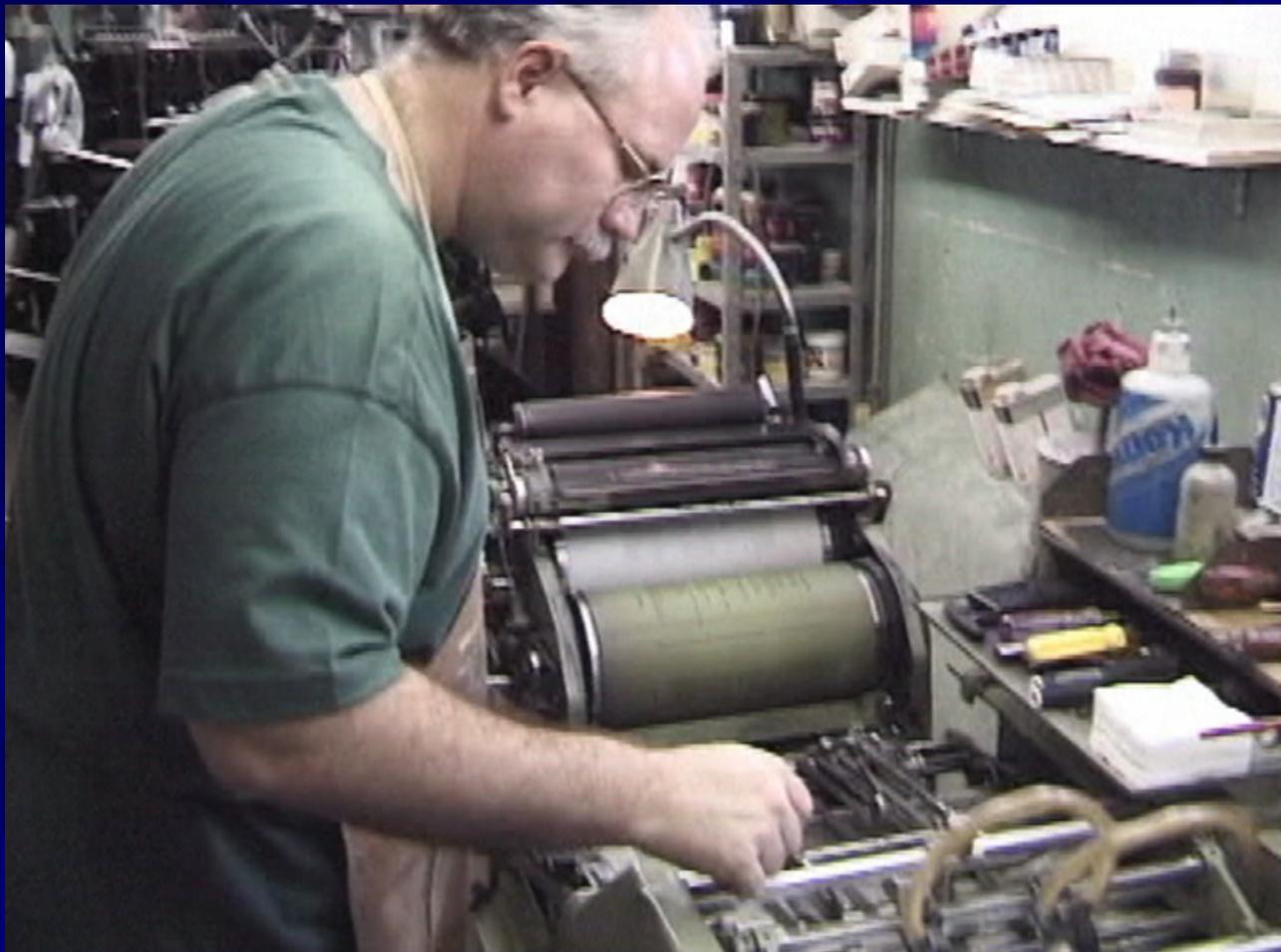


**Health Effects from Occupational  
Exposure to Chemicals  
and/or  
Using Toxics Use Reduction  
Planning to Protect Workers**

Wednesday April 14, 2010

Elise Pechter MPH, CIH

Massachusetts Department of Public Health,  
Occupational Health Surveillance Program



- IPA in offset printing
- Prohibited as VOC (400 ppm TWA)
- Replaced with 2-BE, a glycol ether (NIOSH REL 5ppm)

# Energy saving using foam



**The Icynene Insulation System<sup>®</sup>**  
Healthier, Quieter, More Energy Efficient<sup>®</sup>



# Massachusetts Department of Public Health, EOHHS

## John Auerbach

### Helping People Lead Healthy Lives In Healthy Communities

We believe in the power of *prevention*.

We work to help all people reach their *full potential* for health.

We ensure that the people of the Commonwealth receive quality *health care* and live in a safe and healthy environment.

We build partnerships to maximize *access* to affordable, high quality health care.

We are especially dedicated to the health concerns of *those most in need*.

We *empower our communities* to help themselves.

We protect, preserve, and improve the health of all the Commonwealth's residents.



# Why surveillance?



- It doesn't count, if you don't count.
  - Who?
  - Where?
  - Doing what?
  - What happened?
- Prevention
- Government role

# Public Health Surveillance

On-going, systematic surveillance

- collection, analysis, and interpretation of health data essential to public health practice
- dissemination of these data to those who need to know for the purposes of prevention
  - “follow up to see that action has been taken”



# Occupational Health Surveillance Program

Bureau of Health Information,  
Statistics, Research & Evaluation

- Collects, analyzes and disseminates information about work-related injuries and illnesses in Massachusetts
- Uses information to conduct and promote intervention and prevention activities

# Occupational Health Surveillance

## Sentinel

- Sentinel health events indicate need for action
  - Failure of prevention
  - “Why did this happen?”
  - Referral
  - Stories
- Identify industries, occupations and exposures

## Population-based

- Scope
- Magnitude
- Representative of whole population
- Distribution
  - Who
  - Where
- Trends

