

Prevention and Control of HBV and HCV in Healthcare Workers

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Discussion topics

- HBV and HCV infections – what is the risk for healthcare workers (HCW)?
- Mitigating risk of occupational exposure to HBV and HCV
 - Pre and post exposure management: HCW vaccination, PEP
 - Minimizing risk of exposure:
 - Engineering control and safety devices
 - Personal protective equipment
- Recommendations in Israeli healthcare system and barriers for compliance

Which is the most dangerous profession?



Occupational death rate for various jobs, US, 2000–2002

Occupation	No. employed (× 10 ³)	Total deaths	Death rate per 1 million
Fisherman	39	46	1,179
Construction worker	825–1,108	1,198	1,081–1,452
Pilot	107–129	102	791–953
Military (active and reserve)	2,600	94	361
Truck driver	2,544–3,365	530	157–208
Protective service	2,000	219	108
Firefighter	1,100	102	93
US workforce	136,000	5,780	42.5
Healthcare worker	6,200–9,100	157–353	17–57
Sheetmetal worker	172–207	8	39–46
Bartender	339–427	10	23–29
Lawyer	490–920	6	7–14
Waiter	1,893–1,981	9	5

Occupational deaths among HCW, US 2000- 2002

Cause of death	No. deaths	HCW death rate, excluding support occupations per 1 million (N = 6.2 million)	HCW death rate, including support occupations per 1 million (N = 9.1 million)
Injury	77–93	12–15	8–10
Infection-related†	80–260	13–42	9–29
Total	157–353	25–57	17–39

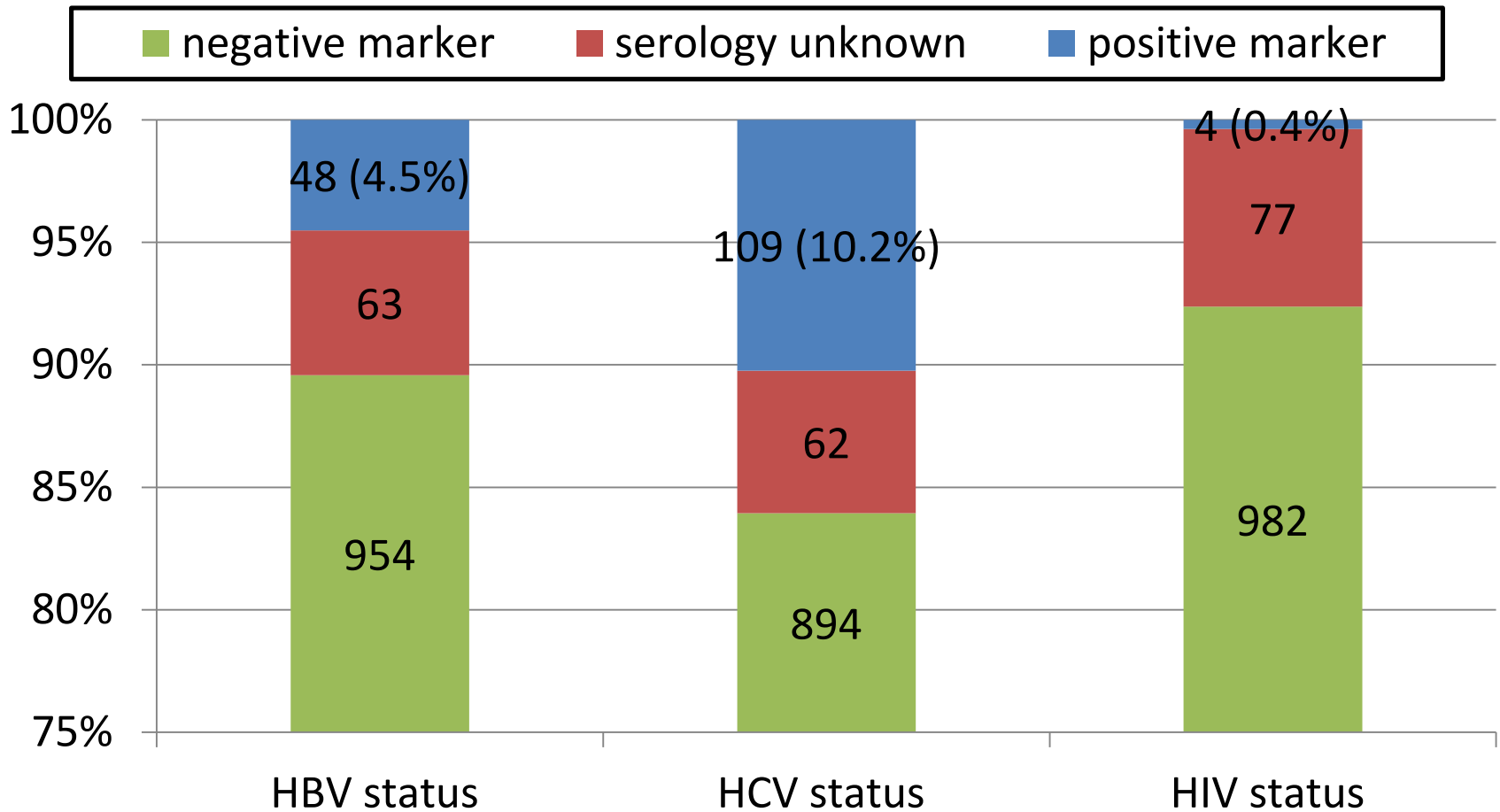
†Deaths from HBV (75–250) and HCV, HIV, and TB (5–10 total)

