The Massachusetts Standard Certificate of Death: Data and Public Health Uses

Jane Purtill, M.S.
Director, Statistics Unit
Registry of Vital Records and Statistics
Bureau for Health Information, Statistics, Research and Evaluation
Massachusetts Department of Public Health

Outline

- Cause of Death and Manner

- Demographic and Cause of Death Coding

- Data Uses

- Reports of Fetal Death

- Vitals Information Processing (VIP) System

Why do it right?

1. **Completion of the death certificate is the final act of care given to a patient and provides closure to the family**

2. **The death certificate is much more than just an administrative document**

Standard format for reporting cause of death

Part I. Diseases, injuries, or complications that caused the death

Approximate interval between onset and death

Immediate cause a. Condition which directly preceded death _____

Due to (or as a consequence of)

Sequentially list conditions, if any, leading to the immediate cause with underlying cause last

{

b. _____ _____

Due to (or as a consequence of)

c. _____ _____

Due to (or as a consequence of)

d. _____ _____

}

Part II. Other significant conditions contributing to death but not resulting in the underlying cause

Immediate cause of death – Part I, line (a)

- **The disease or complication which directly preceded death**

- **There must always be an entry on line I(a)**

Standard format for reporting cause of death

Part I. Diseases, injuries, or complications that caused the death

Approximate interval between onset and death

Immediate cause a. _____ _____

Due to (or as a consequence of)

Sequentially list conditions, if any, leading to the immediate cause with underlying cause last.

b. Antecedent condition _____ _____

Due to (or as a consequence of)

c. Underlying cause _____ _____

Due to (or as a consequence of)

d. _____ _____

Part II. Other significant conditions contributing to death but not resulting in the underlying cause

Antecedent causes
(conditions, if any, leading to immediate cause) – Part I, lines (b), (c) and (d)

- Reported conditions should be in a logical sequence in terms of time, etiology and/or pathology

- If more lines are needed "due to" can be written between conditions on the same line –the sequence should not be continued into Part II

Underlying Cause of Death

The disease that initiated the train of morbid events leading directly to death

or…

- **The circumstances of the accident or violence that produced the fatal injury**

Interval between onset and death

- **For each condition reported, the interval between the presumed onset of the condition (not the date of diagnosis) and the date of death should be reported**

- **Terms "unknown" or "approximately" are OK when necessary**

Standard format for reporting cause of death

Part I. Diseases, injuries, or complications that caused the death

Approximate interval between onset and death

Immediate cause a. _____ _____

    Due to (or as a consequence of)

Sequentially list conditions, if any, leading to the immediate cause with underlying cause last.

b. _____ _____

    Due to (or as a consequence of)

c. _____ _____

    Due to (or as a consequence of)

d. _____ _____

Part II. Other significant conditions contributing to death but not resulting in the underlying cause

Other significant conditions – Part II

- **Other important diseases or conditions that were present at the time of death and that may have contributed to death, but were not directly related to the underlying cause of death should be reported in   Part II**

Manner of Death

- Must never be left blank

- Only one allowed

- It is the physician's best "reasonable medical certainty"

Demographic Coding

- In preparation for data entry, RVRS staff code:

  - Hospital

  - Place of death

  - Hispanic Origin/ Race

  - Age if under 1 year

  - Place of injury

  - Out of state residence code

Data Entry

- Records are data entered by DPH IT

- Shipments tracked - separate demographic & medical

- Index created

- Statistical database merged on mainframe

Cause of Death Coding

- Trained "nosologists"

- SuperMICAR

- Underlying cause of death

- ICD-10 in 1999

& More Processing...

- Infant Death Match

- Edits - Internal & Federal

- Out-of-State coding for Massachusetts residents

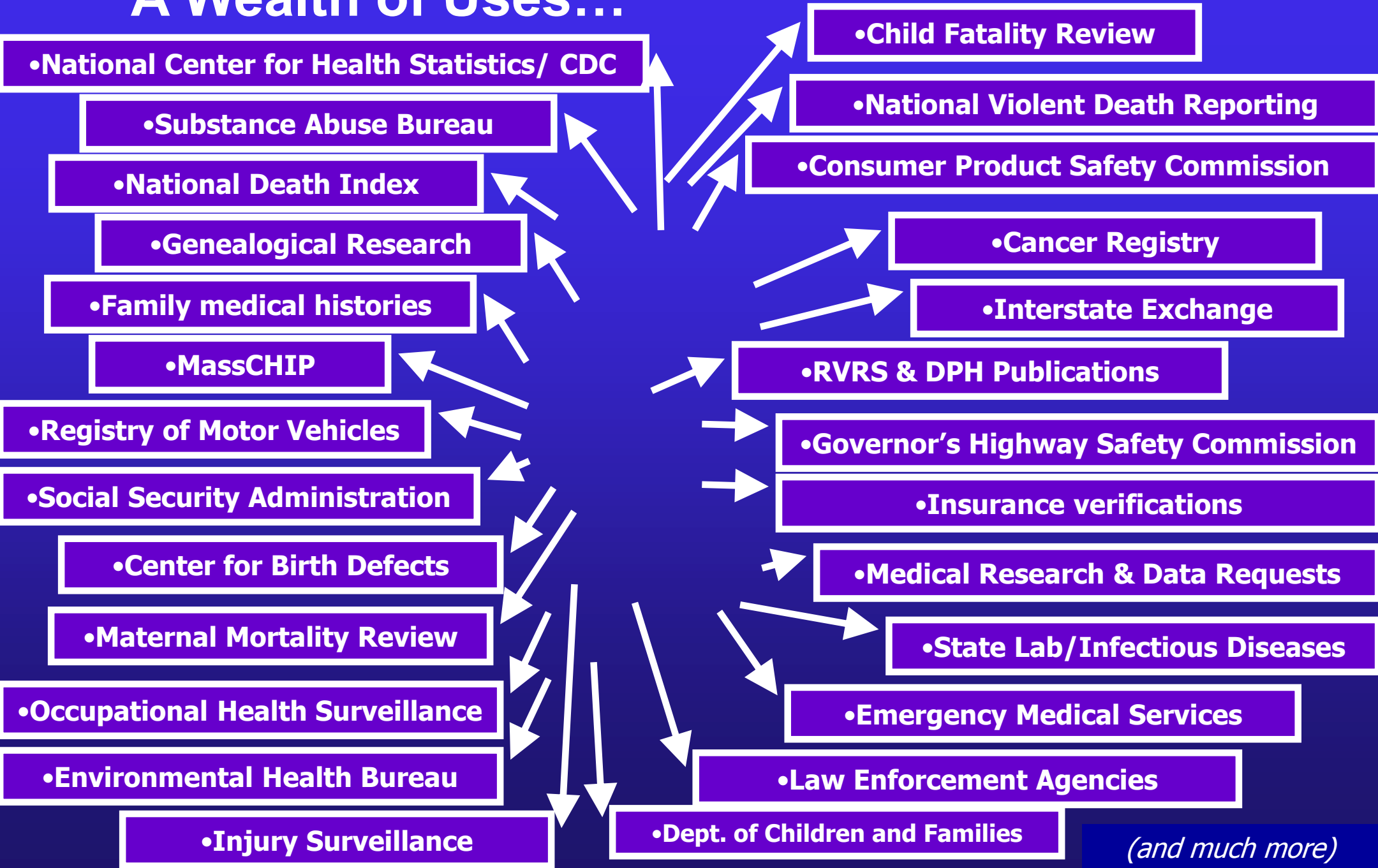- Interstate Exchange for non-MA residents

