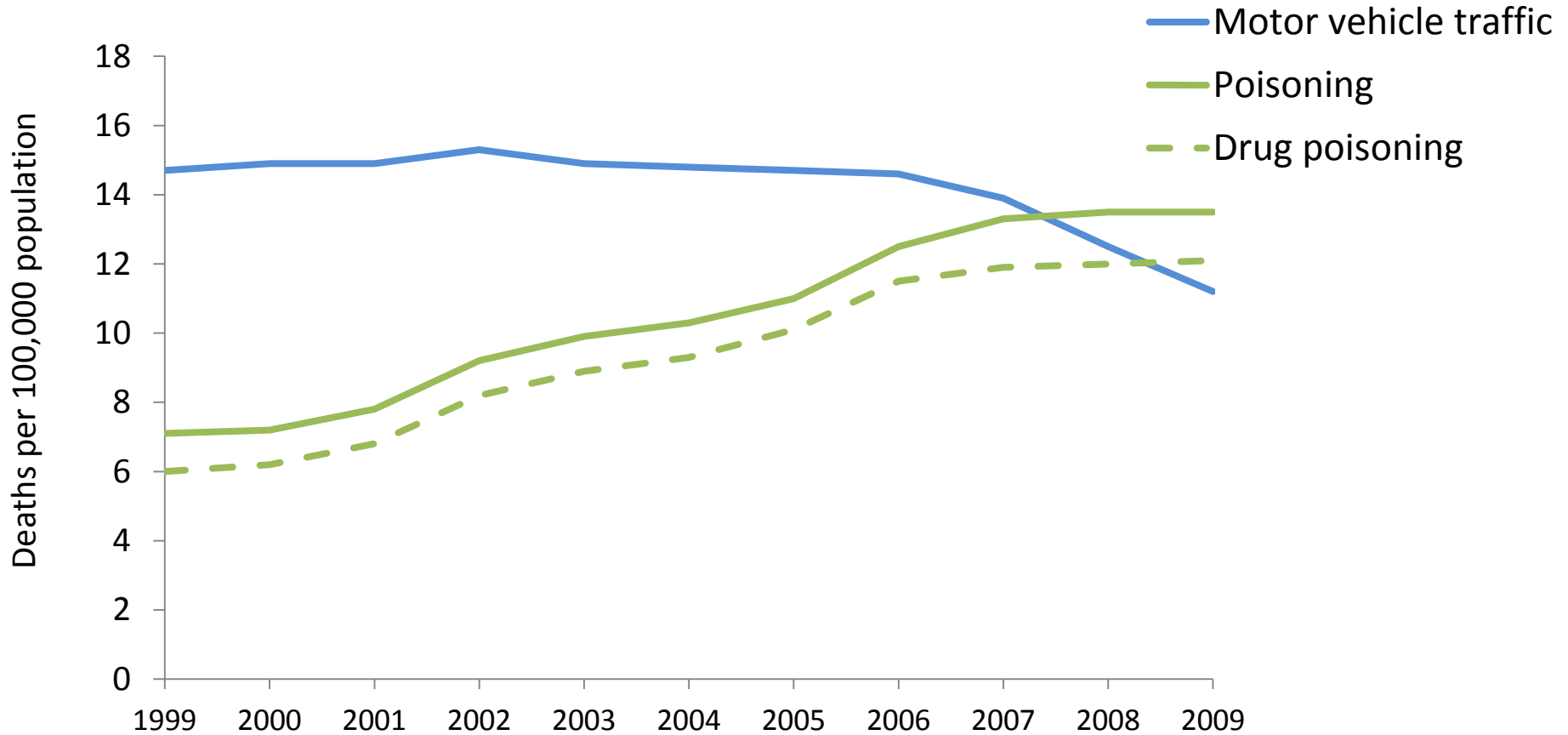
Drug poisoning deaths by type of drug
United States, 1999--2009
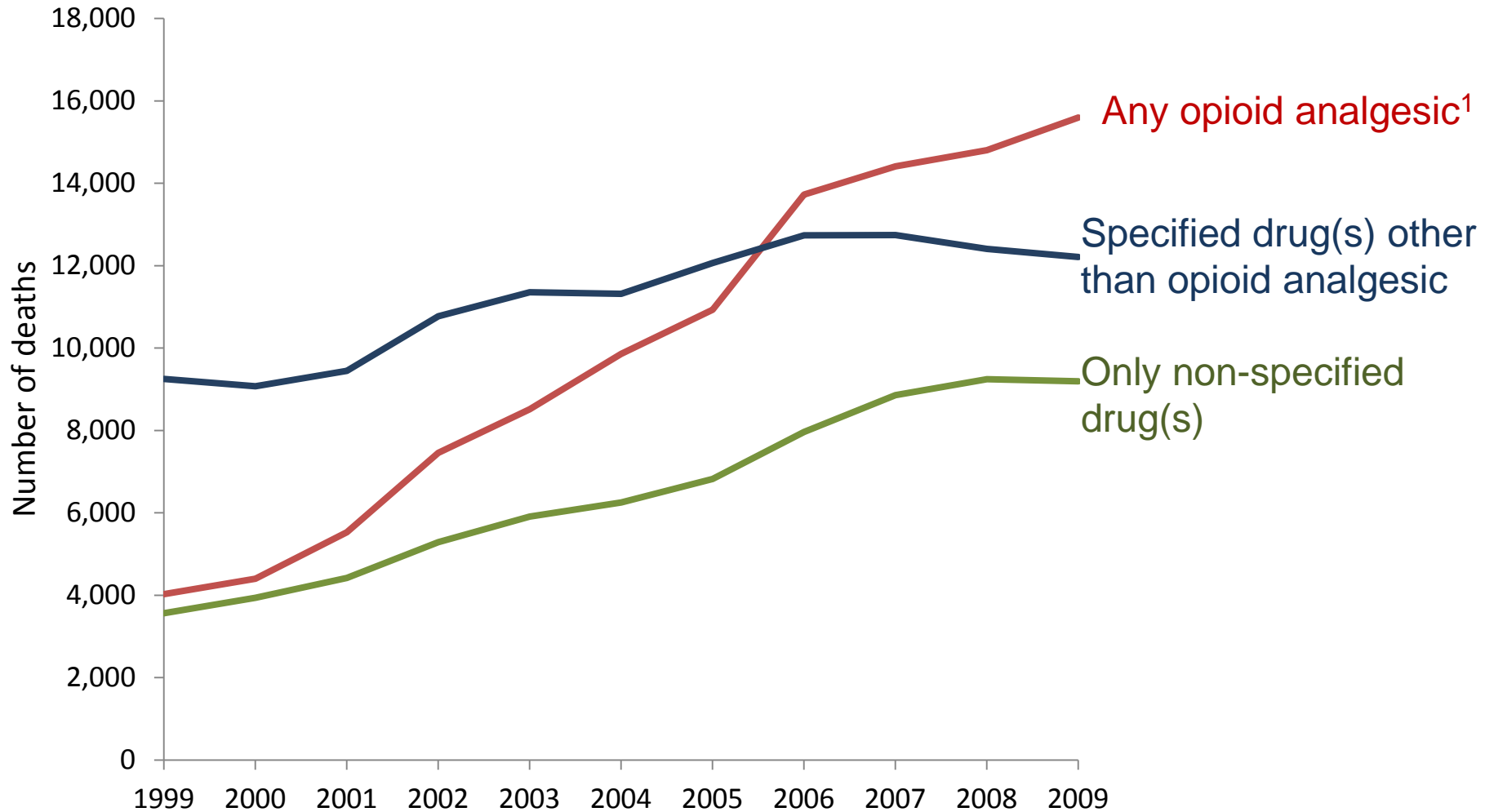
NOTES: Drug categories are mutually exclusive. 