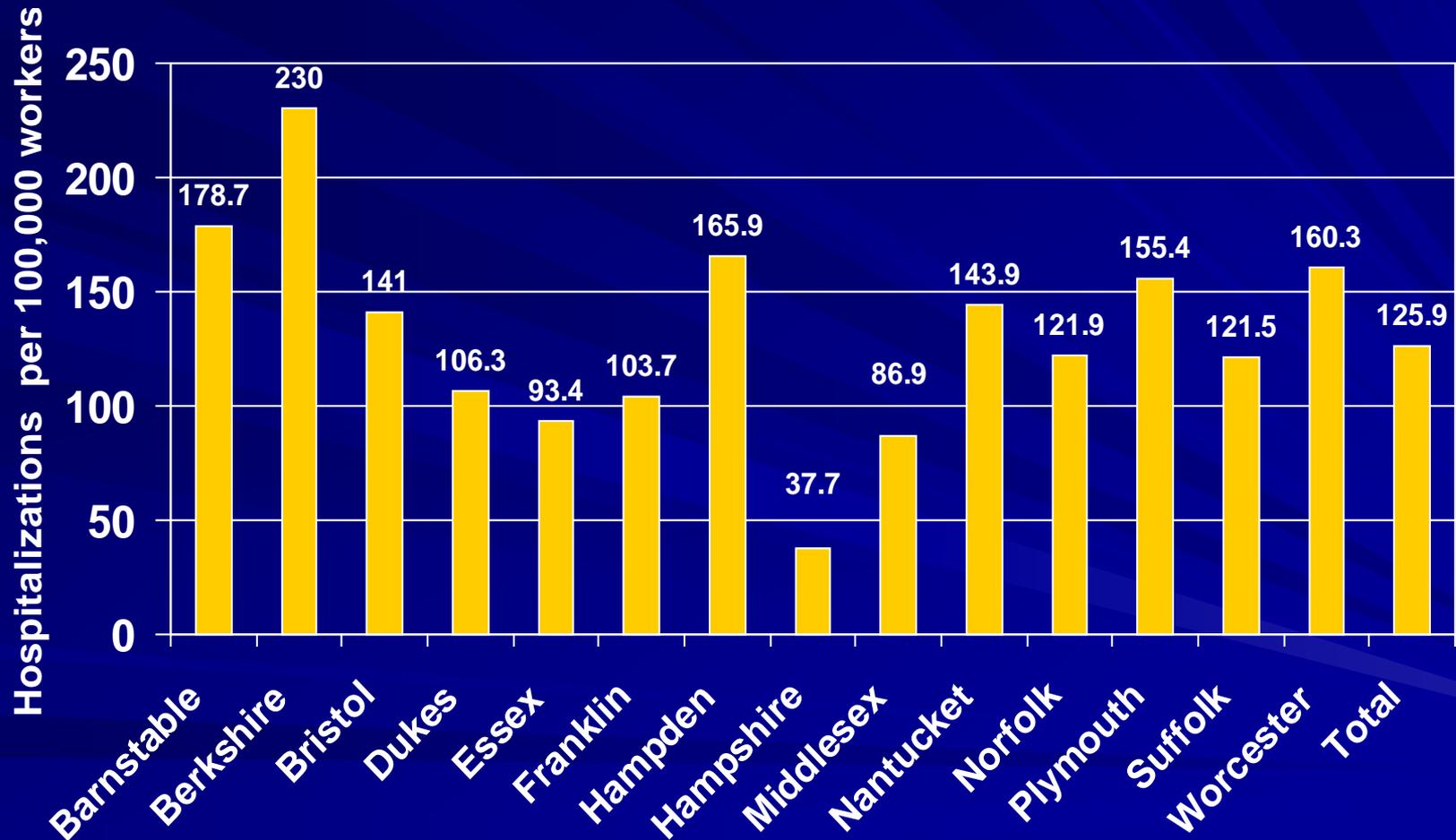
# What does the population-based data tell us ?



# Work-related hospitalizations in Massachusetts: 1996 - 2000

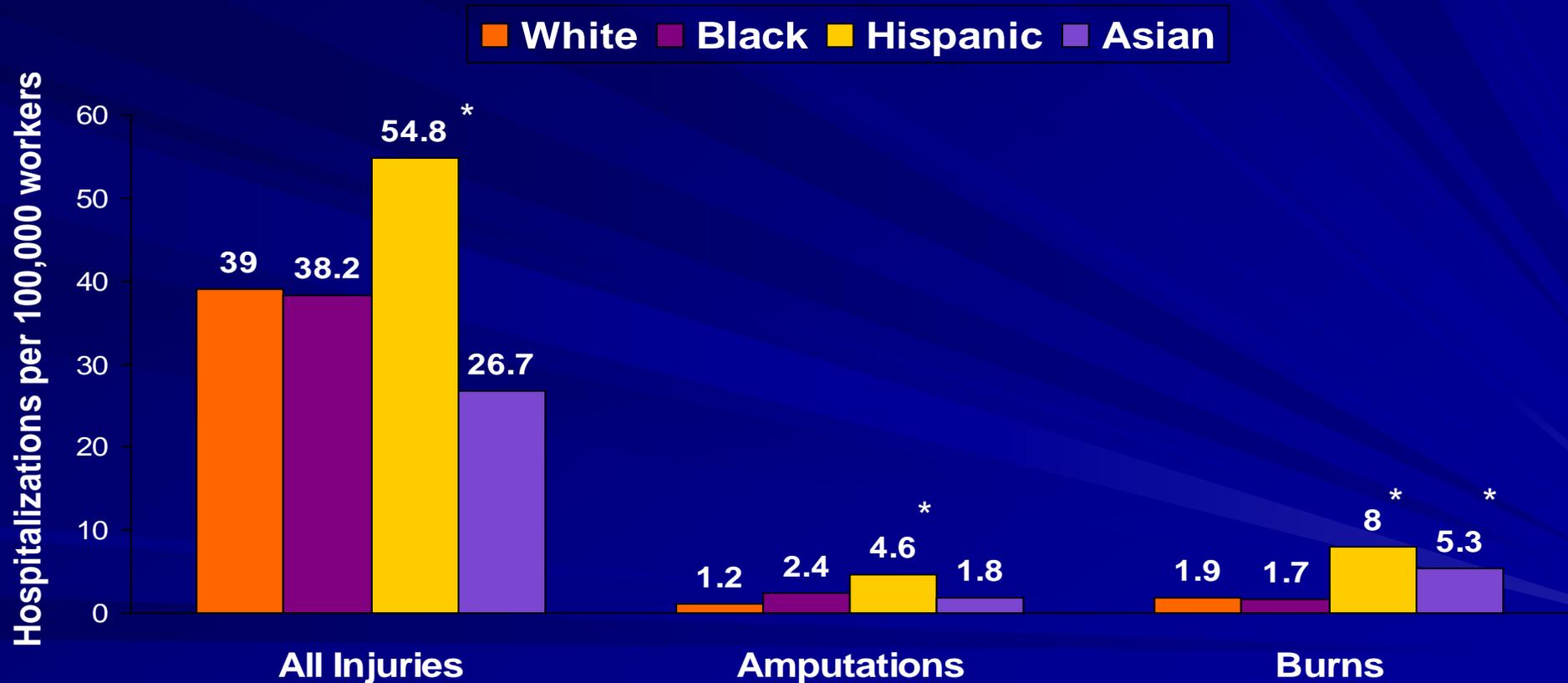
- 3,647,596 resident hospitalizations
- 20,457 work-related hospitalizations (paid for by workers' compensation)
  - 0.56% of all hospitalizations
  - 1.2% of hospitalizations of persons 16-64 years of age
- Average 4,113 work-related hospitalizations per year