- NCHS Samples

How Information Is Used

- **Information from the death certificate, including the cause of death, is used to generate official mortality statistics such as:**

  - Life expectancy

  - Deaths and death rates by cause of death, geographic area and socio-demographic characteristics

  - Leading causes of death

  - Infant and maternal mortality rates

How Information Is Used

- **Mortality statistics generated from death certificates are used to:**
  - Assess the general health of the population
  - Examine medical problems which may be found among specific groups of people
  - Indicate areas in which medical research may have the greatest impact on reducing mortality
  - Allocate medical services, funding, and other resources

A Wealth of Uses…

- National Center for Health Statistics/ CDC
- Substance Abuse Bureau
- National Death Index
- Genealogical Research
- Family medical histories
- MassCHIP
- Registry of Motor Vehicles
- Social Security Administration
- Center for Birth Defects
- Maternal Mortality Review
- Occupational Health Surveillance
- Environmental Health Bureau
- Injury Surveillance

- Child Fatality Review
- National Violent Death Reporting
- Consumer Product Safety Commission
- Cancer Registry
- Interstate Exchange
- RVRS & DPH Publications
- Governor's Highway Safety Commission
- Insurance verifications
- Medical Research & Data Requests
- State Lab/Infectious Diseases
- Emergency Medical Services
- Law Enforcement Agencies
- Dept. of Children and Families

(and much more)

# Child Fatality Review

- M.G.L. Chapter 38: Section 2A

  Purpose of the team shall be to decrease the incidence of preventable child fatalities…

- Multidisciplinary Teams

- RVRS provides death certificates for individuals under 18 and birth data for children under one year on a monthly basis