1. Opioid analgesics include natural and semi-synthetic opioid analgesics (e.g. morphine, oxycodone, hydrocodone) and synthetic opioid analgesics (e.g. methadone, fentanyl). Some deaths in which the drug was poorly specified or unspecified may involve opioid analgesics.
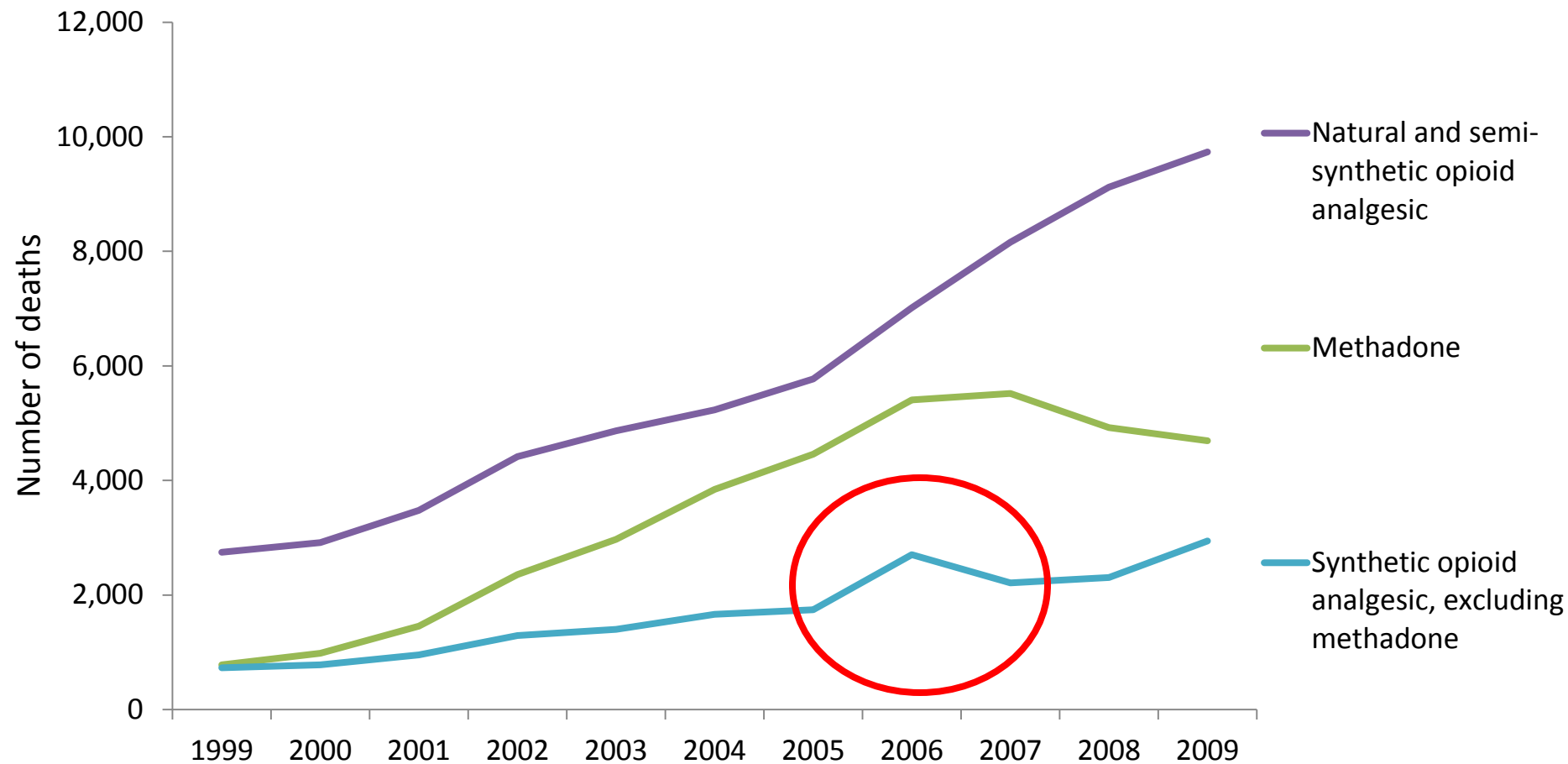SOURCE: CDC/NCHS, National Vital Statistics System