Risk of acquisition of bloodborne pathogens (BBPs)

- Prevalence of the infectious agent
 - in the general population and
 - within the patient population served by the healthcare facility
- Frequency of exposures capable of transmitting the infectious agent
- Nature of the exposure and efficiency of transmission for that exposure (ie, exposure via percutaneous, mucosal, or nonintact skin)
- Which virus(es) are present in the contaminated fluid and viral load in that fluid
- Availability and efficacy of pre- and postexposure prophylaxis

Seroprevalence of BBP among hospitalized patients reported source of exposure injuries*

Rabin Medical Center 2006-2010



*Total reported 1277 incidents; excluded 208 exposure events to contaminated object from unknown source.

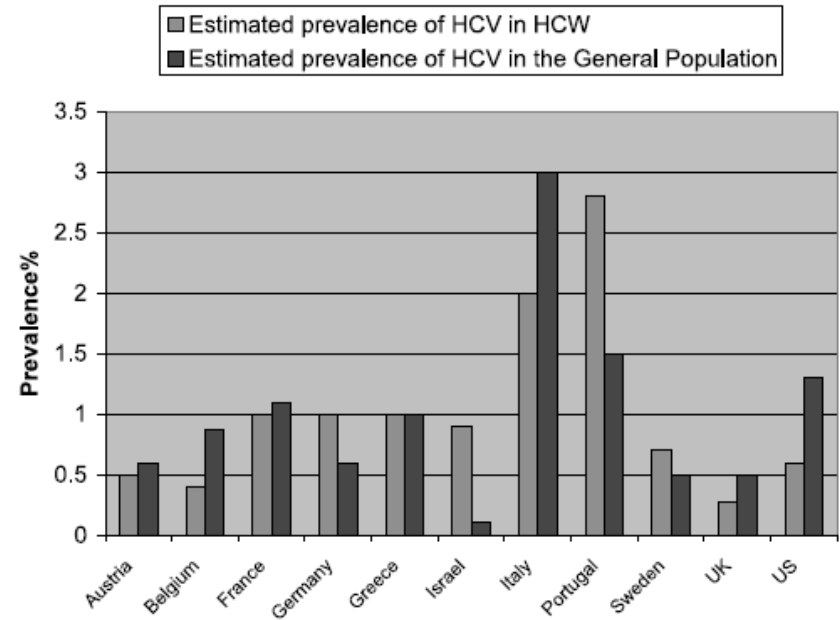
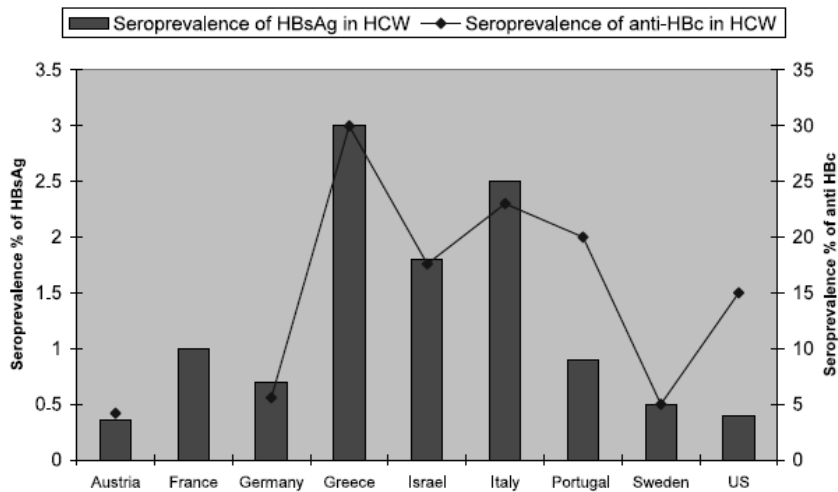
Seroprevalence general population and HCW