Maternal Mortality Review

- Pregnancy associated deaths

- Maternal death

- Case ascertainment

  - Division of Health Care Quality

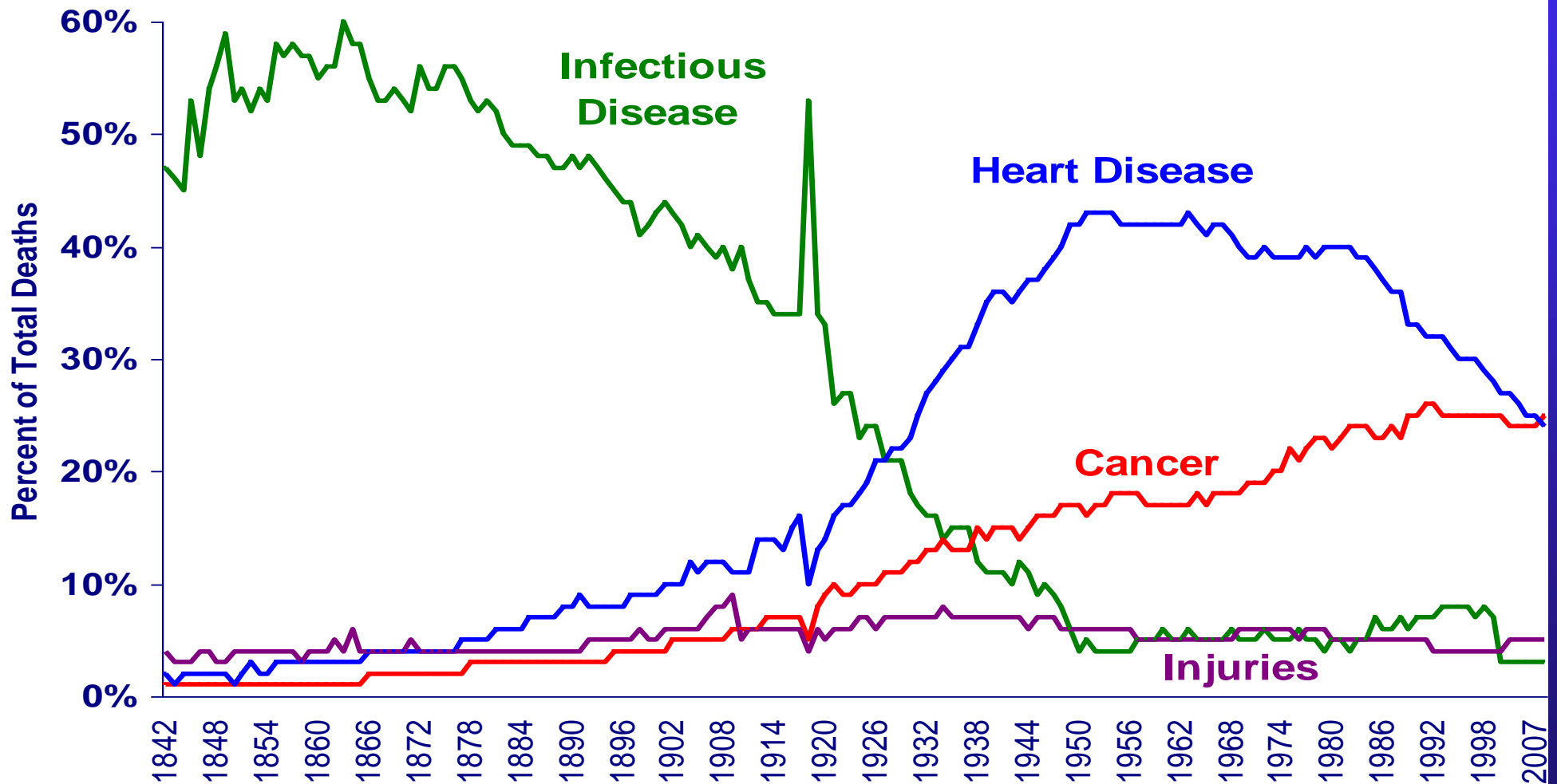 - RVRS

- Clinicians review cases

Number of Pregnancy Associated and maternal Deaths, Massachusetts: 2004-2007
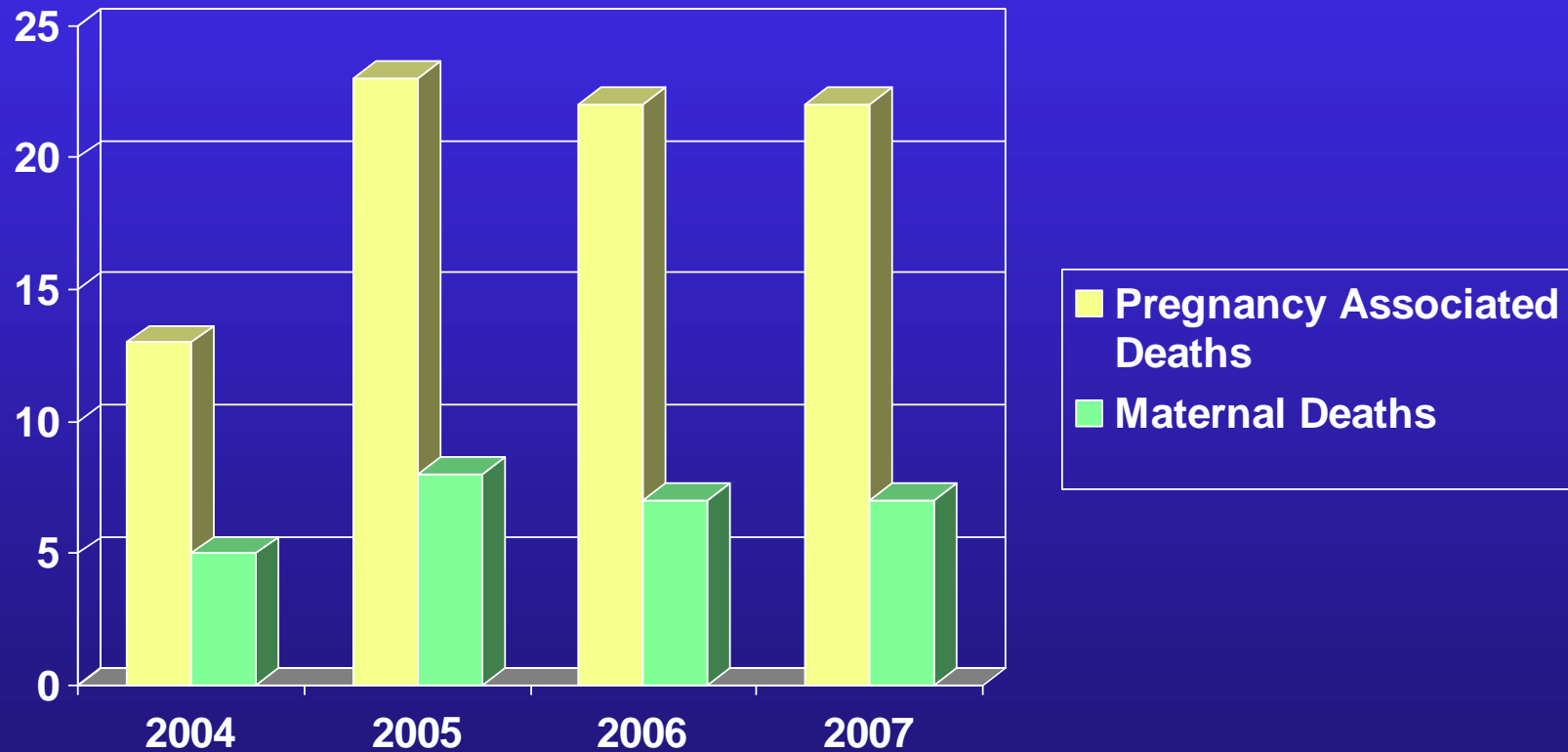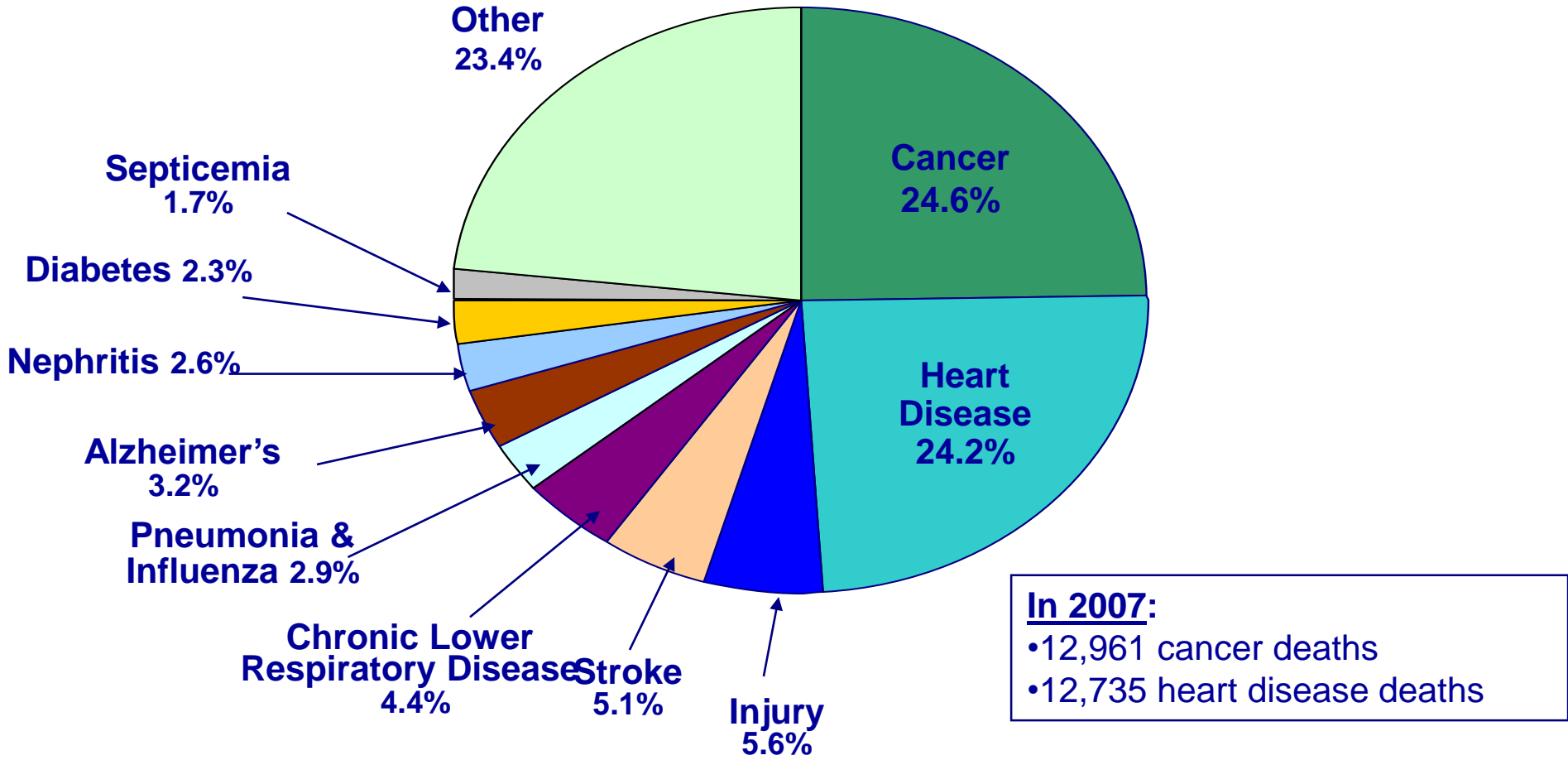
Publications and Statistics