# Rates of Work-Related Hospitalizations by County of Residence Massachusetts, 1996-2000\*



\*Workforce estimates from Current Population Survey

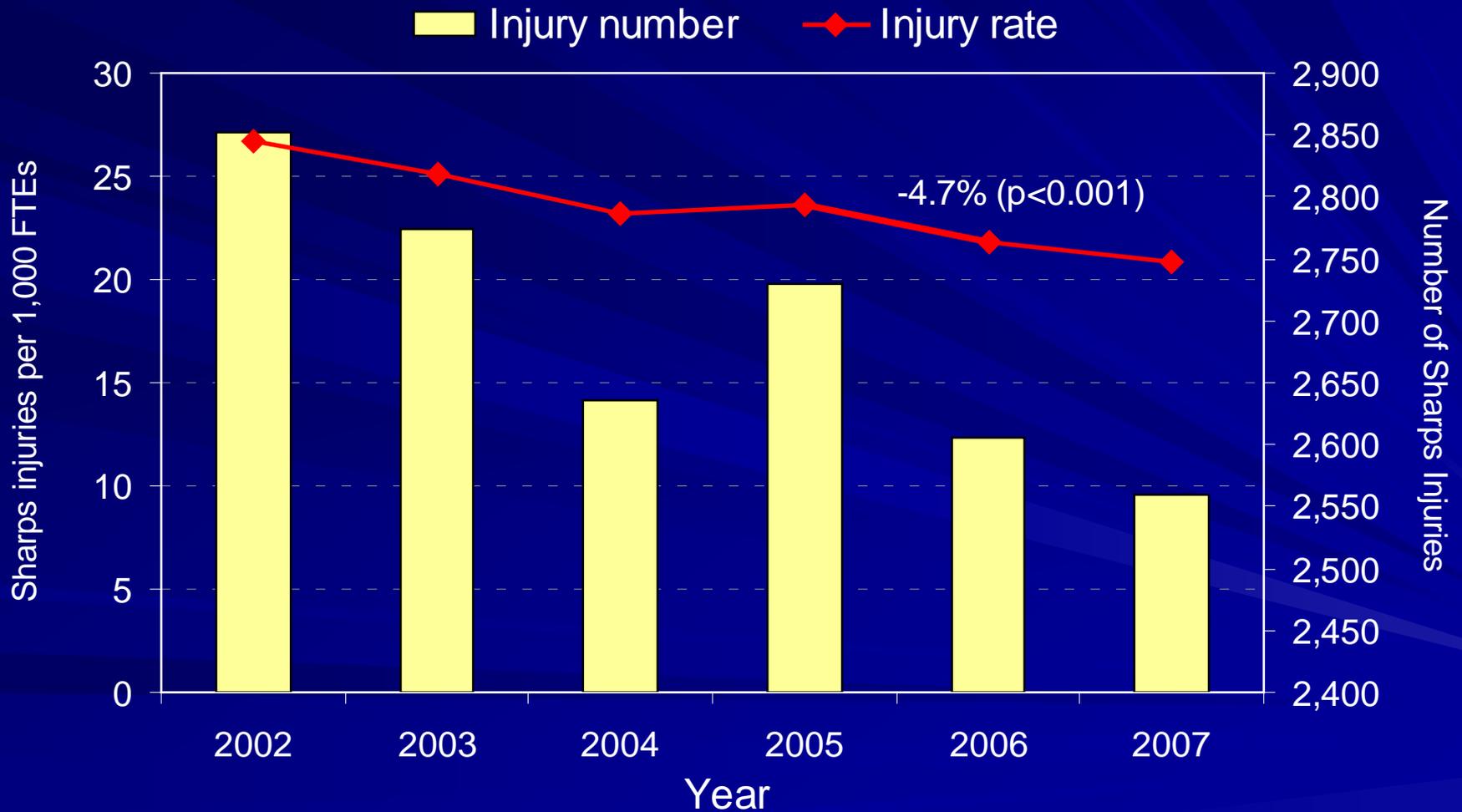
# Hospitalization Rates for Work-Related Injuries, All Injuries and Selected Injury Types by Race and Ethnicity\* Massachusetts: 1996-2000



\* Race and ethnicity were mutually exclusive categories in this data set during this time period.

(\*) Statistically greater than rate for Whites ( $p \leq .05$ )

# Sharps Injuries among Employees of Acute Care Hospitals, Massachusetts, 2002-2007, N=16,158



# Number and Rate of Fatal Occupational Injuries by Industry Division, Massachusetts, 2003 - 2007



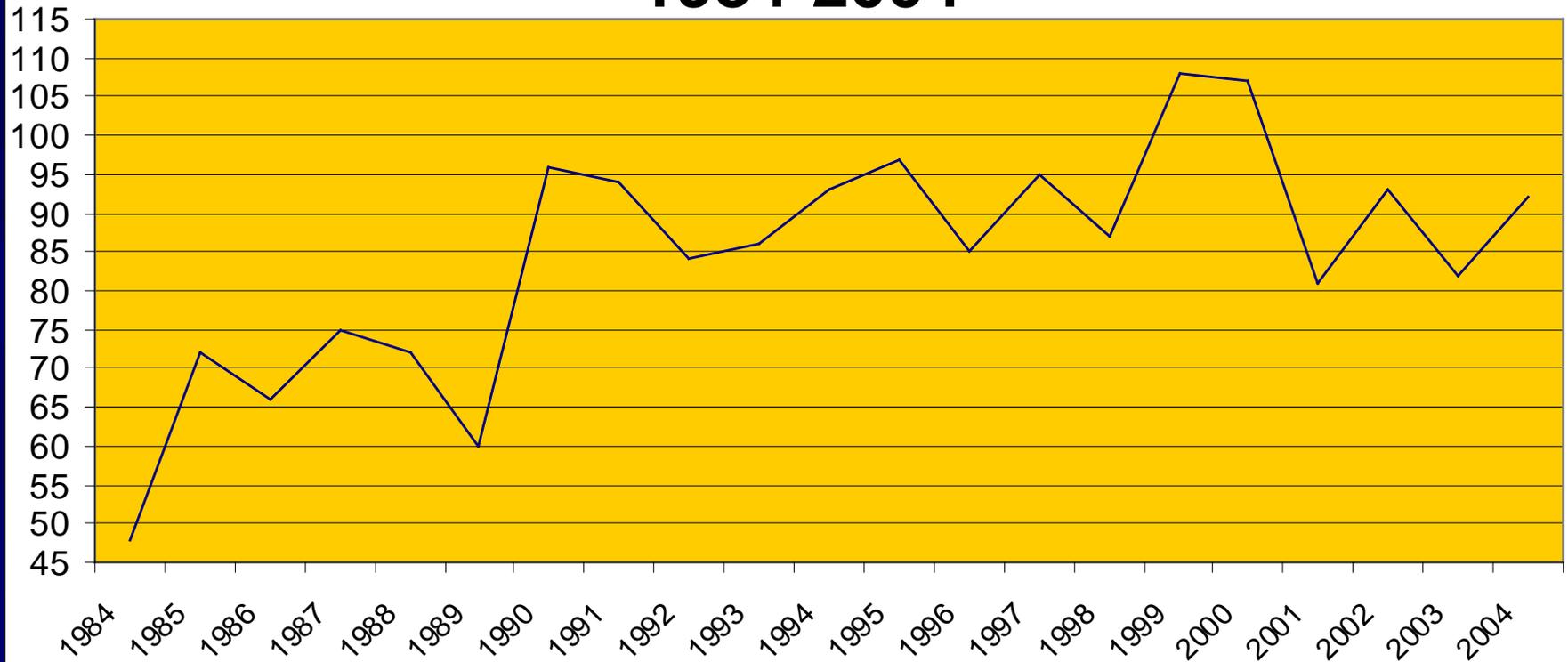
# Fatal Occupational Injuries

( ~75/Year in MA )

