

The ICD injury matrices

Margaret Warner & Ari Minino

National Conference on Health Statistics

Learning institute, 2012

ICD coding (Injury-centric view)

Injury conditions/events

- Nature of injury codes
 - Body region & diagnosis
 - e.g. Intracranial injury, upper extremity fracture
- External cause of injury codes (E-code)
 - Cause & intent
 - e.g. Unintentional fall, firearm suicide

All non-injury codes diagnoses

- Usually used for co-morbid conditions
 - e.g. diabetes

What are the ICD Injury matrices?

- External cause codes and nature of injury codes are multi-axial (i.e. describe more than one dimension).
- The ICD Injury matrices are frameworks designed to organize ICD coded injury data into meaningful groups and to standardize tabulations in either dimension
- External cause matrix categorizes ICD codes by cause & intent.
- Nature of injury matrix categorizes ICD codes by nature & body region.

Objectives of ICD matrices

- To facilitate national and international comparability in the presentation of injury statistics.
- To standardize retrieval of injury cases for epidemiological, clinical and management oriented analyses.
- To create a bridge between classification systems (e.g. ICD-9 and ICD-10).
- To eliminate some of the variations in classification between jurisdictions and over time, by creating broader groupings of cause categories.

Process for creating the ICD matrices

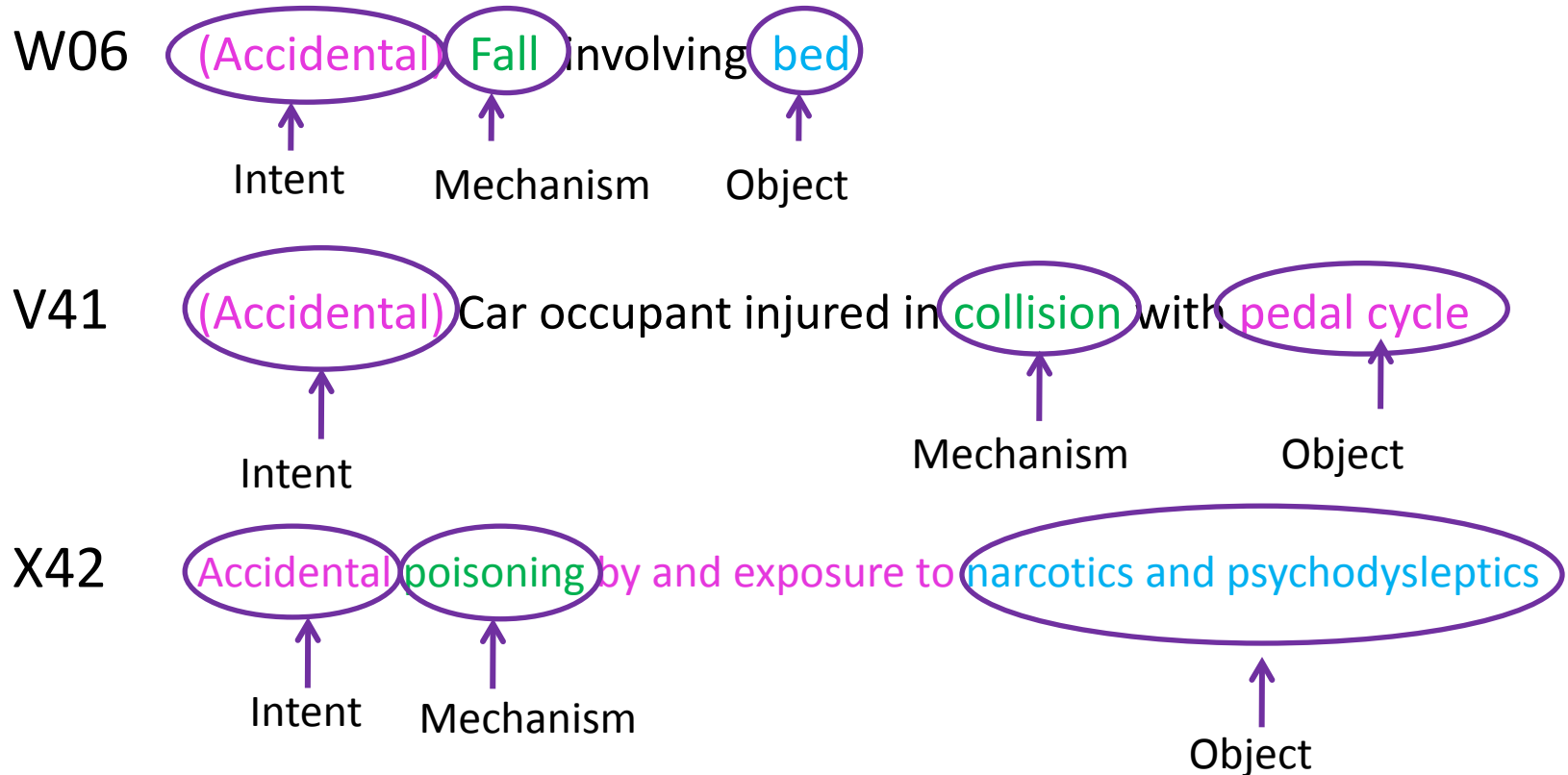
- Jointly developed by the Injury Control and Emergency Health Services (ICEHS) section of the American Public Health Association and the International Collaborative Effort (ICE) on Injury Statistics
- ICD-9 matrices was developed first and ICD-9CM and ICD-10 was designed to be similar to the ICD-9 matrix
- Draft matrices were reviewed by injury researchers, injury prevention practitioners, and others prior to finalization

ICD Injury matrices

ICD Revisions & modifications	External cause of injury	Nature of injury
ICD-9	✓ Matrix	
ICD-9-CM	✓ Matrix	✓ Barell Matrix
ICD-10	✓ Matrix	✓ Injury Mortality Diagnosis Matrix
ICD-10-CM	In development	In development

External cause code structure

Intent-Mechanism-Object



External cause of injury matrix

	Intent		
Mechanism			

ICD-10 External cause codes

External cause of injury matrix

		Intent				
		Un-intentional	Suicide	Homicide	Un-determined	Legal intervention/ war
Mechanism	All injury					
	Cut / pierce					
	Drowning					
	•					
	•					
	•					
	Suffocation					
Unspecified						

ICD-10 External cause codes

External cause-of-injury mortality matrix

NVSS, 2009

	UNINTENTIONAL	SUICIDE	HOMICIDE	UNDETERMINED	LEGAL/WAR	TOTAL
Cut/Pierce	125	669	1,874	20	-	2,688
Drowning	3,517	389	41	264	...	4,211
Fall	24,792	685	18	67	...	25,562
Fire/Flame	2,756	161	91	117	-	3,125
Hot object/Substance	67	-	2	1	-	70
Firearm	554	18,735	11,493	232	333	31,347
Machinery	608	...	...	...	...	608
Motor Vehicle Traffic	34,485	...	...	...	...	34,485
Other Pedal cyclist	256	....	...	....	...	256
Other Pedestrian	1,110	...	...	...	...	1,110
Other land transport	1,398	104	60	19	-	1,581
Other transport	1,006	...	-	...	-	1,006
Natural/Environmental	1,327	...	...	...	...	1,327
Overexertion	10	...	...	...	...	10
Poisoning	31,758	6,398	87	3,349	-	41,592
Struck by or against	776	1	132	1	-	910
Suffocation	5,939	9,000	543	163	...	15,645
Other specified, classifiable Injury	1,389	332	226	19	53	2,019
Other specified, not elsewhere classified	1,050	246	504	200	31	2,031
Unspecified Injury	5,098	189	1,728	553	3	7,571
Total	118,021	36,909	16,799	5,005	420	177,154

Leading causes of death

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

Rank	Age Groups										Total
	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	
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	Cerebrovascular 109,238	Cerebrovascular 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	Cerebrovascular 6,163	Cerebrovascular 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	Cerebrovascular 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	Cerebrovascular 193	Cerebrovascular 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	Cerebrovascular 32	Cerebrovascular 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.