- The Registry's PD1 (Annual Report of Vital Statistics) is the oldest continuously published public document in the U.S.

- RVRS has a full set of PD1s from 1842 to the most recent

Causes of Death
Massachusetts: 1842-2007

Leading Causes of Death
Massachusetts: 2007

Other
23.4%

Septicemia
1.7%

Diabetes 2.3%

Nephritis 2.6%

Alzheimer's
3.2%

Pneumonia &
Influenza 2.9%

Chronic Lower
Respiratory Disease
4.4%

Stroke
5.1%

Injury
5.6%

Cancer
24.6%

Heart
Disease
24.2%

In 2007:
• 12,961 cancer deaths
• 12,735 heart disease deaths

OH9900

Ranking of Leading Causes of Death by Race and Ethnicity
Massachusetts: 2007

	White[1] (N=48,.518)	Black[1] (N=2,211)	Asian[1] (N=610)	Hispanic (N=1,264)
Cancer	1	1	1	1
Heart Disease	2	2	2	2
Stroke	3	6	3	5
CLRD[2]	4	9	6	16
Unintentional Injuries	5	5	5	3
Alzheimer's Disease	6	14	14	15
Influenza & Pneumonia	7	15	4	17
Nephritis	8	3	8	9
Diabetes	9	4	7	4
HIV/AIDS	29	8	--	8
Homicide	30	7	21	7

OH9900

Note: The lower the number the higher the rank   [1] Non-Hispanic, [2] Chronic Lower Respiratory Disease
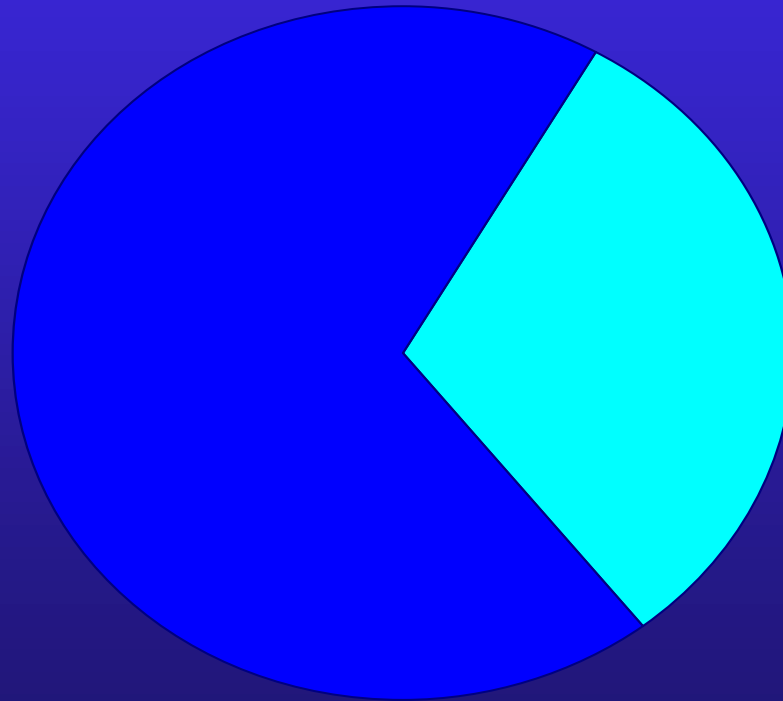
Leading Causes of Death by Age
Massachusetts: 2007