Rate of Fatal Occupational Injury,  
Massachusetts, 2000 - 2007



# Incident Mesothelioma Cases, MA 1984-2004



1982-1989 avg.: ~63 cases/yr

1982-1999 avg.: ~79 cases/yr

1990-1999 avg.: ~93 cases/yr

2000-2004 avg.: 91 cases/yr

Avg. % pleural (men): 94%\*

Avg. % pleural (women): 79%\*

\* thru 1999

Source: Massachusetts Cancer Registry

# Sentinel Surveillance

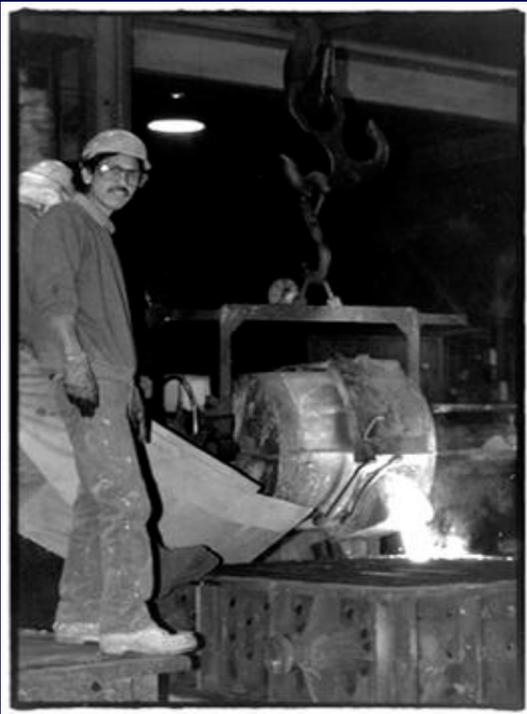


- **SENSOR: Sentinel Event Notification System for Occupational Risks**
  - Work-related asthma
- Burn injuries
- Lead poisoning in adults
- Work injuries in teens <18 years
- Traumatic work fatalities
- Work-related poison center cases

# Work-related diseases and injuries that must be reported 105 CMR 300

- Occupational lung disease
  - Asbestosis, silicosis, beryllium disease, WRA
- Serious work-related traumatic injuries to persons <18 years
- Work-related acute chemical poisoning
  - Carbon monoxide, pesticide
- Heavy metal absorption
  - Mercury, cadmium
- Clusters of any work-related condition

# Medical reports—sentinel surveillance



- Mandatory reporting
- Personal identifiers
  - Compliant with HIPAA
- Indications of a hazard that has already caused illness
- Responsibility for:
  - disease prevention,
  - job protection,
  - trust with patient
  - trust with health care provider

# Reportable Occupational Health Conditions Under Surveillance in Massachusetts

## Health Condition

## Major Data Sources

Fatal occupational injuries\*

Death certificates  
Town clerk, ME reports  
OSHA/Coast Guard report  
Police/Fire reports  
Workers' comp claims  
Newspaper clippings, etc

Sharps Injuries

Hospital Sharps Logs

Work-related injuries to teens  
< 18 years of age

Workers' compensation  
Select EDs

\*Not reportable but personal data can be collected.