	HBV	HCV
Seroprevalance, US general population, 2011	0.42% (95% CI, 0.32-0.55)	1.8% (95% CI, 1.5-2.3)
Seroprevalance in patient reported as source of exposure injuries RMC, 2006-2010	4.6%	10.2%
Seroprevalance in HCW reporting exposure injuries RMC, 2006-2010	0.6%	1.5%

Estimation of HBV and HCV in HCW in European countries and Israel

HBsAg: 0.4-3%

Anti HCV: 0.3-2.7%



Risk of infection by mode of exposure

	HBV	HCV
Percutaneous	6-30%	1.8 percent (range, 0-7%)
Mucosal	Risk not quantified, transmission documented	Risk not quantified, transmission documented
Nonintact skin	Risk not quantified, transmission not documented	Risk not quantified, transmission not document
Human bite	Risk not quantified, transmission not documented	Risk not quantified, transmission not document

Occupational safety

Central concept of healthcare: It is the responsibility of the healthcare facility to provide a safe environment for its patients and to protect its personnel

- Vaccine-preventable diseases – vaccination
- Processes, equipment and technologies required for protection
 - Personal Protective Equipment (PPE)
 - Engineering control and safety devices
- Protocols and procedures for managing exposures
 - Surveillance network
 - PEP protocols

Prevention of occupational exposure to BBP: Israeli regulatory status

- Several Ministry of Health circulars formalizing regulatory and logistic aspects of professional guidelines
- States what employers must do to protect HCW who are occupationally exposed to blood and other body fluids
 - Offer HB vaccine
 - Provide post-exposure evaluation and prophylaxis (immediately available)
 - At no cost to worker
 - Effective since 2006

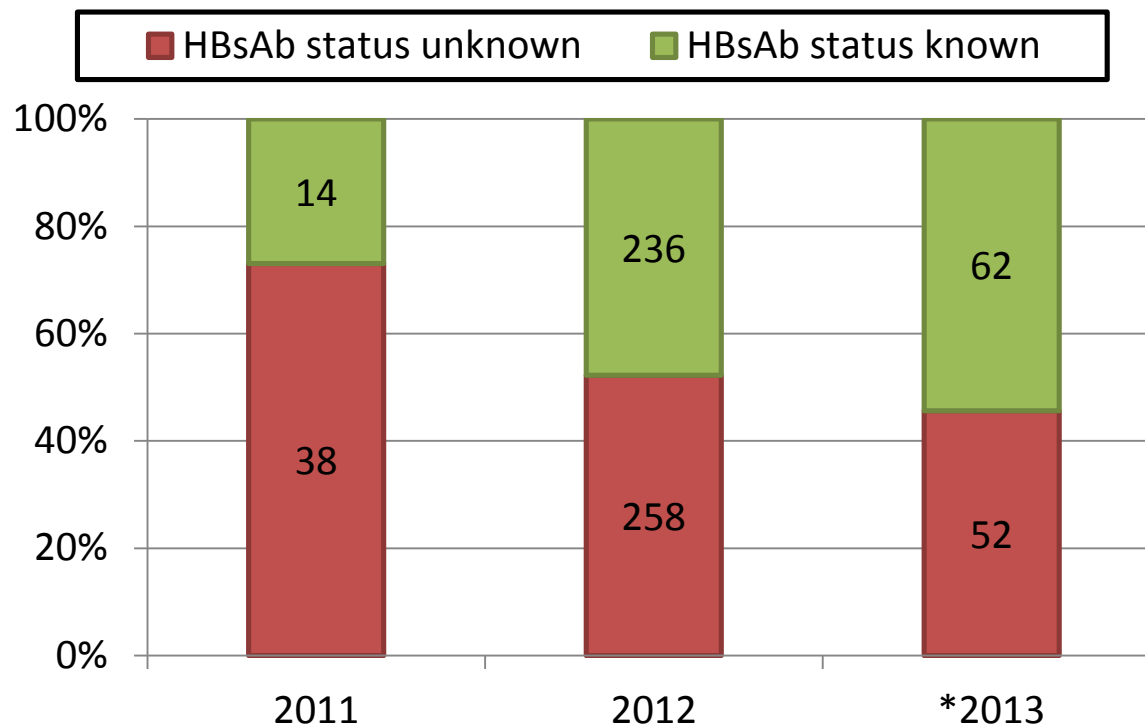
1. **Prevention of occupationally acquired HBV and HCV following exposure to blood and other body fluids among HCW.** Public health services, Circular 3/2006
2. **Vaccination of students of health professions.** Public health services, Circulars 1/2006, 7/2011
3. **Prevention of HIV acquired following exposure to blood or unprotected sex.** Public health services, Circular 5/2010
4. **Standard precautions in HCF.** Circular 10/2010
5. **Vaccination of HCW.** Public health services, Circular 28/2011; Director General 7/2013