Age	Leading Cause	% of Total in Age Group	Total Deaths
1-14	Injuries	32%	128
15-24	Injuries	72%	505
25-44	Injuries	44%	2,023
45-64	Cancer	37%	8,560
65-74	Cancer	40%	7,494
75-84	Cancer	27%	14,781
85+	Heart Disease	30%	18,816

Diabetes-Related Deaths
Massachusetts: 2007

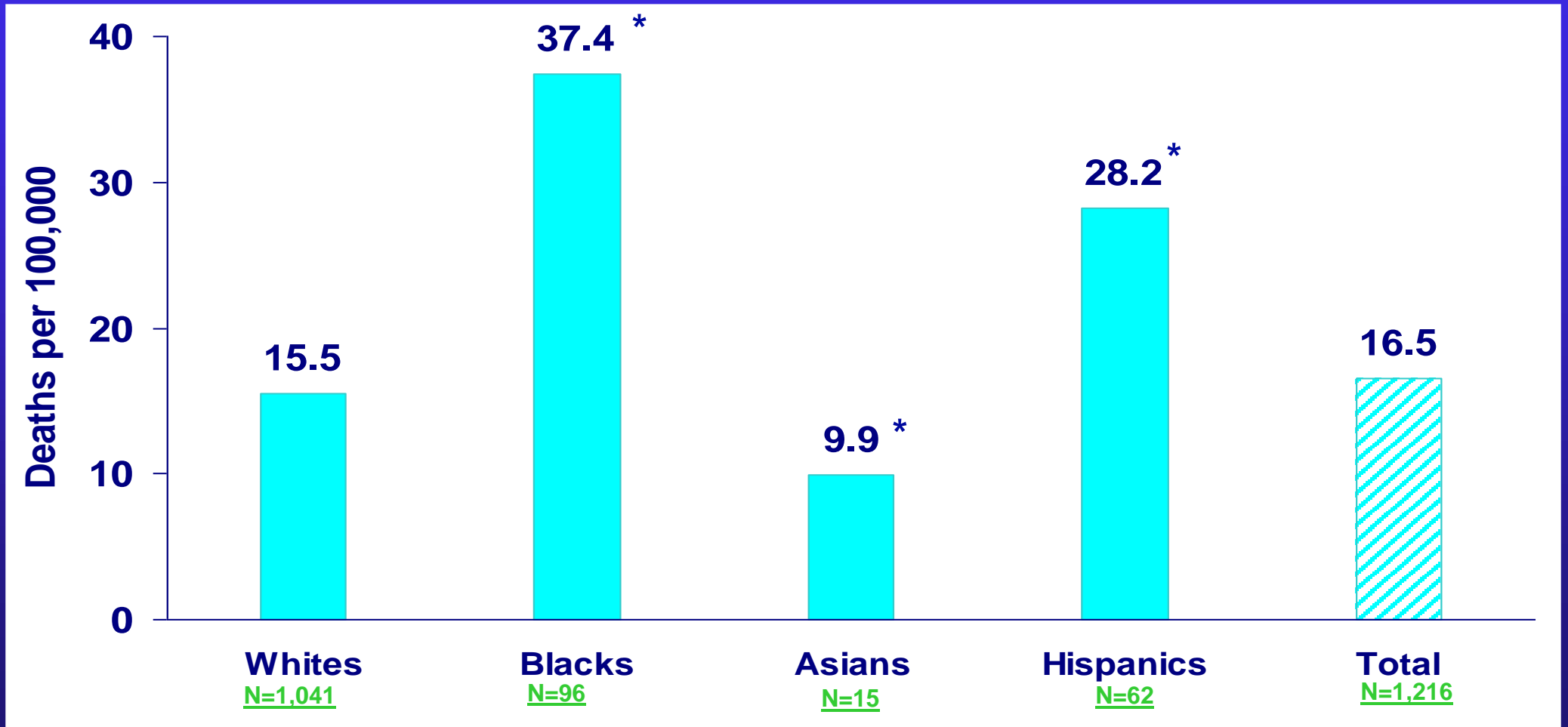**All Diabetes-related**
N=3,899

Underlying Cause
(Disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury)[1]

N=1,216

Contributing Cause
(Looking at all other 15 conditions mentioned on death certificates)

N=2,683

[1] World Health Organization. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. 2d ed. Geneva: World Health Organization. 2004.