# Reportable Occupational Health Conditions Under Surveillance in Massachusetts

## Health Condition

## Major Data Sources

Work-related asthma

Physician case reports  
In-patient and ED data  
Workers' comp claims

Elevated blood lead levels

Clinical lab reports

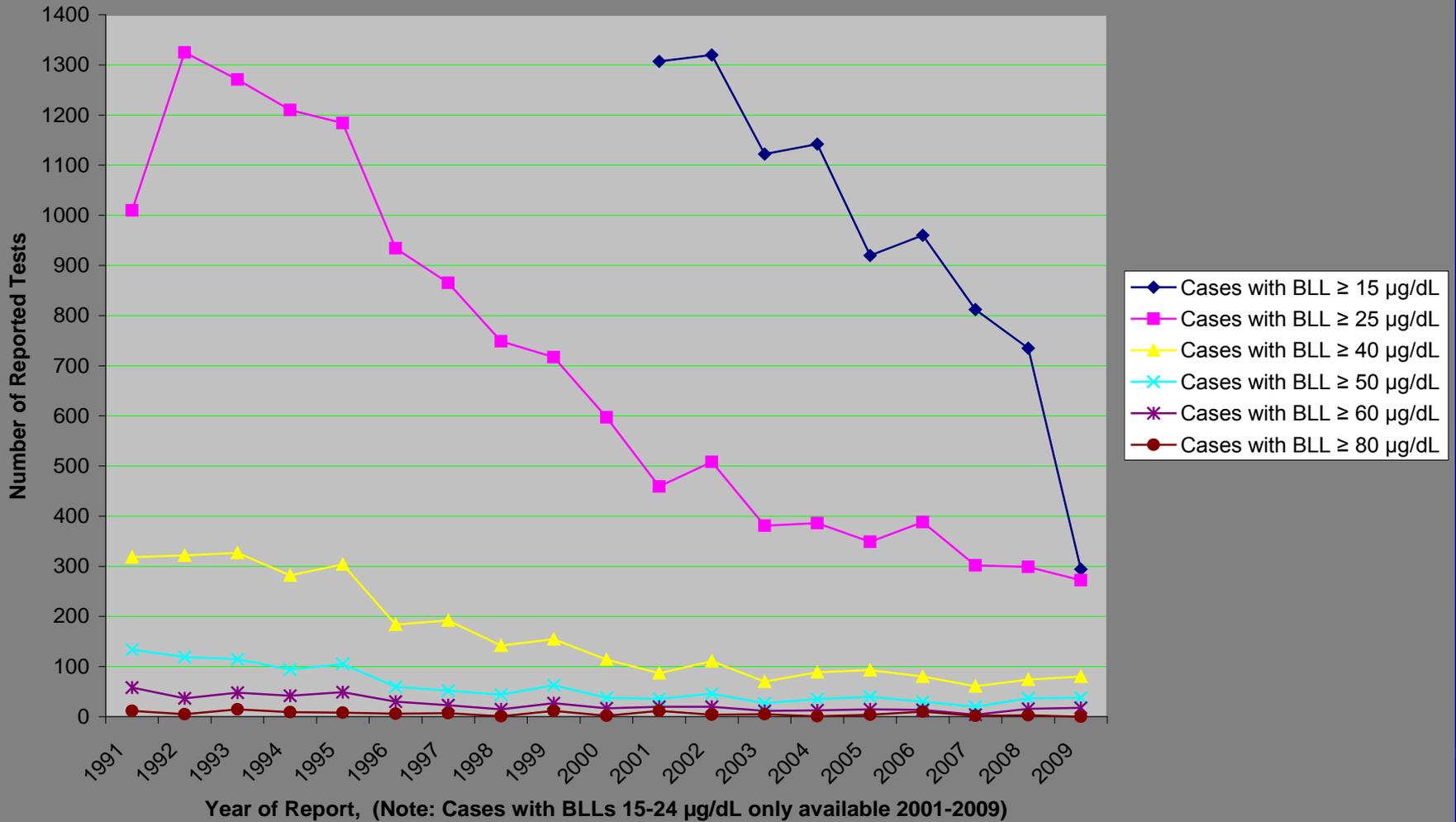
Acute chemical poisonings

Physician and ED reports  
Hyperbaric chamber reports  
Poison Control Center

Serious burns

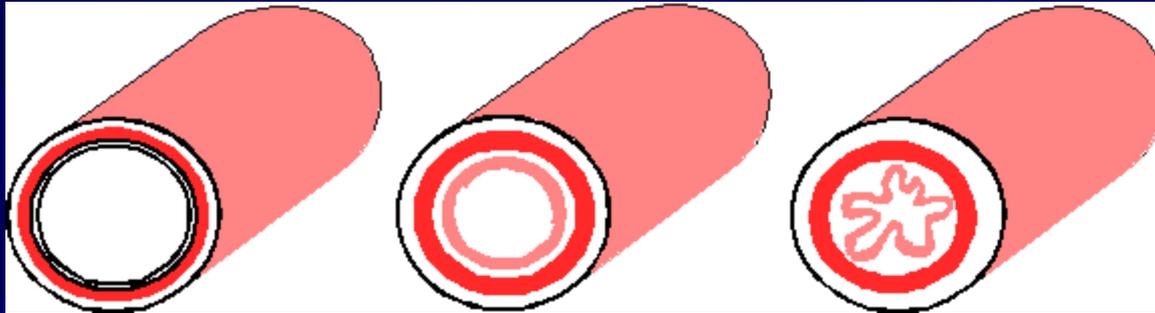
Massachusetts Burn  
Registry/ED reports

## Total Number of Tests Reported to MA Blood Lead Registry (1991-2009) by Blood Lead Level (BLL)



DRAFT DATA 4/8/10—NOT FOR RELEASE

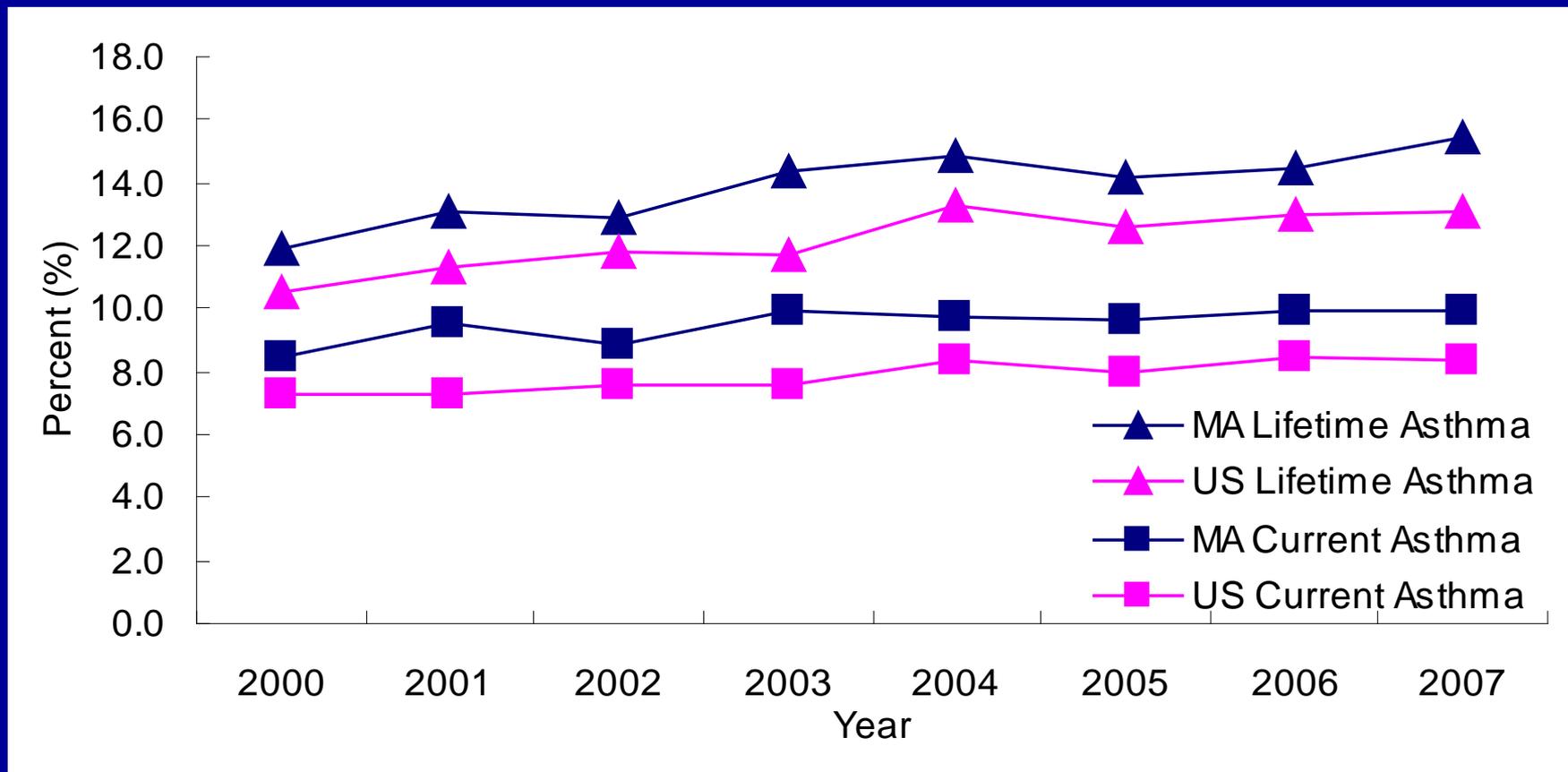
# ASTHMA



- Airflow obstruction that is reversible
  - Airway inflammation
  - Mucous
  - Airway narrowing
  - Airway responsiveness
- 
- Symptoms: cough, wheezing, chest tightness, shortness of breath, tight throat, scared-agitated

# Asthma in Massachusetts Adults

**Figure: Trend in Prevalence of Lifetime and Current Asthma among MA and US Adults, 2000-2007**



\*Burden of Asthma in Massachusetts, 2009 (MA BRFSS data)

# Work-related asthma



# Work-Related Asthma

- Asthma caused by- or made worse by- work
- 2 categories:
  - New Onset **Occupational Asthma (OA)**
    - sensitizer induced asthma,
    - irritant induced asthma
  
    - reactive airways dysfunction syndrome (RADS)
  - Workplace Exacerbation of Asthma