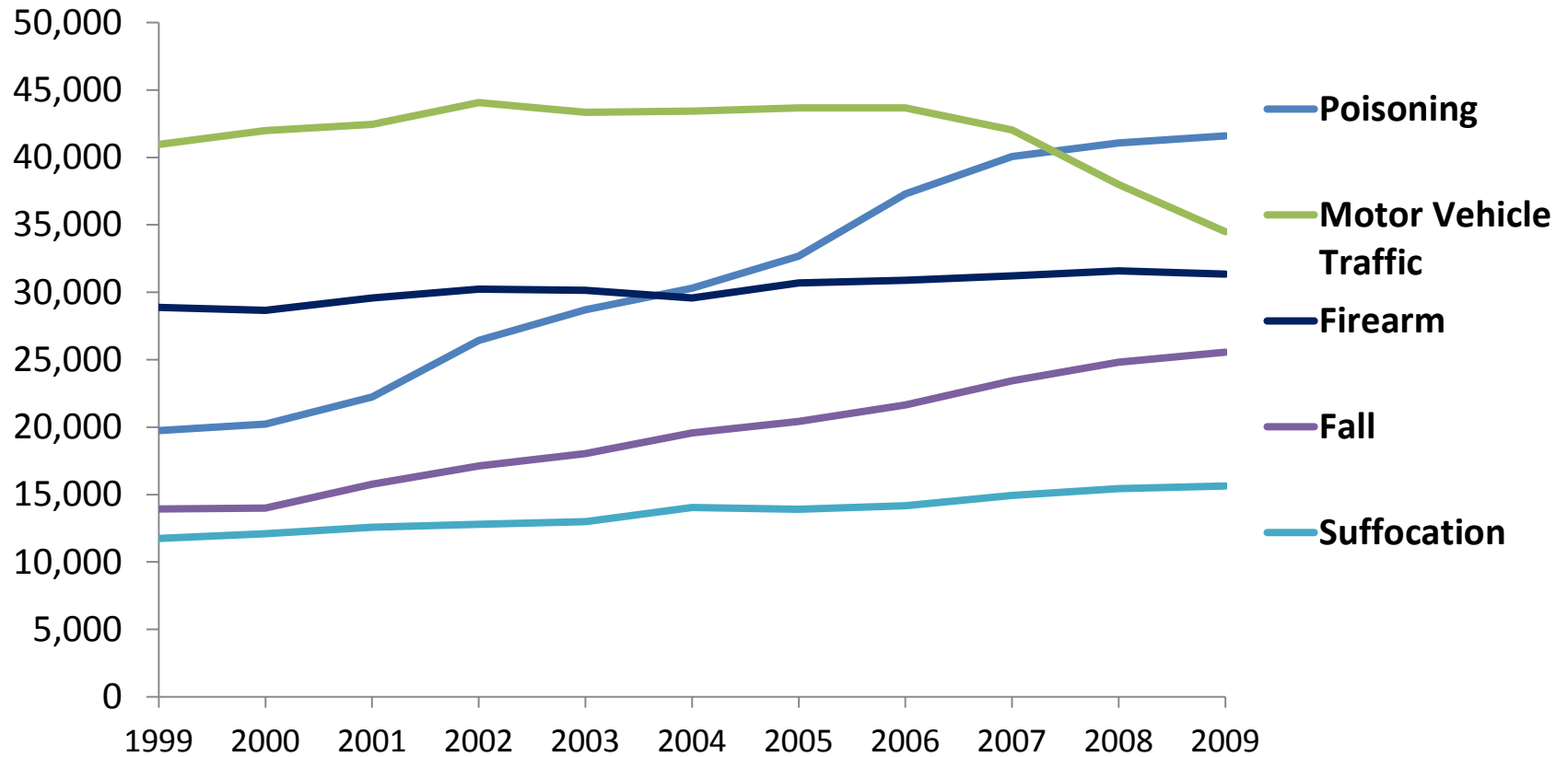
Produced by: Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC using WISQARS™.



Centers for Disease
Control and Prevention
National Center for Injury
Prevention and Control