# Drug poisoning deaths by type of opioid analgesics
United States, 1999--2009

Chart showing number of deaths on the y-axis (0 to 12,000) and years (1999 to 2009) on the x-axis, with three lines:
- Natural and semi-synthetic opioid analgesic
- Methadone
- Synthetic opioid analgesic, excluding methadone

Drug poisoning deaths by type of opioid analgesic
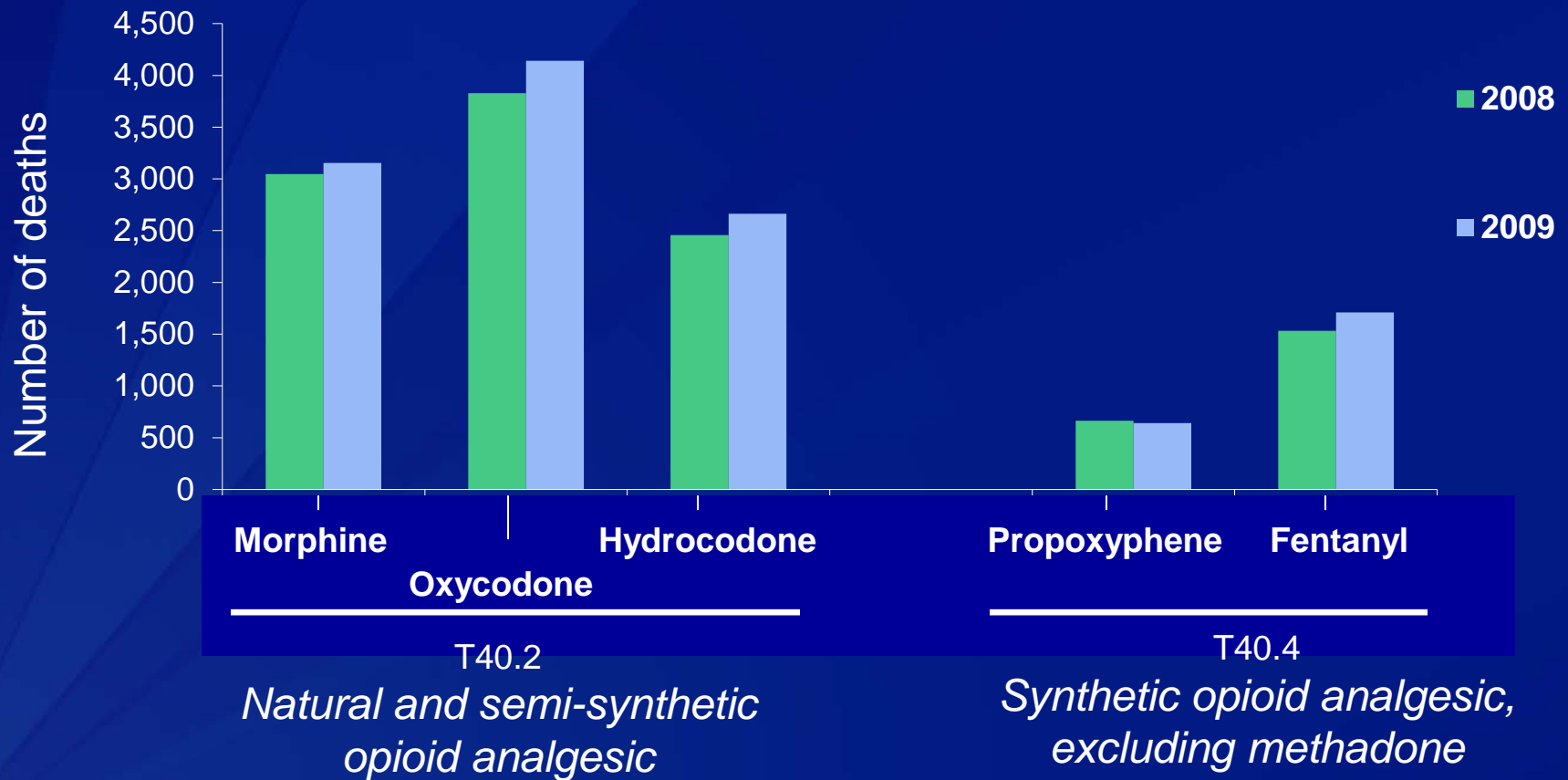# United States, 1999--2009