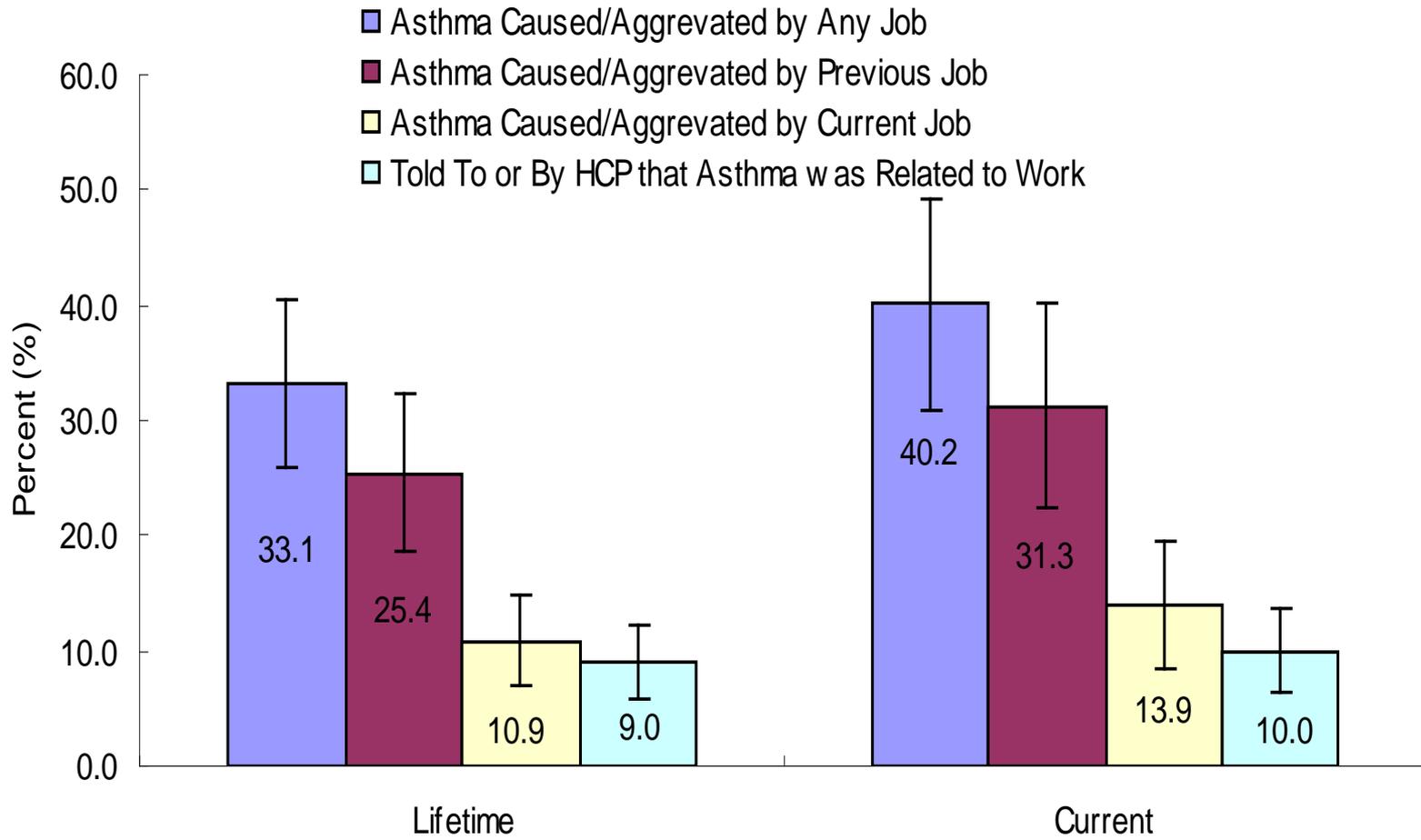
Tarlo SM et al. Diagnosis and management of work-related asthma: : American College of Chest Physicians Consensus statement. Chest 2008;134: 1-41.

# What proportion of adult asthma is related to work?

- Toren and Blanc (2009) 17.6% (range 7%-51%)
- American Thoracic Society (2003) 15%
- American College of Chest Physicians (2008)  
“As much as 25% of adults with asthma . . . estimated to have WRA.”



**Figure 3.1: Proportion of Massachusetts Adults with Lifetime or Current Asthma Reporting That Their Asthma Was Associated with Work, 2006-2007**  
Massachusetts Adults with Lifetime or Current Asthma



# Is WRA different from asthma?

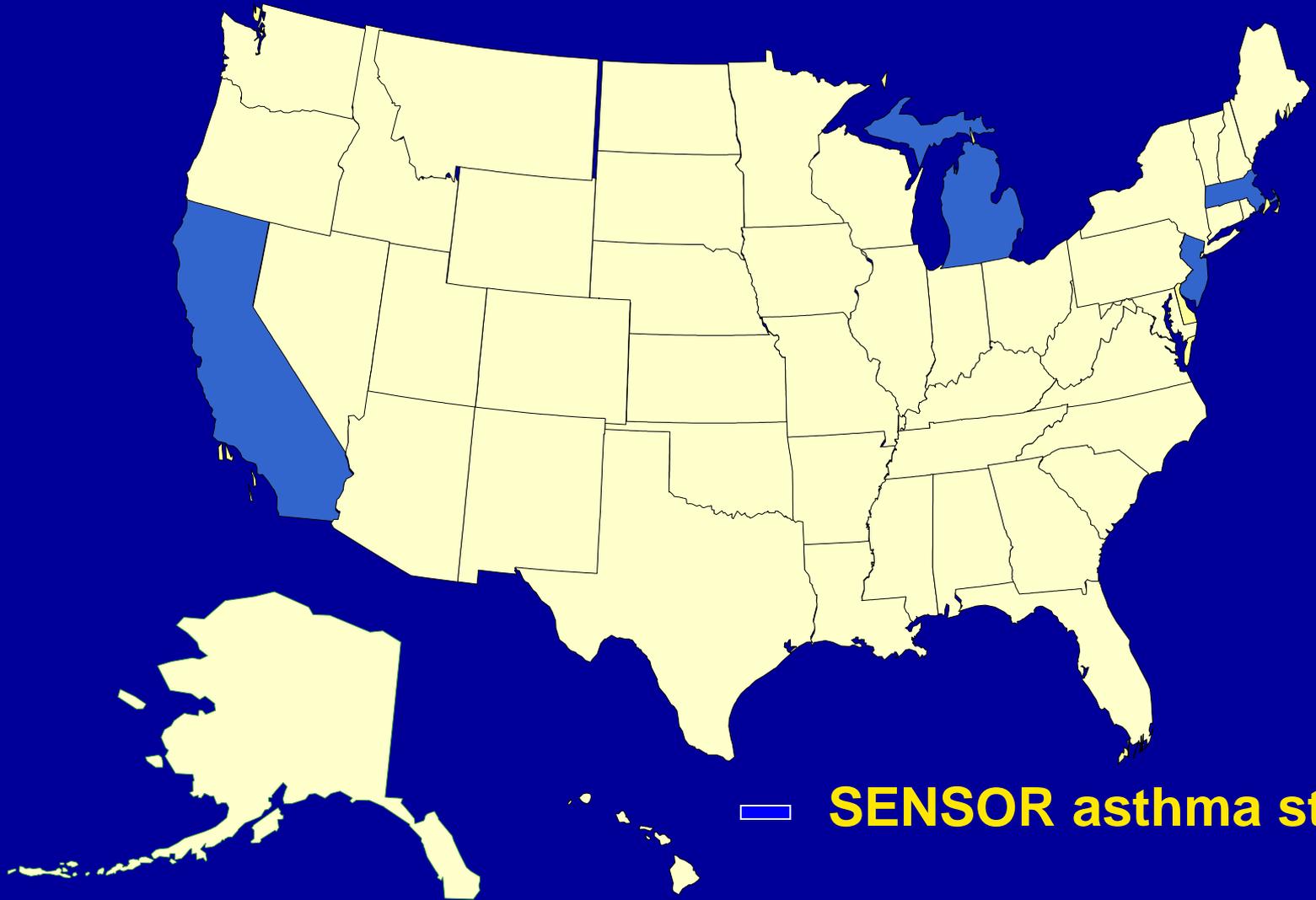
Research based on BRFSS telephone survey in MA