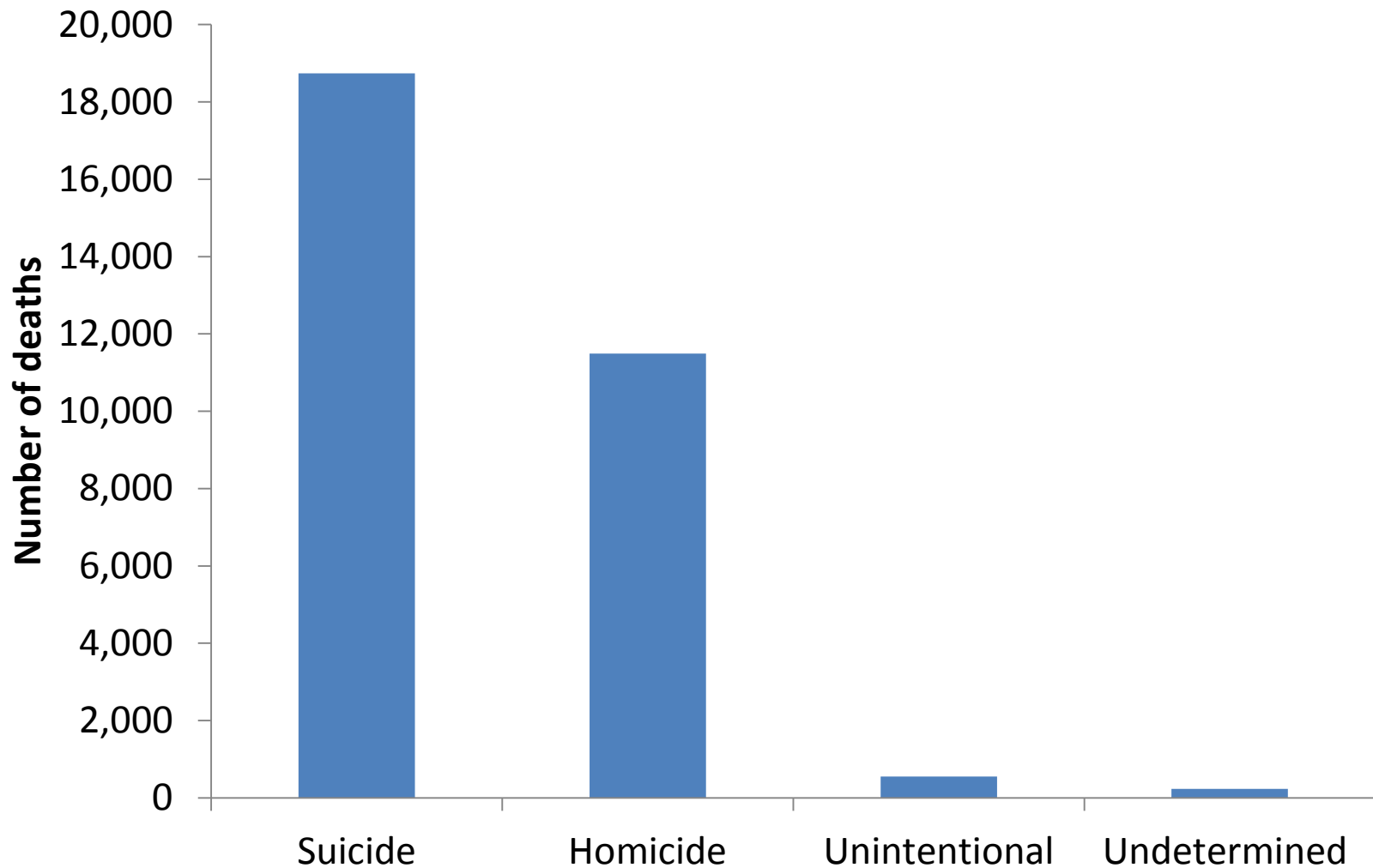
C5230409

Leading causes of injury: United States, 1999--2009



SOURCE: CDC/NCHS, National Vital Statistics System;

Firearm deaths by intent, 2009



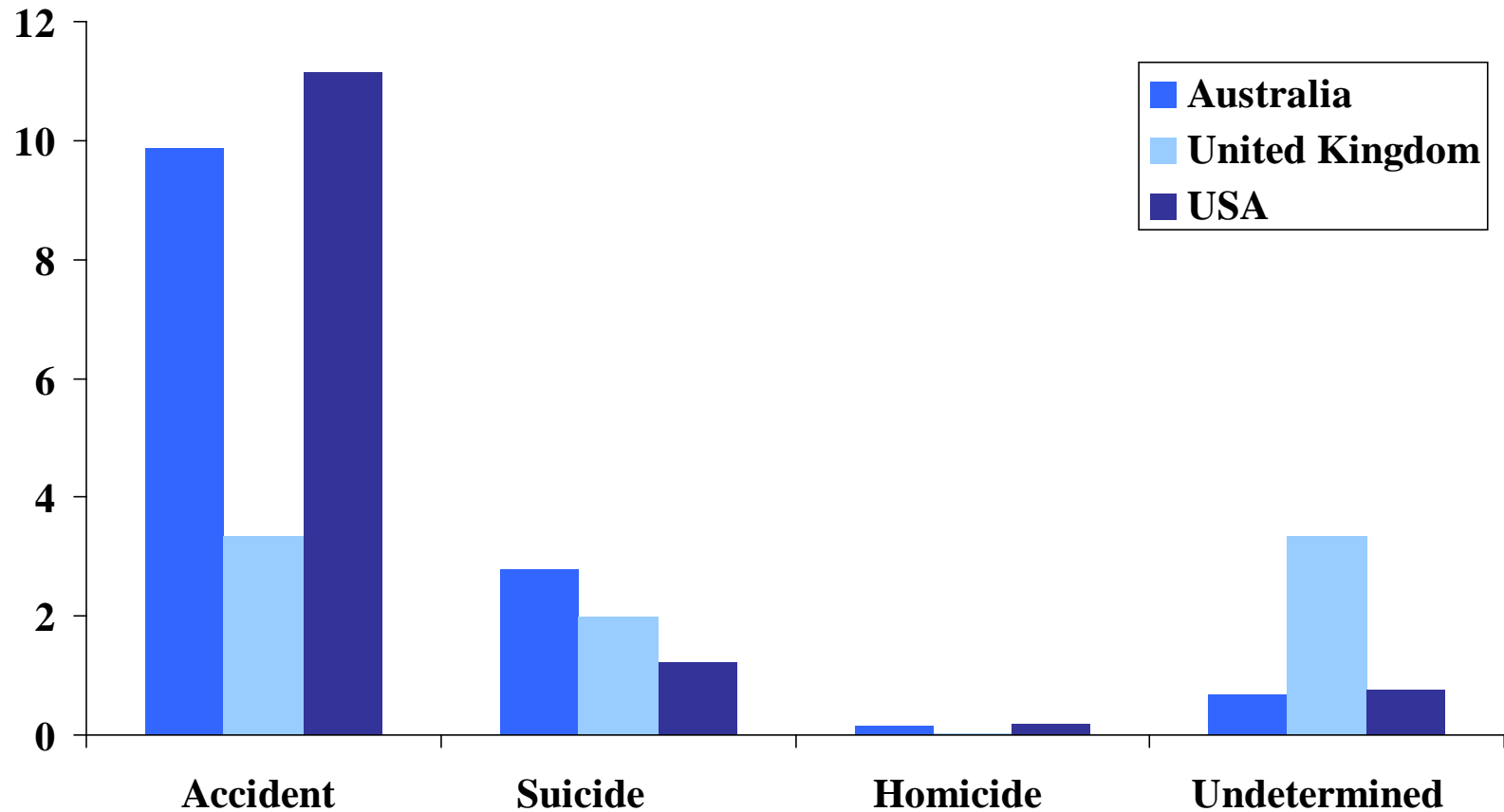
Matrix for international comparisons

Example: Unintentional drowning death rates

<u>Country</u>	<u>Rate per 100,000</u>
Australia	9.9
United Kingdom	3.4
United States	11.1

The UK must have a great prevention program!

Drowning rates per million population for selected countries



Source: Bhalla, K., Harrison, J., Fingerhut, L., Shahraz, S., Abraham, J., Hsiu-Yeh, P., on behalf of the GBD Injury Expert Group, The Global Injury Mortality Database, Version 2.0, Released on October 21 2009, Available from www.globalburdenofinjuries.org

Nature of injury code structure

Less structured than external cause codes

Body region by Nature of Injury

ICD-10	Description	Body region	Nature of Injury
S72.0	Fracture of neck of femur	Hip	Fracture
S06.5	Traumatic subdural hemorrhage	TBI	Internal organ
T31.9	Burns involving 90% or more of body surface	Multiple body regions	Burn
S28.0	Crushed chest	Thorax	Crush