NOTES: Opioid analgesic categories are not mutually exclusive.
SOURCE: CDC/NCHS, National Vital Statistics System

Synthetic opioid analgesic, excluding methadone by month, 1999-2006
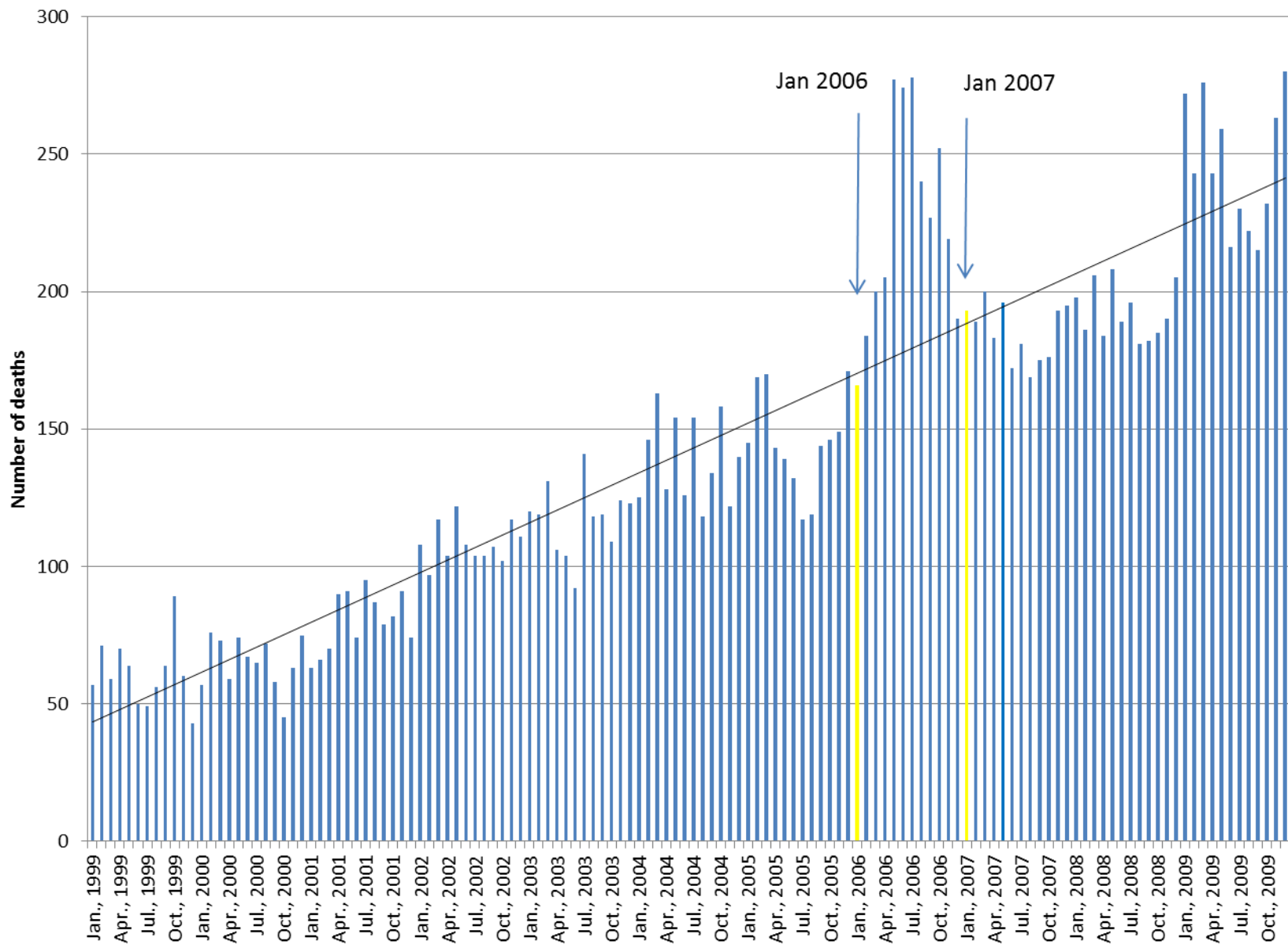
Specific drugs identified using keyword search of literal text file