Compare WRA to asthma-not related to work

- 4.8 times more likely to have an asthma attack
- 4.7 times more likely to go to the ED
- 2.5 times more likely to visit the doctor for worsening asthma
- Other indices of asthma control and health care use elevated, but not significant

# Sentinel Event Notification System for Occupational Risks? (SENSOR)

- Active state-based surveillance for ‘sentinel’ work-related conditions
- Focus on prevention-oriented workplace intervention
- Funded by CDC National Institute for Occupational Safety and Health (NIOSH)



 **SENSOR asthma states**

# Primary Industries by State

## 1993-1999

**CA**

**Health Services**  
(17%)

**Educational Services**  
(14%)

**Justice, Public Order, Safety** (8%)

**MA**

**Health Services**  
(29%)

**Educational Services**  
(13%)

**Justice, Public Order, Safety** (4%)

**MI**

**Transportation Equipment**  
(43%)

**Health Services**  
(11%)

**Fabricated Metal Products**  
(5%)

**NJ**

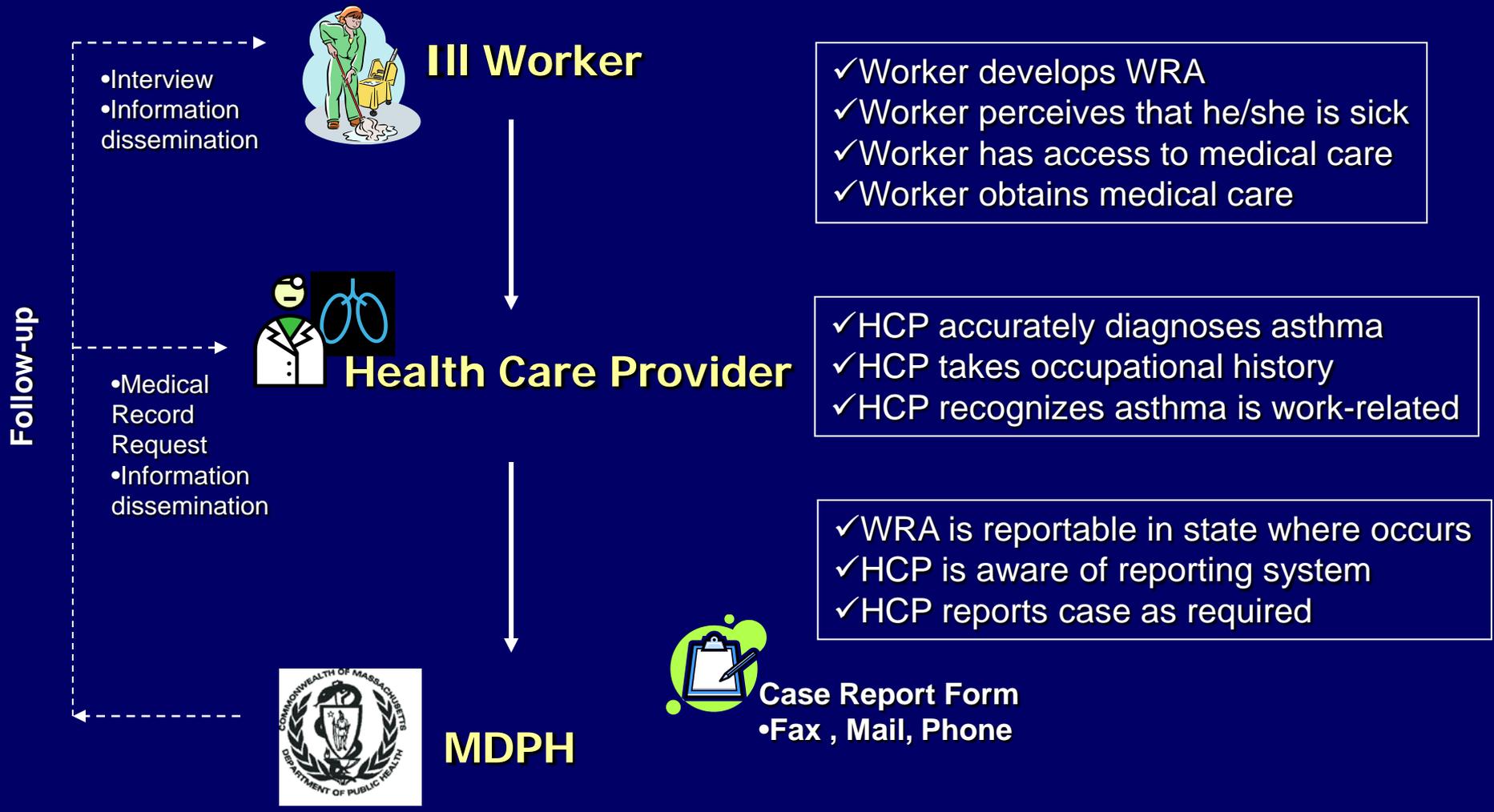
**Health Services**  
(16%)