Injury Mortality Diagnosis Matrix

	Nature of Injury		
Body Region			

ICD-10 'S' or 'T' codes

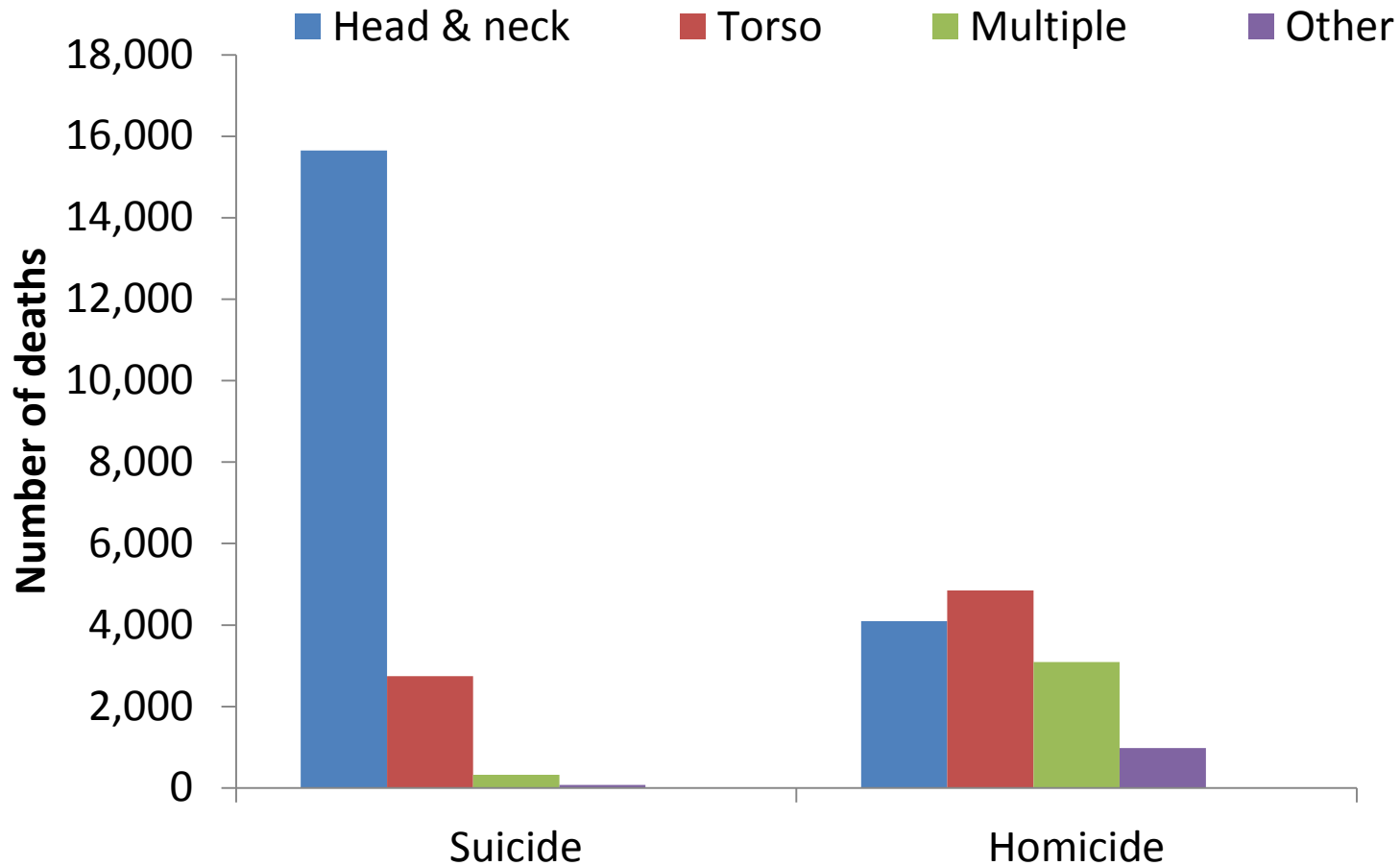
Injury Mortality Diagnosis Matrix

		Nature of Injury				
		Fractures	Dislocations	Internal	Open Wound	...
Body Region	Head/Neck					
	Spine/Upper Back					
	Torso					
	•					
	•					
	•					
	Unclassifiable					
Unspecified						

ICD-10 'S' or 'T' codes

Any mention of body region

Firearm homicide and suicide, 2009



More information (and SAS code)
Available at NCHS Injury Data & Resources
www.cdc.gov/nchs/injury/injury_tools.htm

Injury Data and Resources

- Injury Data and Resources**
- NCHS Databases
- Tools and Frameworks**
- ICD Injury Matrices
- Data Access and Resources
- Presentations
- Publications
- ICE on Injury Statistics

[NCHS Home](#) > [Injury Data and Resources](#)

[Recommend](#) [Tweet](#) 1 [Share](#)

Tools and Frameworks

Tools for Classifying ICD Codes

[Overview of the ICD Injury Matrices](#)

On this Page

- [Tools for Classifying ICD Codes](#)
- [Classifications](#)
- [Programs and Statements for Injury Data Analysis](#)

National Center for Health Statistics

[Like NCHS on Facebook](#)

[Email page](#)

[Print page](#)



Contact Us:

Office of Analysis and Epidemiology
National Center for Health Statistics
3311 Toledo Rd
Hyattsville, MD 20782
 1 (800) 232-4636
 nchsiniury@cdc.gov

- #### Related Sites
- [CDC Injury and Violence](#)
 - [National Center for Injury Prevention and Control](#)
 - [National Institute for Occupational Safety and Health](#)
 - [National Highway Traffic Safety Administration](#)
 - [U.S. Consumer Product Safety Commission](#)

External Cause-of-Injury (E-code) Matrices

ICD-10

- [Codes for the Matrix](#) [XLS - 50 KB]
- [SAS Input Statements](#) [SAS - 5 KB]

Note: The ICD-10 External Cause Matrix was updated to include code W46 *Contact with hypodermic needle*. The code is categorized as "Unintentional" and "Cut or Pierce" (9/9/2011).

ICD-9

- [Codes for the Matrix](#): [PDF - 41 KB] [XLS - 28 KB]
- [SAS Input Statements](#) [SAS - 7 KB]

[ICD-9 modified to be consistent with ICD-10 External Cause of Injury](#)

- [Codes for the Matrix](#): [PDF - 57 KB] [XLS - 34 KB]
- [SAS Input Statements](#) [SAS - 11 KB]

[ICD-9-CM \(Matrix updated and maintained by NCIPC\)](#)

- [Codes for the Matrix](#)
- [SAS Input Statements](#) [SAS - 10 KB]

Injury Diagnosis Matrices

ICD-10 (IMD Matrix)

- [Codes for the Matrix](#): [PDF - 38 KB] [XLS - 47 KB]
- [SAS Input Statements](#)