Diabetes Mortality Rates
by Race and Ethnicity
Massachusetts: 2007

Deaths per 100,000

40

30

20 — 15.5 ... 16.5

10

0

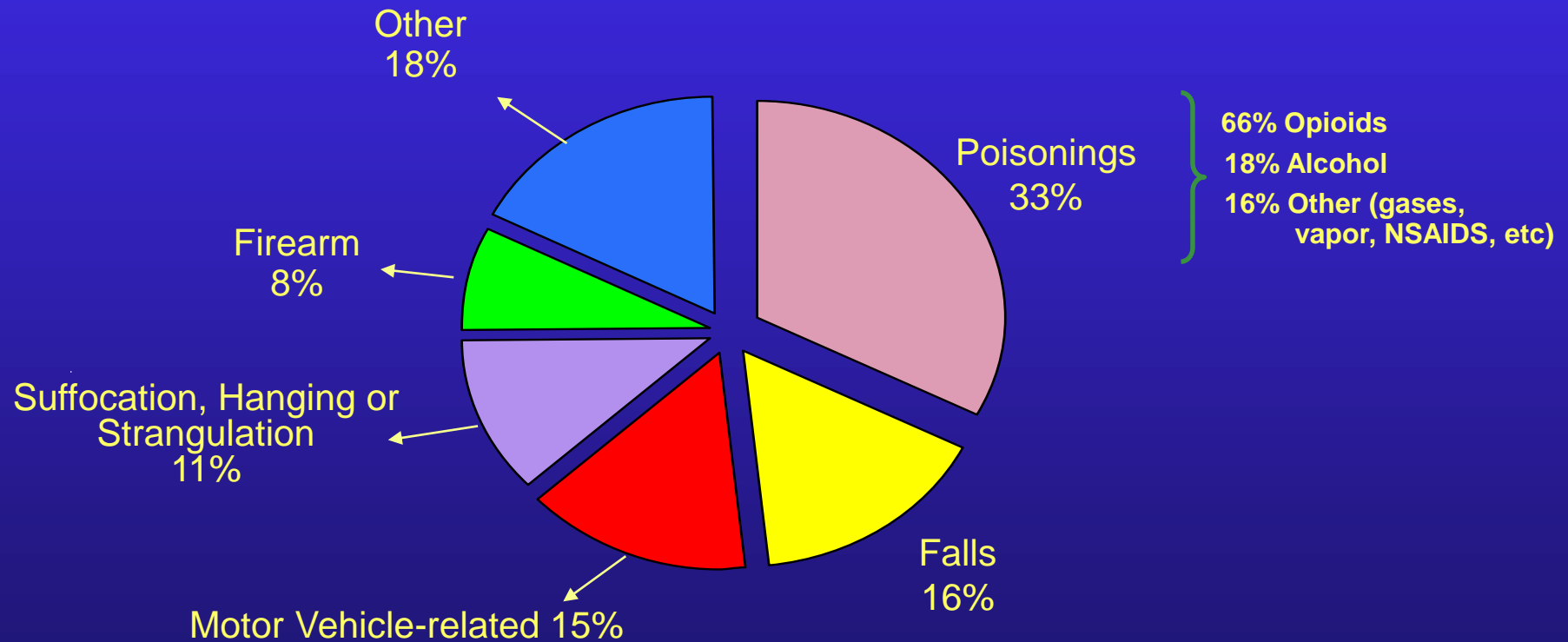| Whites | Blacks | Asians | Hispanics | Total |
| N=1,041 | N=96 | N=15 | N=62 | N=1,216 |

15.5   37.4 *   9.9 *   28.2 *   16.5

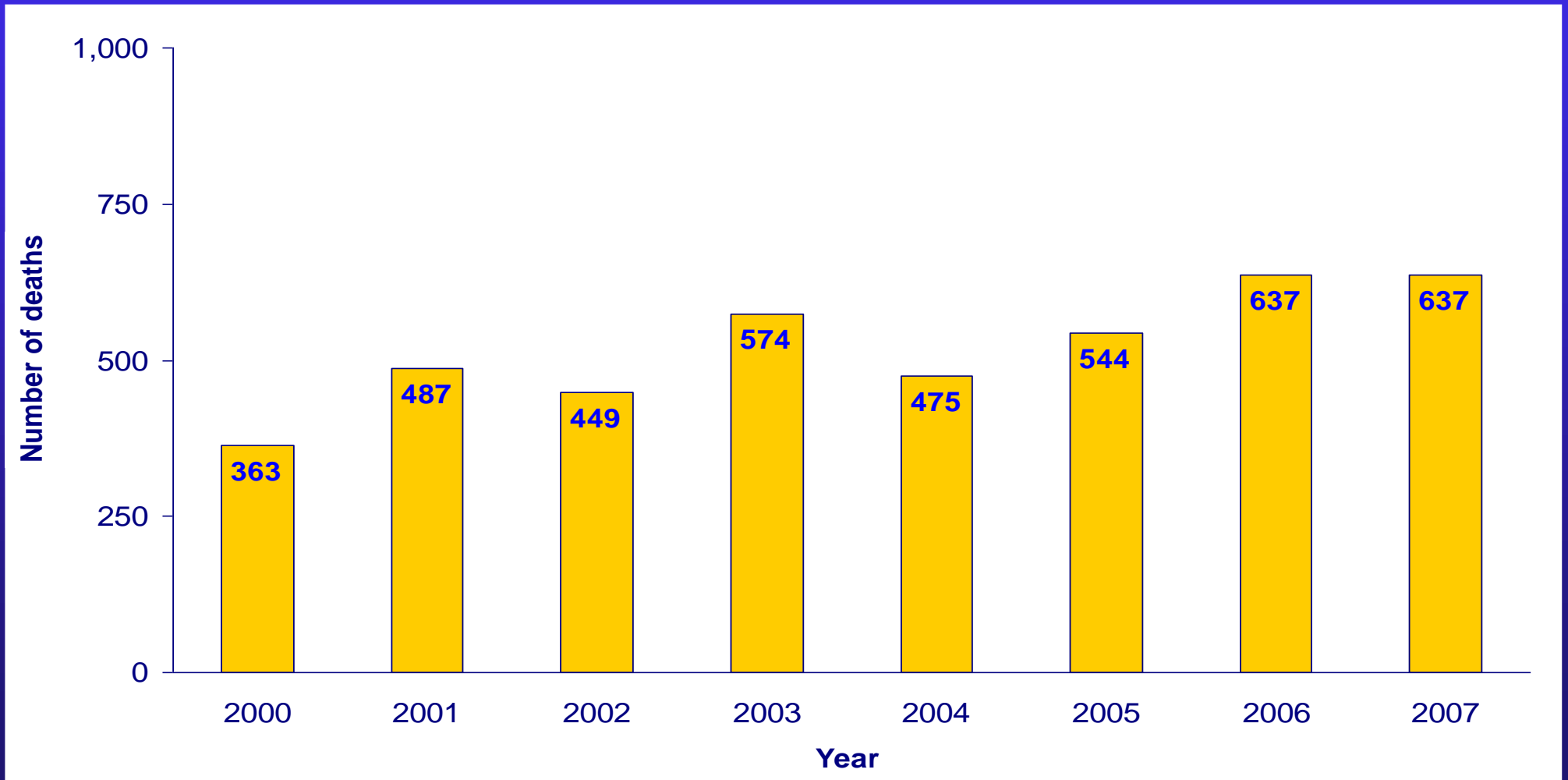Rates are per 100,000 population. Age-adjusted to the 2000 US standard population   * Statistically different than state rate (p<0.05)