Nonpharmaceutical Fentanyl-Related Deaths --- Multiple States, April 2005--March 2007

On April 21, 2006, increases in overdoses were reported among illicit drug users in Camden, New Jersey, via the CDC Epidemic Information Exchange (Epi-X). This alert elicited reports of similar increases in overdoses in o Chicago, Illinois; Detroit, Michigan; and Philadelphia, Pennsylvania. The increases in Chicago and Detroit had been recognized several months earlier but attributed to heroin overdoses until fentanyl was detected in the blood o nonpharmaceutical fentanyl (NPF), a synthetic opioid 30--50 times more potent than heroin (*1*), also was found by law enforcement personnel and medical examiner staffs at the scene of some overdoses. In May 2006, to ide jurisdictions, CDC implemented an ad hoc case-finding and surveillance system, later managed by the Drug Enforcement Administration (DEA). This report summarizes the results of that effort, which identified 1,013 NPF-rel March 28, 2007. As a result, on April 23, 2007, DEA began regulating access to N-phenethyl-4-piperidone, a chemical used to make illicit NPF (*1*). Increased public health efforts are needed to improve epidemiologic data detection of increases in drug overdoses, educate illicit drug users regarding the risks for overdose, and help users obtain treatment for their addictions.

Since 1990, pharmaceutical fentanyl (e.g., Duragesic transdermal patches) has been approved for patient use to relieve severe or chronic pain. However, pharmaceutical fentanyl also has been misused and associated with fata 1970s, NPF and various fentanyl analogs (e.g., alphamethylfentanyl) have been produced illicitly, sold in street drug markets for their heroin-like effect, and implicated in fatal overdoses (*3*). One gram of pure fentanyl can be c (*1*). Manufacture of NPF requires minimal technical knowledge, and recipes for making NPF are available on the Internet (*1*). Testing of drug samples containing fentanyl can distinguish between pharmaceutical and illicitly man samples (e.g., serum) cannot distinguish between pharmaceutical fentanyl and NPF (*4*).

In May 2006, in response to concern over reports of increased NPF-related deaths, CDC collaborated with medical examiners, law enforcement agencies, and public health departments in six state and local jurisdictions* and related deaths. In each jurisdiction, reports from participating medical examiners were reviewed. An NPF-related death was defined as one in which 1) fentanyl caused or contributed to the death, 2) no evidence was found of products, and 3) toxicology testing confirmed fentanyl in the body, in unused drugs of the decedent, or in a specimen from a person with whom the decedent shared drugs. Public health departments and law enforcement agencies examiners, initially identifying NPF-related deaths that occurred during April 2005--May 2006 and adding new NPF-related deaths as they were identified. In September 2006, DEA took over the surveillance system, using t May 2007.

Testing of street drugs found samples consisting of NPF alone and NPF mixed with other drugs. Most of the implicated NPF was mixed with heroin or cocaine, sold as a street drug, and used as an injection. During April 4, 2 surveillance system identified 1,013 NPF-related deaths (Table). The monthly incidence of NPF deaths peaked in June 2006 at 150 cases and decreased to one death in February 2007 and one death in March 2007 (Figure age were known, 577 (58.6%) were aged 35--54 years (Figure 2), and 788 (80.1%) were male. Among the 984 decedents whose race/ethnicity were known, 545 (55.4%) were white, 392 (39.8%) were black, and 41 (4.2

In response to the NPF-related deaths, public health agencies formed task forces; alerted health-care providers, law enforcement, and drug users; and intensified community outreach to drug users (including hiring additional ou activities included training drug users and others in overdose prevention and cardiopulmonary resuscitation and providing "take-home" parenteral or intranasal naloxone, an antagonist used to reverse opioid overdoses (*5*). Law state police) responded by identifying and arresting sellers of NPF, seizing NPF, and closing NPF production facilities, including one in Toluca, Mexico, in May 2006. In April 2007, DEA began regulating access to N-phenethi manufacture NPF (*1*).