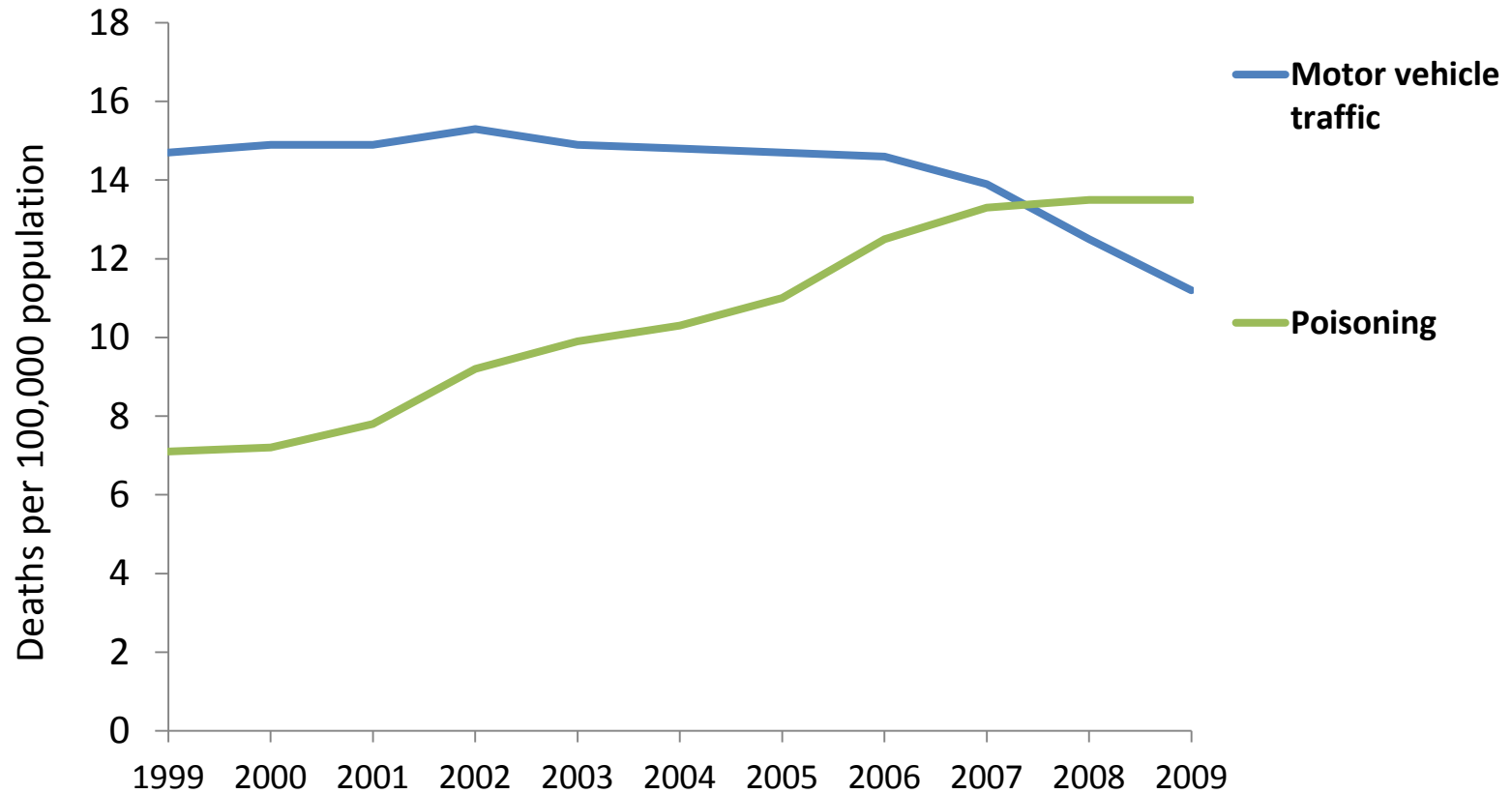
Drug poisoning mortality

Margaret Warner & Ari Minino

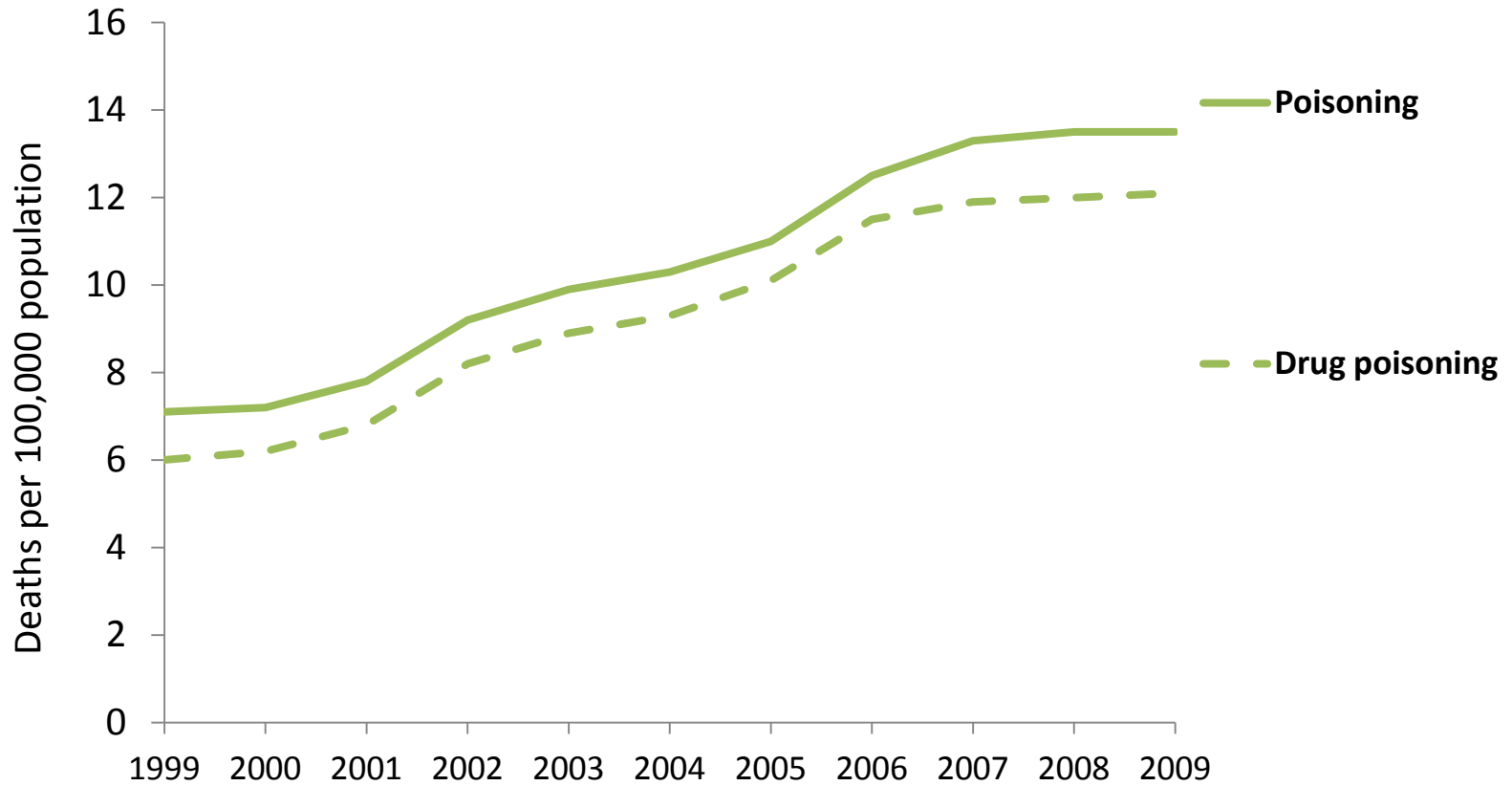
National Conference on Health Statistics