HCW vaccination: Current recommendations in Israel

Ministry of Health 2009, 2011 last update 4/3/2013

✓ Hepatitis B	HCW at risk for blood or body fluid exposure HCP at high risk for occupational exposure should be tested 1-2 months after vaccination to determine serologic response
✓ Seasonal Influenza	All HCW
✓ MMR	HCW who lack presumptive evidence of immunity;
✓ Tdap	All HCW
✓ Varicella	HCW who lack presumptive evidence of immunity;
✓ Polio (IPV)	All HCW
✓ Meningococcal	HCW in relevant lab.
✓ Typhoid	HCW in relevant lab.
✓ Hepatitis A	HCW in relevant lab.
✓ Pneumococcal	HCW in relevant lab.
✓ Rabies	HCW in relevant lab.

Post vaccination HBsAb status, 660 HCW with high risk for contact with blood and body fluids RMC, Beilinson hospital, 2011*-2013 (Jan-Feb)



*occupational health department
established June 2011

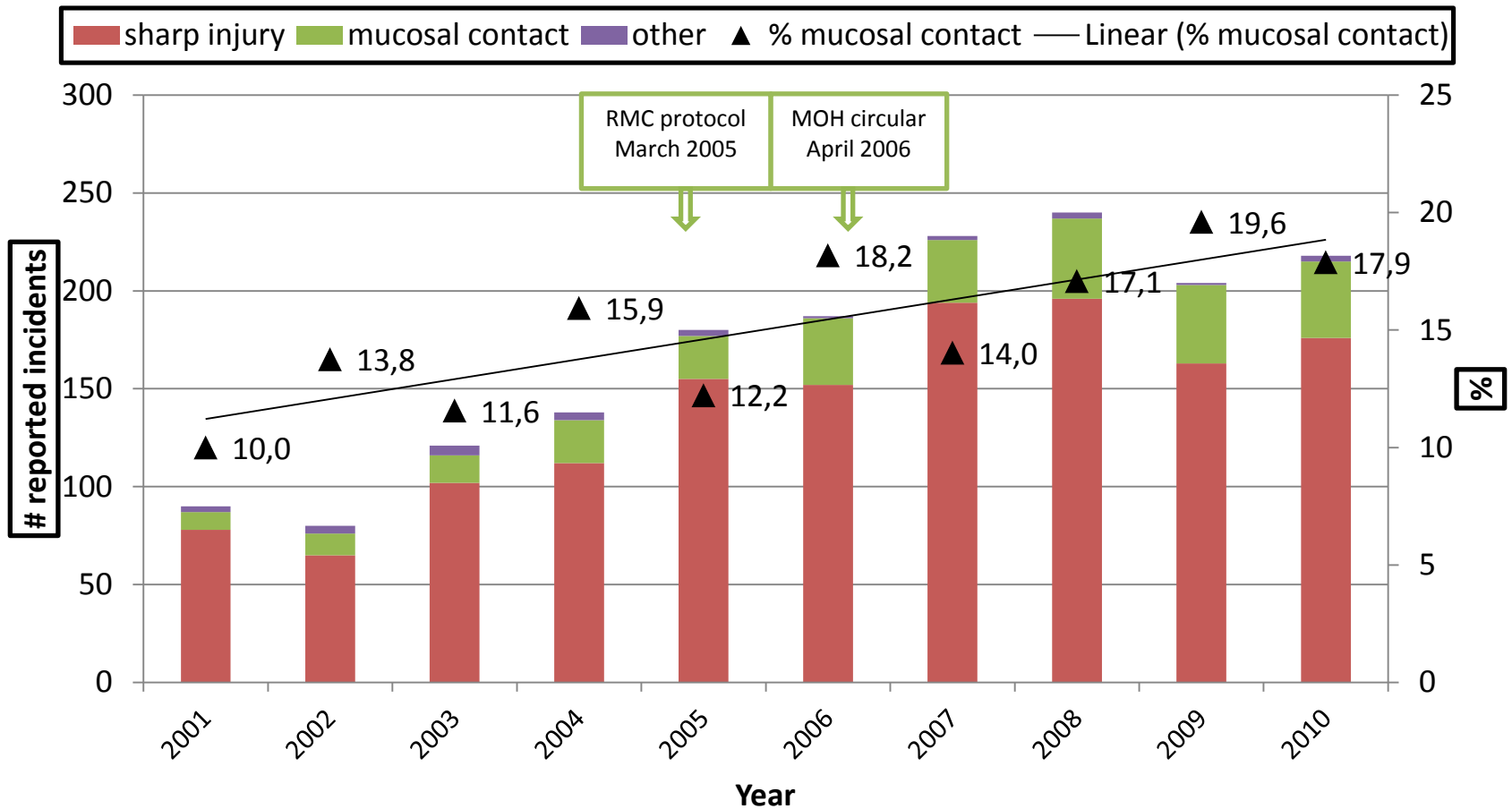
Personal Protective Equipment: problems

- Education and training
- Availability of quality equipment