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Editorial Note:

The findings in this report indicate that, during April 4, 2005--March 28, 2007, a total of 1,013 deaths in six jurisdictions were attributed to NPF, making this the largest NPF epidemic ever reported. An earlier epidemic in the caused by 10 different fentanyl analogs (*3*). The NPF epidemic described in this report was multifocal, with the largest numbers of deaths occurring in metropolitan Chicago, Detroit, and Philadelphia. In addition to the NPF-re surveillance system, other NPF-related deaths were reported in suburban and rural areas of Illinois, Michigan, and Pennsylvania and in Kentucky, Maine, Maryland, Massachusetts, New Hampshire, Ohio, and Virginia during

Drug specific enhancements

- ❏ ICD-10 drug classification limits the ability to identify drugs and monitor trends

- ❏ Code drugs using drug specific classification in addition to ICD-10

- ❏ Develop list of terms and keywords to monitor death certificate literal text

- ❏ Increase timeliness

Example:
Drowning surveillance

Why drowning?

❑ **Leading cause of death among children**

❑ **Related to severe weather events (e.g. hurricane, floods) and climate change**

❑ **Follows geographic boundaries (e.g. oceans, rivers)**

❑ **Consumer product -- emerging threat**

❑ **Prevention strategies known !**

Location of drowning

- **Locations identified using ICD-10 codes (W65-W74)**

  - Bathtub

  - Swimming pool

  - Natural body, including lake, open sea, river, stream

  - Other specified

  - Unspecified

- **Special study**

  - Collaborators: Consumer Product Safety Administration & National Institutes of Health

  - Abstracted all location information from death certificate

Where do children drown?

| Site	Number (%)
TABLE 2. Childhood Drownings by Site, United States, 1995	
Artificial pools	457 (32)
Swimming pools	435 (31)
Jacuzzi/hot tub/whirlpool/spa	22 (2)
Domestic	125 (9)
Bathtub	81 (6)
Buckets	26 (2)
Other specified sites	15 (1)
Other unspecified sites	3 (<1)
Natural freshwater	669 (47)
Fresh outdoor still	
Lakes	231 (16)
Ponds, pits, quarries	123 (9)
Other specified sites	10 (<1)
Fresh outdoor waterways	
River, creek	235 (17)
Canal	46 (3)
Other specified sites	18 (1)
Fresh, other	6 (<1)
(unclear if still or moving)	
Salt water	57 (4)
Unspecified	112 (8)
Total—all sites	1420 (100)

Example:
Suicide surveillance

Suicide

- **10th leading cause of death**
- From ICD-10
  - Mechanism (e.g. firearm, drowning, poisoning)
- Partners:
  - SAMSHA, Action Alliance of Suicide Prevention
- Geographic variation
- Clustering
- Changes over time