Learning institute, 2012

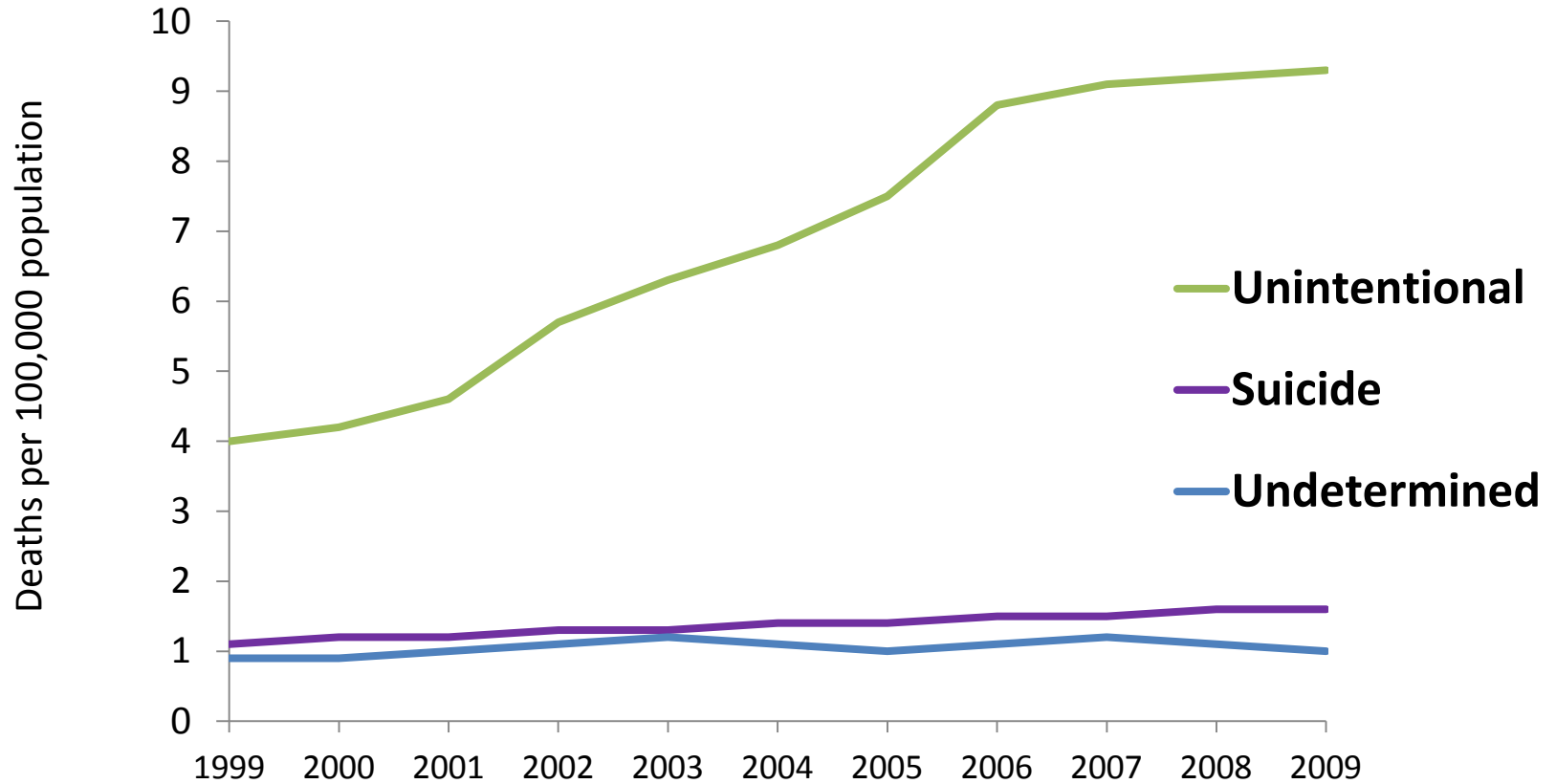
Motor vehicle traffic and poisoning death rates United States, 1999--2009



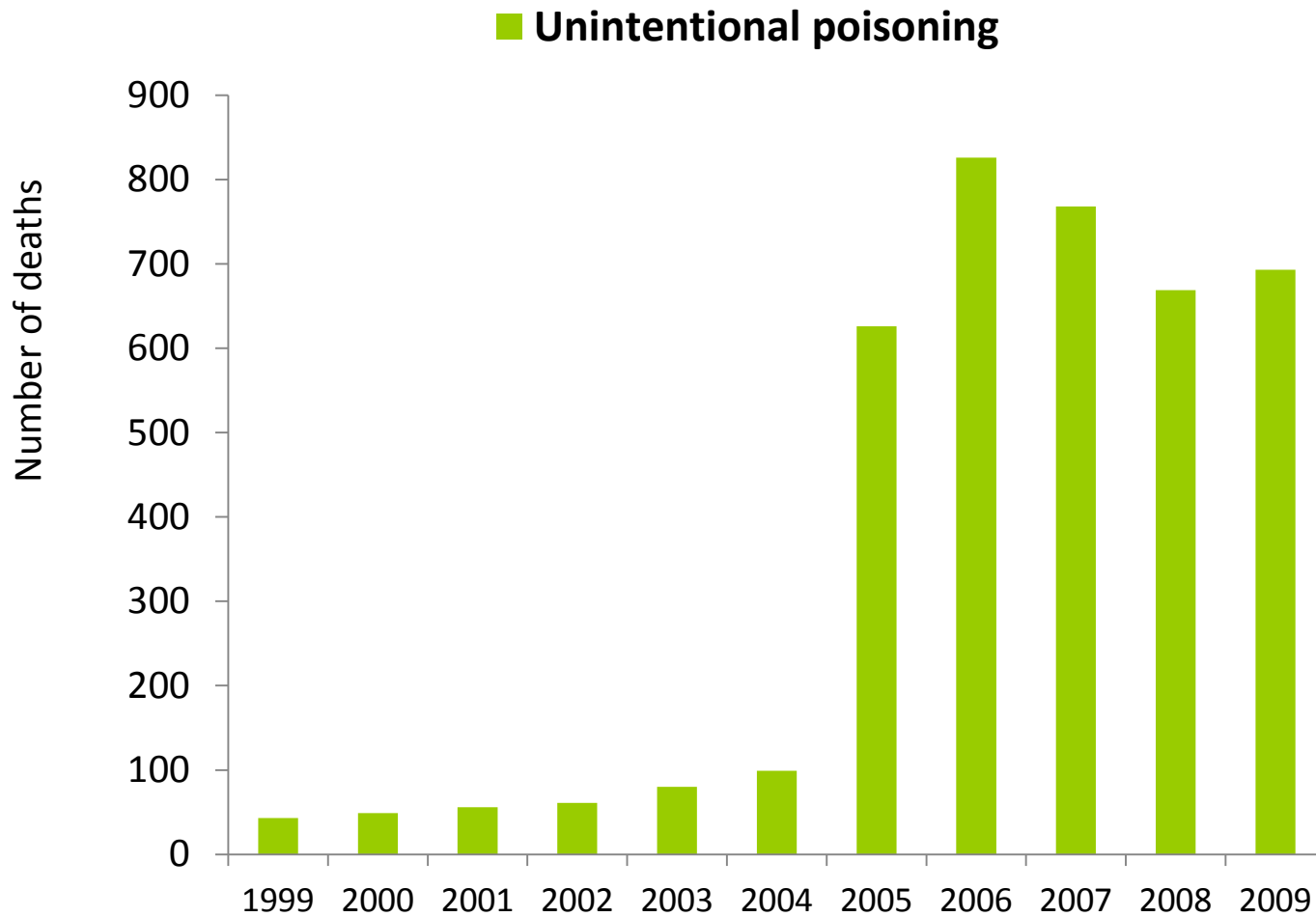
Poisoning and drug poisoning death rates United States, 1999--2009