- HCW learn **not to** use PPE routinely



Reported incidents of exposure to blood or body fluids: via percutaneous or mucosal contact

RMC 2001-2010



Processes and engineering control

- Long work hours and sleep deprivation among medical trainees result in fatigue, **which is associated with a threefold increase in the risk needlestick injuries**
- 699 surgeons in training at 17 medical centers: more than half of the most recent injuries had not been reported; the most common reason lack of time

Fisman DN. Fatigue increases the risk of injury from sharp devices in medical trainees: results from a case-crossover study. *Infect Control Hosp Epidemiol.* 2007;28(1):10.

Ayas NT. Extended work duration and the risk of self-reported percutaneous injuries in interns. *JAMA* 2006; 296:1055.

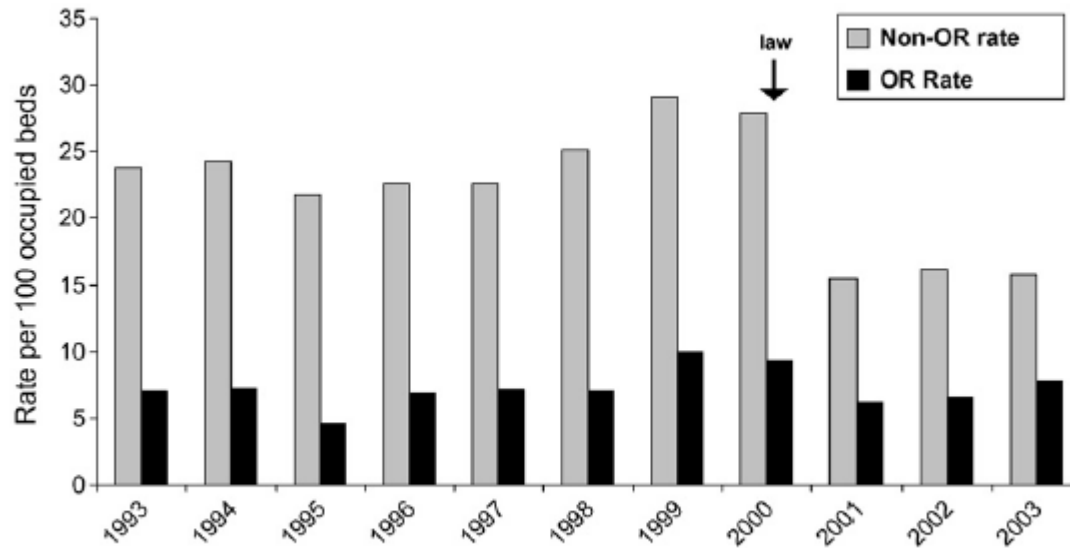
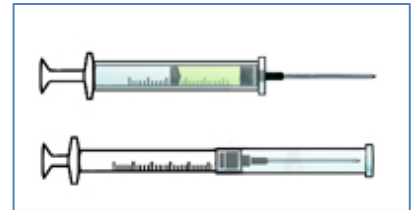
Makary MA. Needlestick injuries among surgeons in training. *N Engl J Med* 2007; 356:2693.