Causes of Injury Deaths
Massachusetts: 2007

Total Injuries = 2,967

Other
18%

Firearm
8%

Suffocation, Hanging or
Strangulation
11%

Motor Vehicle-related 15%

Falls
16%

Poisonings
33%

66% Opioids
18% Alcohol
16% Other (gases,
vapor, NSAIDS, etc)

Number of Poisoning Deaths Where *Opioids Are Mentioned* Massachusetts: 2000-2007

Report of Fetal Death

- Hospital or ME Transmits Directly to RVRS

- Board of Health may receive a copy for disposition permit

Report of Fetal Death

- Pregnancy and Delivery information are captured on the back of the Report of Fetal Death

- Information is similar to what is collected on the statistical portion of the birth certificate and is used to assess birth outcomes.
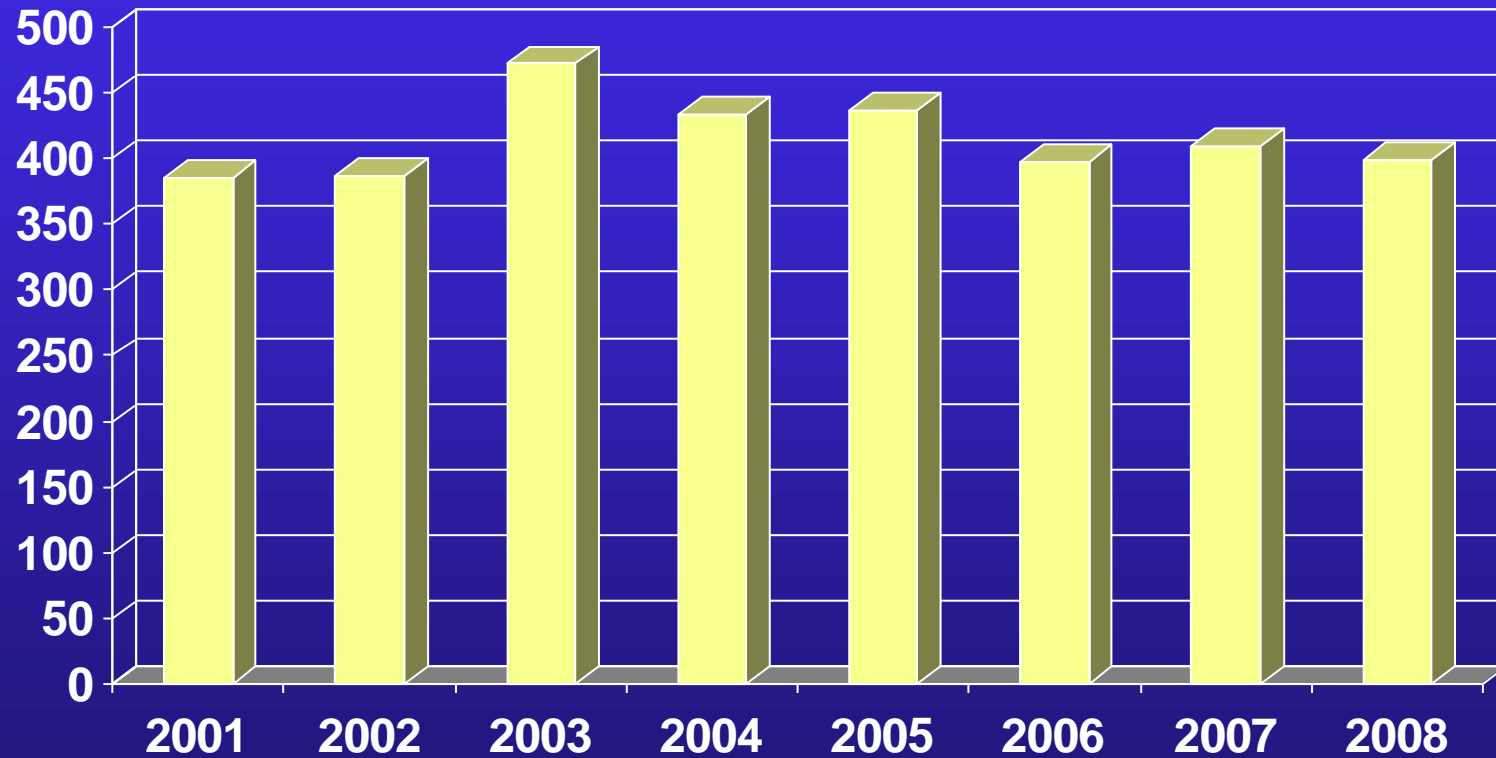
Report of Fetal Death

- Massachusetts General Law Chapter 111 section 202 governs the reporting of fetal death information.

- "… death prior to the complete expulsion or <u>extraction</u> from its mother…"

- If a fetus weighs 350 grams or more OR is twenty weeks gestation or more, it is reportable to DPH within 10 days of the event.

Report of Fetal Death

- Reports are confidential and shall be released only upon written request of the parent, executor or any other person designated by the parent in writing.

- Beginning in 2002, parents may now request a Certificate of Birth Resulting in Stillbirth provided there is a Report of Fetal Death

Reports of Fetal Death by Year

2007 Reports of Fetal Death

Cause of Death

  1) Fetal death of unspecified cause

  2) Unknown

  3) Compression of umbilical cord

  4) Placental separation and hemorrhage

  5) Extreme immaturity

A wealth of public health information

Vital Records computer files date back to 1969.

In total, RVRS maintains files of:

- **3,500,000 birth records (6,000 bytes/record)**
- **2,000,000 death records (1,600 bytes/record)**
- **1,500,000 marriages records (120 bytes/record)**
- **500,000 divorce records (90 bytes/record)**
- **13,500 fetal death records (3,500 bytes/record)**
- **20,400 abortion reports (500 bytes/record)**
- **Linked infant death/birth and other misc. files**
- **15,000,000 backup records**

Current State: Existing Challenges

Since 1969, vital records registration and statistics processing has changed very little

- 200,000 legal birth, death and marriage documents travel every year by mail between registration partners:

  - City/town clerks, physicians, medical examiners, hospitals, funeral directors, courts, marriage officiants, boards of health, and out-of-state state vital records offices…& more

  - Most legal birth, death and marriage paper certificates arrive 2-4 months after occurrence

  - Non-uniform issuance: over 500 variations of certified copies

Current State: Existing Challenges, cont.