**Chemical Manufacturing**  
(11%)

**Educational Services (8%) / Food & Kindred Products**  
(8%)

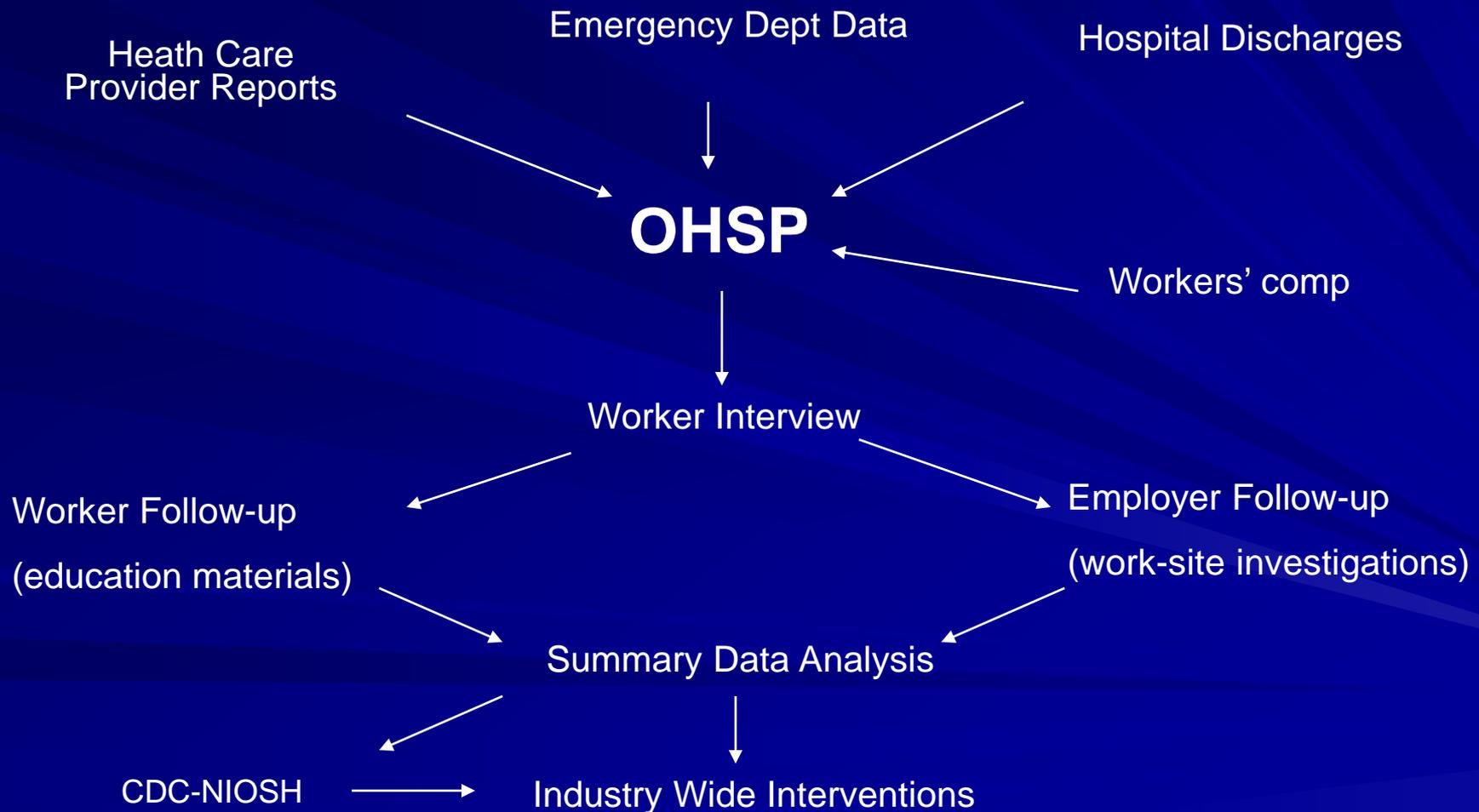


# Health Care Provider Reporting System



\*Derived from model developed by Azaroff et al., 2002

# MA Surveillance System for Work-Related Asthma



# Industries among MA people with WRA, 1993-2006, n=633

Industry	# of WRA reports	% of WRA reports	% of MA workforce
Services	334	53%	42%
<i>Health care</i>	181	29%	10%
<i>Education</i>	83	13%	9%
Manufact.	150	24%	14%
Public Admin	56	9%	4%
Trade	42	7%	19%
Construction	22	4%	6%
Other	29	4%	14%

# 4-state WRA data

Cleaning products and WRA  
CA, MA, MI, NJ 1993-1997  
Rosenman et al 2003 JOEM  
45(5):556-63

Health care workers with WRA, 2005, CA,  
MA, MI, NJ, 1993-1997  
Pechter et al 2005 AJIM 47:265-75

556

Cleaning Products and Work-Related Asthma • Rosenman et al

## Cleaning Products and Work-Related Asthma

Kenneth D. Rosenman, MD  
Mary Jo Reilly, MS  
Donald P. Schill, MS, CIH  
David Valiante, CIH  
Jennifer Flattery, MPH  
Robert Harrison, MD, MPH  
Florence Reinisch, MPH  
Elise Pechter, MPH, CIH  
Letitia Davis, ScD  
Catharine M. Tumpowsky, MPH  
Margaret Filios, RN, ScM

AMERICAN JOURNAL OF INDUSTRIAL MEDICINE 47:265-275 (2005)

## Work-Related Asthma Among Health Care Workers: Surveillance Data From California, Massachusetts, Michigan, and New Jersey, 1993-1997

Elise Pechter, MPH, CIH,<sup>1</sup> Letitia K. Davis, ScD,<sup>1</sup> Catharine Tumpowsky, MPH,<sup>1</sup>  
Jennifer Flattery, MPH,<sup>2</sup> Robert Harrison, MD, MPH,<sup>2</sup> Florence Reinisch, MPH,<sup>2</sup>  
Mary Jo Reilly, MS,<sup>3</sup> Kenneth D. Rosenman, MD,<sup>3</sup> Donald P. Schill, MS, CIH,<sup>4</sup>  
David Valiante, CIH,<sup>4</sup> and Margaret Filios, RN, ScM<sup>5</sup>

**Background** Asthma morbidity has increased, posing a public health burden. Work-

### ORIGINAL ARTICLE

## A descriptive study of work aggravated asthma

S K Goe, P K Henneberger, M J Reilly, K D Rosenman, D P Schill, D Valiante, J Flattery, R Harrison,  
F Reinisch, C Tumpowsky, M S Filios

*Occup Environ Med* 2004;61:512-517. doi: 10.1136/oem.2003.008177

**Background and Aims:** Work related asthma (WRA) is one of the most frequently reported occupational lung diseases in a number of industrialised countries. A better understanding of work aggravated asthma (WAA), as well as work related new onset asthma (NOA), is needed to aid in prevention efforts.

**Methods:** WAA and NOA in the United States were compared using cases reported to the National Institute for Occupational Safety and Health (NIOSH) from four state Sentinel Event Notification Systems for Occupational Risks (SENSOR) surveillance programmes for 1993-95.

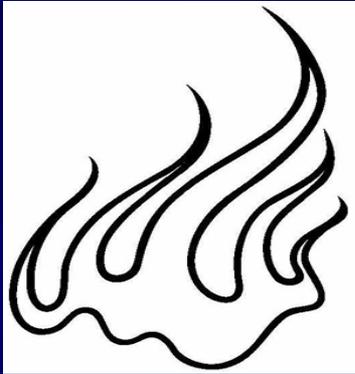
## Fifteen Most Frequently Reported Exposures for WRA Cases, 1993-2006, N=1899 agents (more than one can be reported for each case)

AGENT	# of reports	Percentage
Indoor Air Pollutants	156	8.2%
Cleaning Products	145	7.6%
Minerals and Inorganic Dusts	142	7.5%
Chemicals, NOS	108	5.7%
Mold	78	4.1%
Solvents	73	3.8%
Products of Combustion	51	2.7%
Latex	46	2.4%
Isocyanates	39	2.1%
Paints and Lacquers	27	1.4%
Acids and Bases	25	1.3%
Metals	23	1.2%
Formaldehyde	21	1.1%
Polymers	20	1.1%
Welding Fumes	19	1.0%





# Hierarchy of Controls & Toxics Use Reduction



<b>1 Source</b>	<b>2 Path</b>	<b>3 Person</b>
Substitution	Local exhaust ventilation	PPE
Engineering and Maintenance	Housekeeping	Administrative controls
Enclosure		

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