Processes and engineering control



Safety devices: Injury rates from hollow-bore needles: safety versus conventional

Injury rate decreased by 34% after passage of NSPA



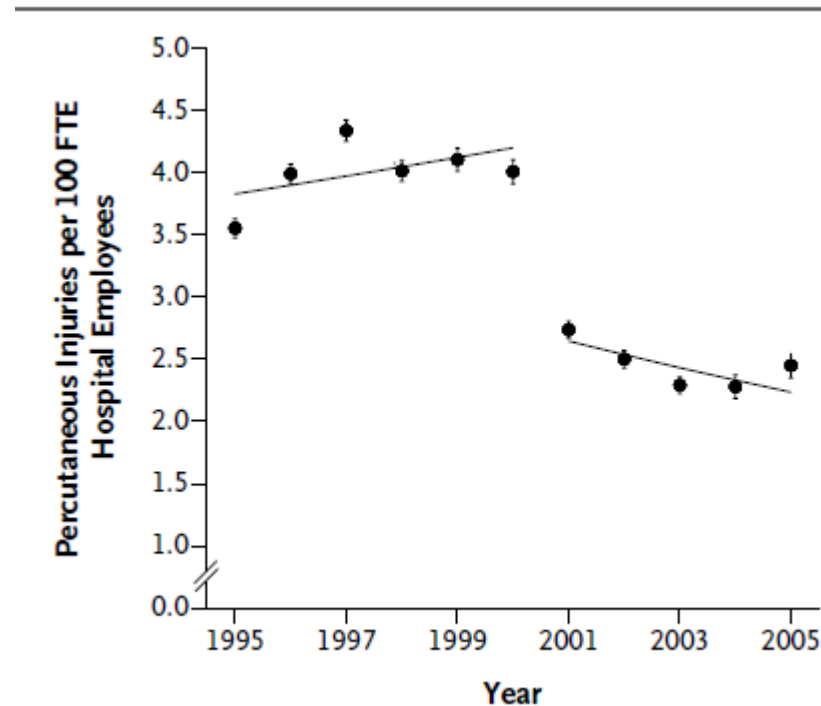
International Healthcare Worker Safety Center, University of Virginia

EPINet 1993–2004. 87 hospitals; total injuries = 18,975 (excludes injuries occurring before use of device).

US: Needlestick Safety and Prevention Act (NSPA) 2000

- Signed into law by president Clinton on 6 November 2000
- Required that:
 - Frontline HCWs (those providing direct patient care) be included in the process of evaluating and selecting safety-engineered devices
 - Employers document evaluation plan
 - Employers update their evaluation plan annually to reflect the availability of new technology
 - **Employers maintain a sharp injury log** documenting the types of devices causing injuries and an explanation of the circumstances of each incident

Percutaneous injuries before and after the needlestick safety and prevention act



N Engl J Med 2012

Summary and recommendations

- MOH requirements and regulation of HCW vaccination meet professional standards
- PEP protocols meet professional standards
- Implementation of standard precautions guidelines is suboptimal: low quality of equipment is a potential barrier for HCW compliance
- Engineering control and safety devices – legislation, similar to NSPA act is needed