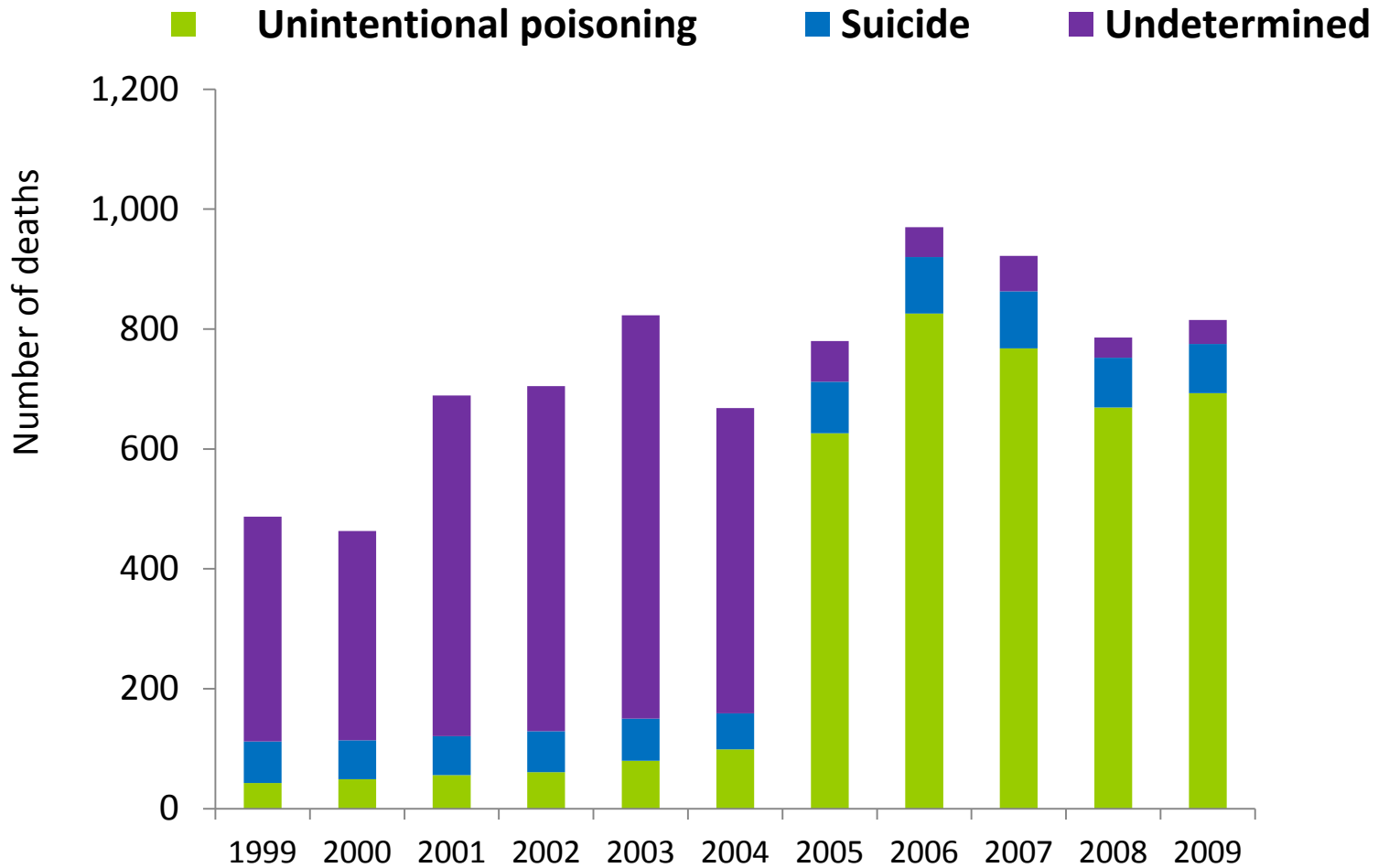
Drug poisoning death rates by intent United States, 1999--2009



Drug poisoning death rates Massachusetts, 1999--2009



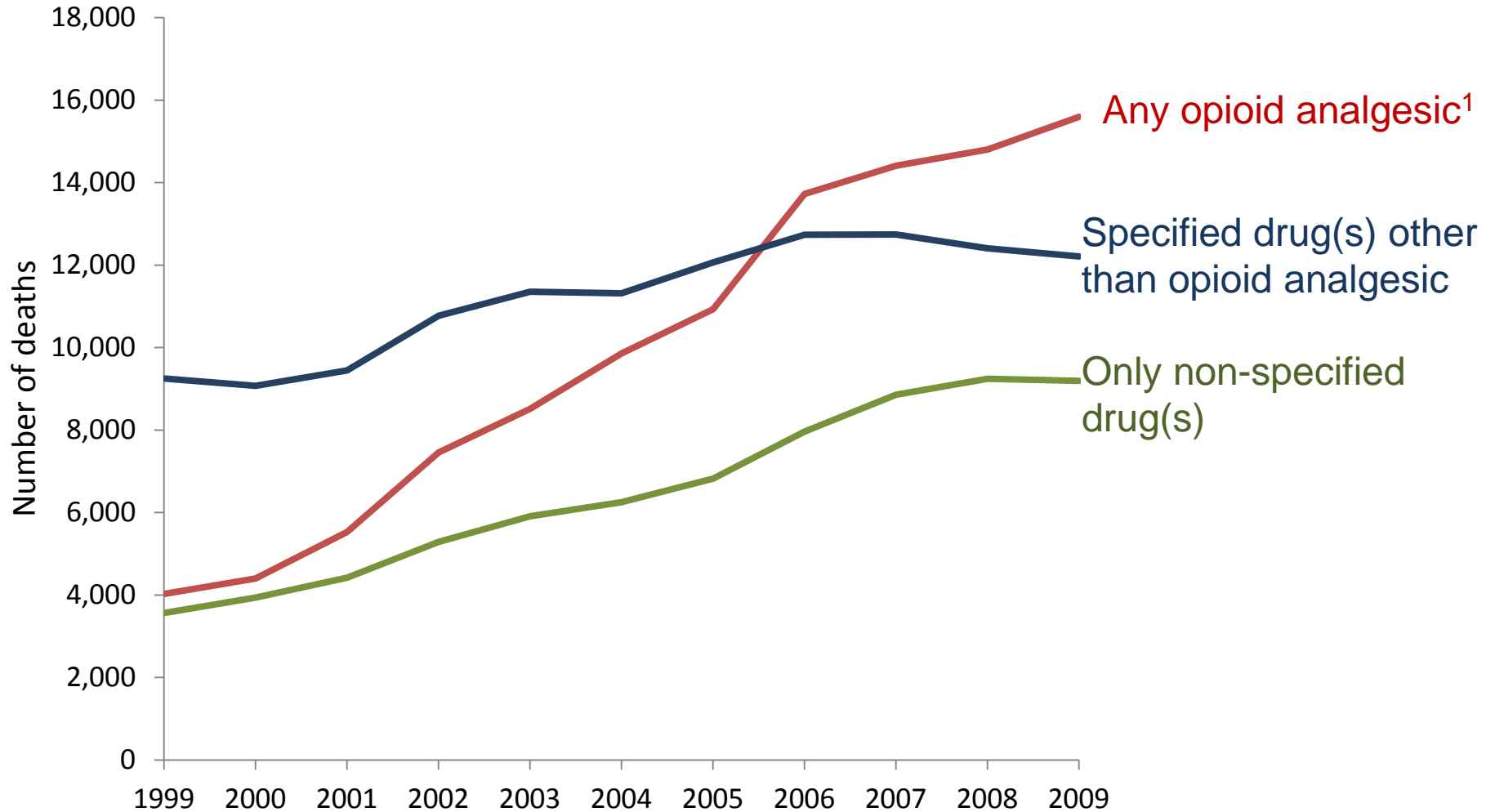
Drug poisoning death rates by intent: Massachusetts, 1999--2009