Suicide Rate, by Age Group
United States, 1999-2009

Rate per 100,000 population

Legend:
- 15-24
- 25-44
- 45 -64
- 65+
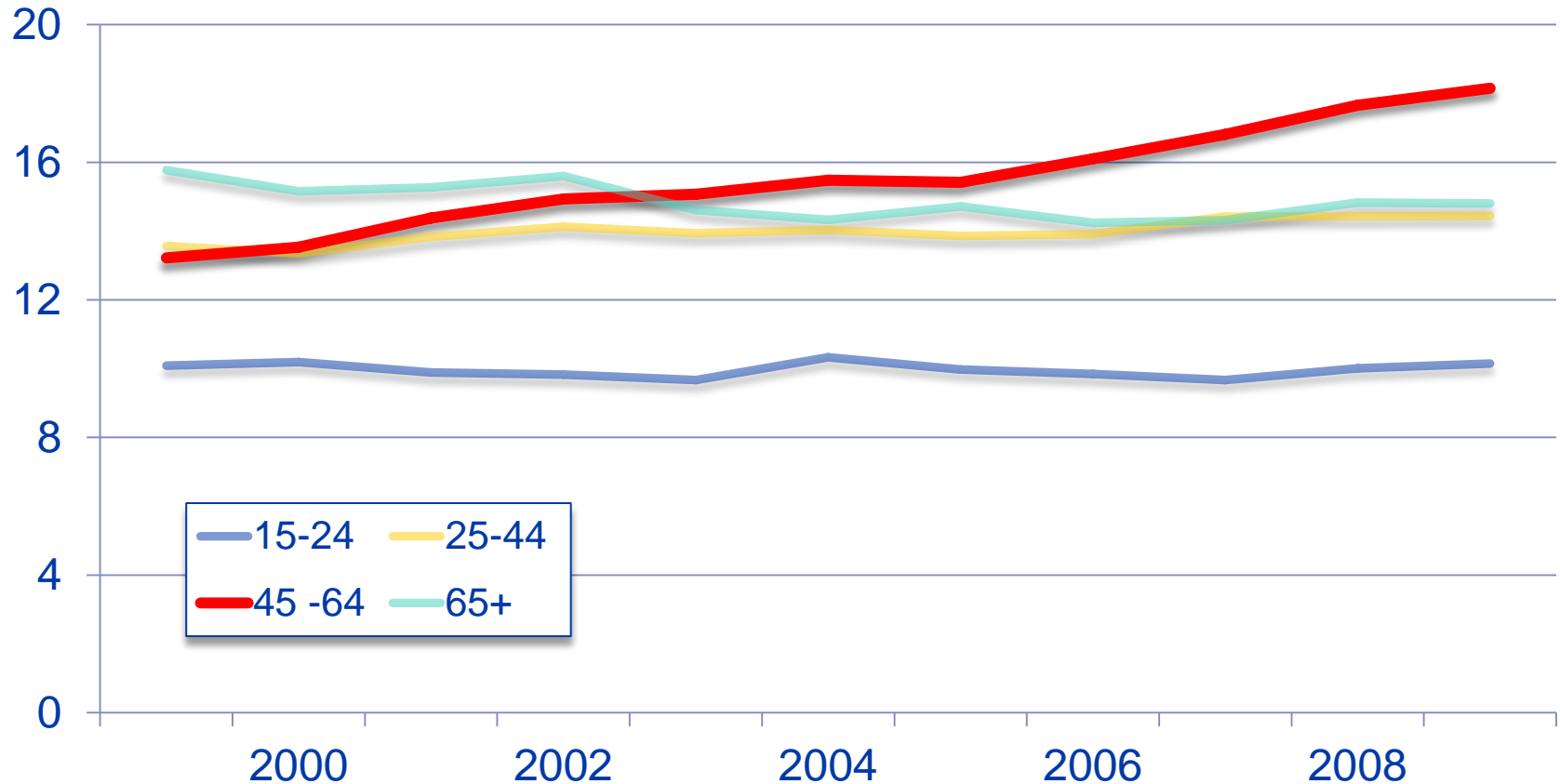
Data from CDC WISQARS at http://www.cdc.gov/injury/wisqars/index.html

Recent enhancements to data collection and process

- Electronic death registration up and running in 37 states
- Increased automation of data processing at NHCS
- Streamlining data flow from all states
- NCHS systems enhanced for monitoring data flow and feedback
- Specified time frame for data receipt in NCHS cooperative agreement with States (since mid-2012)
- NCHS coding of causes of death for all states (since 2011)

Next steps

- ❑ Routine, "real-time" monitoring of deaths
  - ▪ Electronic death registration
  - ▪ Improved processing at NCHS
- ❑ Monitoring for "emerging threats"
  - ▪ e.g. Drugs, consumer products
- ❑ Using ICD-10 codes and key word searches for selected causes
- ❑ National capacity to monitor by geography across jurisdictions
  - ▪ e.g. Appalachia, severe weather

Thanks!!!

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