- Statistical data capabilities are limited
  - Birth data is transmitted via 2400 bps modem from DOS-based system at hospital
    - 14 year-old system is no longer supported by vendor
    - No ability to modify for changing needs of DPH programs and researchers
  - Death and marriage records are not available on a statistical file for 7-8 months
    - No ability to respond with timely mortality data
    - Little mainframe or COBOL support available for fixes or modifications

VITALS INFORMATION PROCESSING SYSTEM

Create a secure, fully web based system to support the processing of vital records information and associated statistical data.

1. Streamline processing through use of shared central system

2. Replace current obsolete systems

3. Compliance with Federal and Commonwealth statutes

4. Improve timeliness and accuracy of data

5. Reduce administrative burden for all stakeholders in capturing and reporting information

Additional Benefits of the VIP System

Ability to respond quickly and inexpensively to changing needs – e.g., emerging legal and statistical data such as Assisted Reproductive Technology and new mandates such as the adoption registry

1. Keep personal information secure and private
2. Prevent ID theft and vital records fraud
3. Match births and deaths beyond age 1
4. Match marriages and divorces
5. Support nationwide verifications and inter-jurisdictional exchange
6. Rapidly assist law enforcement activities
7. Provide improved and timely customer service

Features of the VIP System

Births
- Process Birth Records
- Statistical Information

Deaths, Fetal Deaths
- Process Death and Fetal Death Records
- Statistical Information

Marriages, Divorces, ITOP
- Process Marriage Records
- Process Divorce Reports
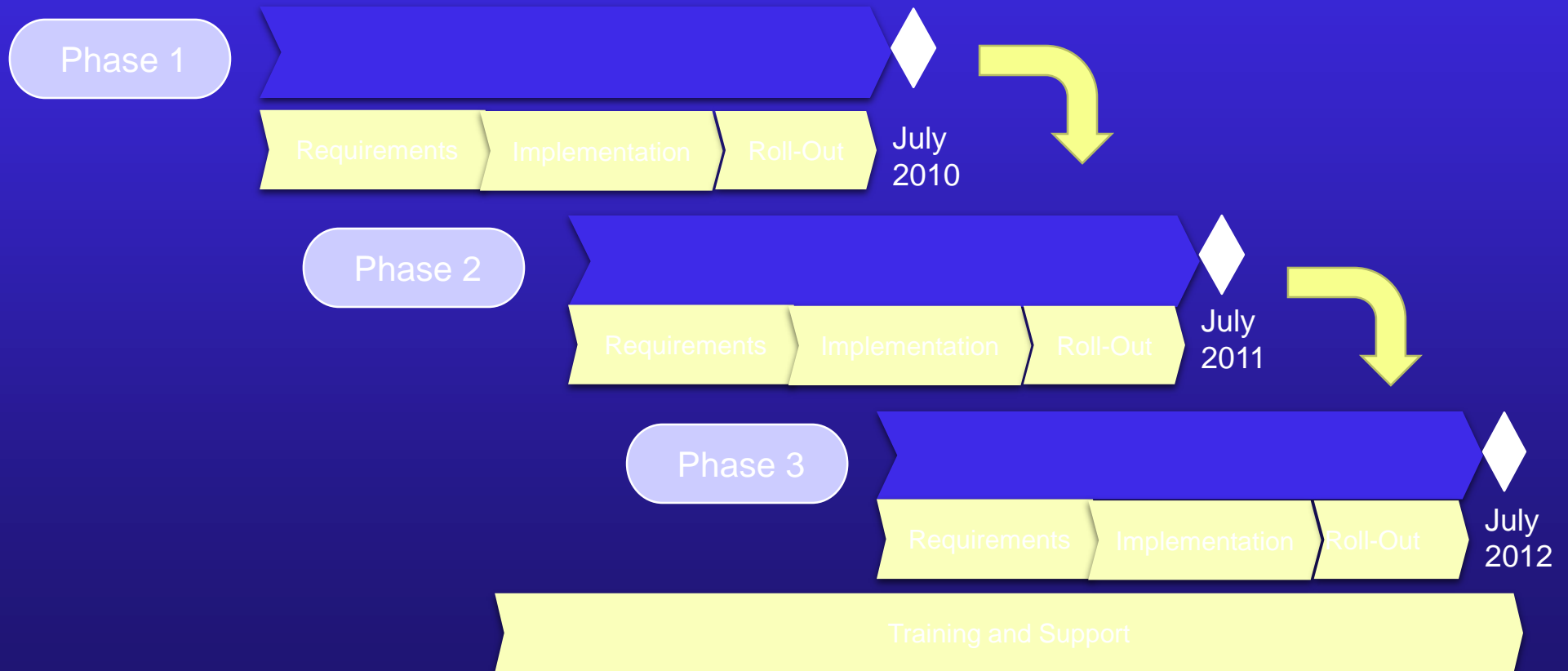- Statistical Information

Core Functions
Security
Reporting
Data Exchange

Project Timeline

Project completed in independent steps or phases which build on each other.
Each step will provide value to the RVRS and stakeholders.

Phase 1

Requirements | Implementation | Roll-Out
July 2010

Phase 2

Requirements | Implementation | Roll-Out
July 2011

Phase 3

Requirements | Implementation | Roll-Out
July 2012

Training and Support

Contacts

Stan Nyberg
Registrar
617-740-2617
Stanley.Nyberg@state.ma.us

Maisy Wong
VIP Program Manager
(617) 740-2618
Maisy.Wong@state.ma.us

Annie B. Hobbs
Fetal Death Contact
(617) 740 - 2624
AnnieHobbs@state.ma.us

Karin Barrett
Assistant Registrar
(617) 740-2621
Karin.Barrett@state.ma.us

Jane Purtill
Director of the Statistical Unit
(617) 740-2625
Jane.Purtill@state.ma.us

June Deloney
Supervisor of Registration
(617) 740-2665
June.Deloney@state.ma.us