Drugs in multiple causes (aka T-codes)

Drug category	ICD-10 code	Types of drug
Natural and semi-synthetic opioid analgesics (aka "Other opioids")	T40.2	Opioid analgesics Morphine Oxycodone Hydrocodone
Methadone	T40.3	
Synthetic opioid analgesics, excluding methadone (aka "Other synthetic narcotics")	T40.4	
Heroin	T40.1	Heroin
Cocaine	T40.5	Cocaine
Other and unspecified drug(s)	T50.9	Drugs Polypharmacy

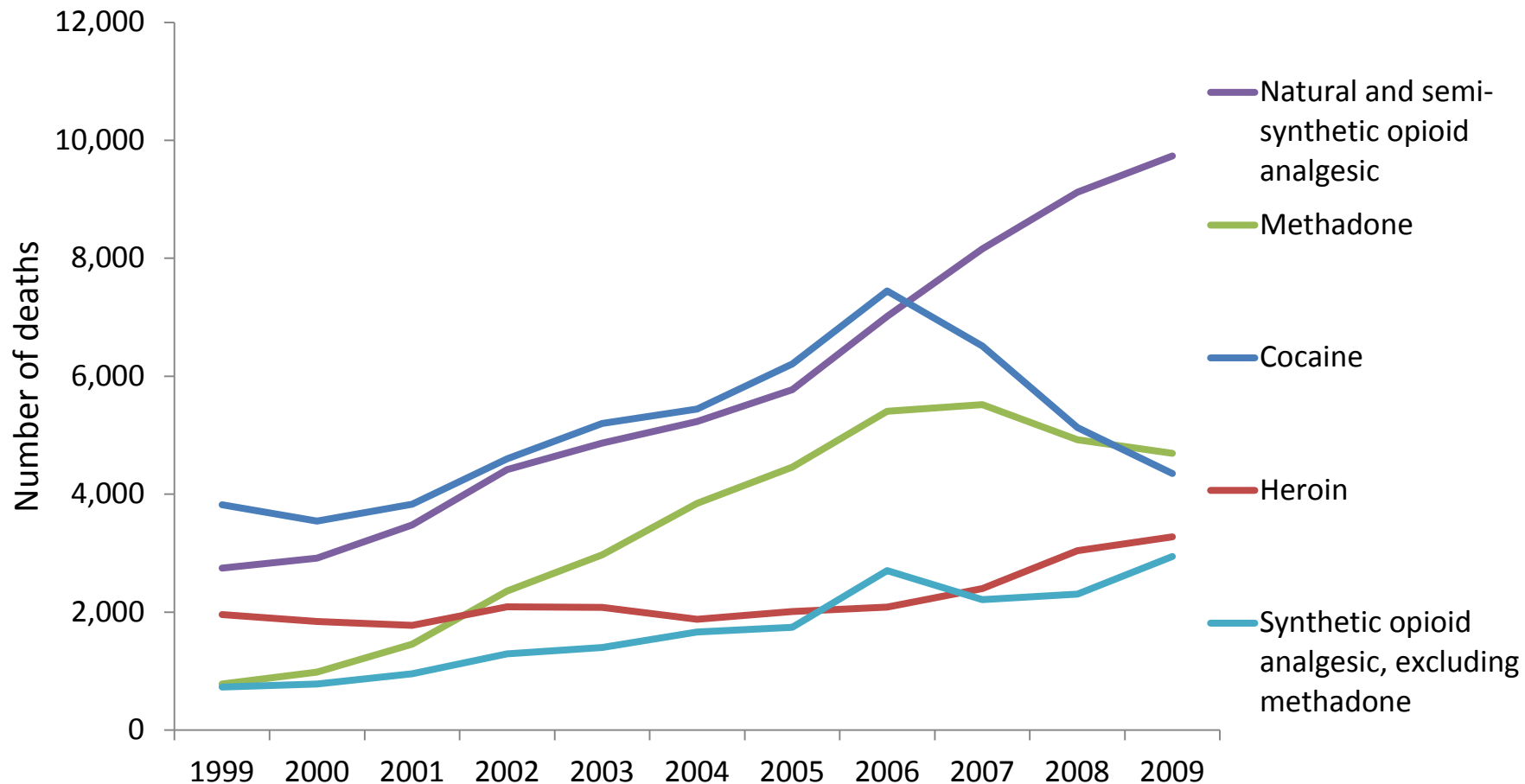
Drug poisoning deaths United States, 1999--2009



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 drug United States, 1999--2009



NOTES: Opioid analgesic categories are not mutually exclusive. Deaths involving more than one opioid analgesic category shown in this figure are counted multiple times. Natural and semi-synthetic opioid analgesics include morphine, oxycodone and hydrocodone; and synthetic opioid analgesics include fentanyl.

SOURCE: CDC/NCHS, National Vital Statistics System; and Warner M, Chen LH, Makuc DM, Anderson RN, Miniño AM. *Drug poisoning deaths in the United States, 1980–2008*. NCHS data brief, no 81. Hyattsville, MD: National Center for Health Statistics. 2011.

<http://www.cdc.gov/nchs/data/databriefs/db81.htm>

Poisoning Surveillance Matrix for ICD 10

From Safe States Injury Surveillance Workgroup 7

Consensus
Recommendations
for National
and State
Poisoning
Surveillance

- **Conceptual & operational definitions of poisoning**
- **SAS programming code**



REPORT FROM THE INJURY SURVEILLANCE WORKGROUP (ISW7)
April 2012

 SAFE STATES

See <http://safestates.org/displaycommon.cfm?an=1&subarticlenbr=236>