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# **Risk of Waste Management- Associated Needlestick Injuries (NSI) & Prevention of Bloodborne Infections in Sanitation Workers**

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Janine Jason, M.D.

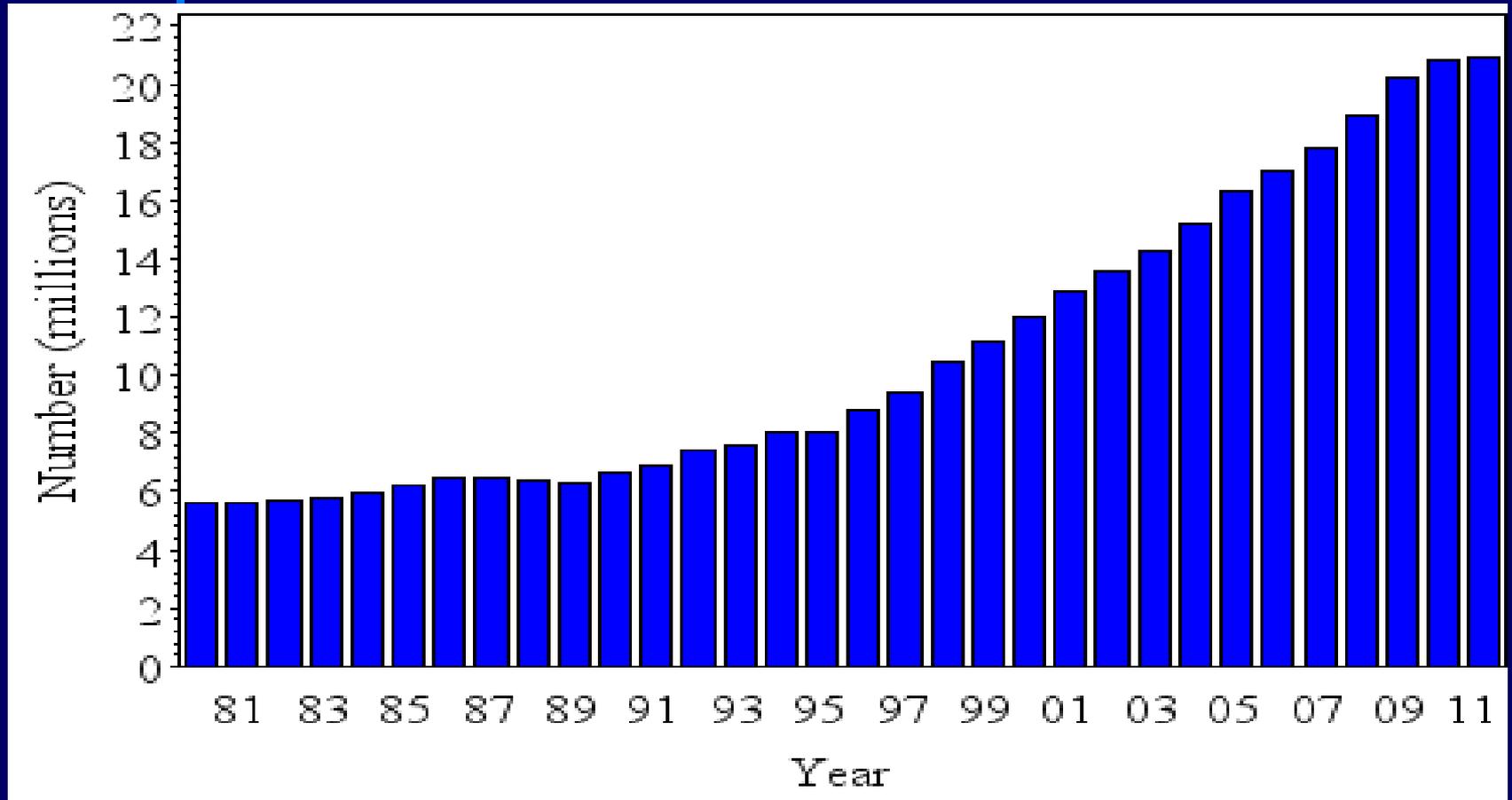
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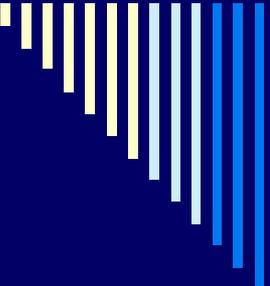
# Number (in Millions) of U.S. Persons with Diagnosed Diabetes, 1980–2011



From: CDC's Diabetes Program-Data and Trends

<http://www.cdc.gov/diabetes/statistics/prev/national/figpersons.htm>

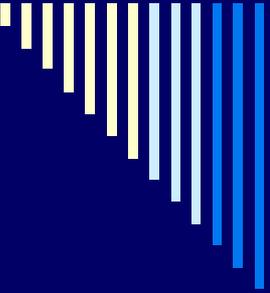
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## Evidence that Increasing Insulin Use Hasn't Been Associated with an Increase in Non-Healthcare-Setting Occupational Accidental NSI

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- No analyzable data in NHIS and the Survey of Occupational Injuries and Illnesses (SOII)
  - A NIOSH study had to expand its survey time frame in order to collect a minimally adequate number of non-hospital, work-related injuries for analysis.
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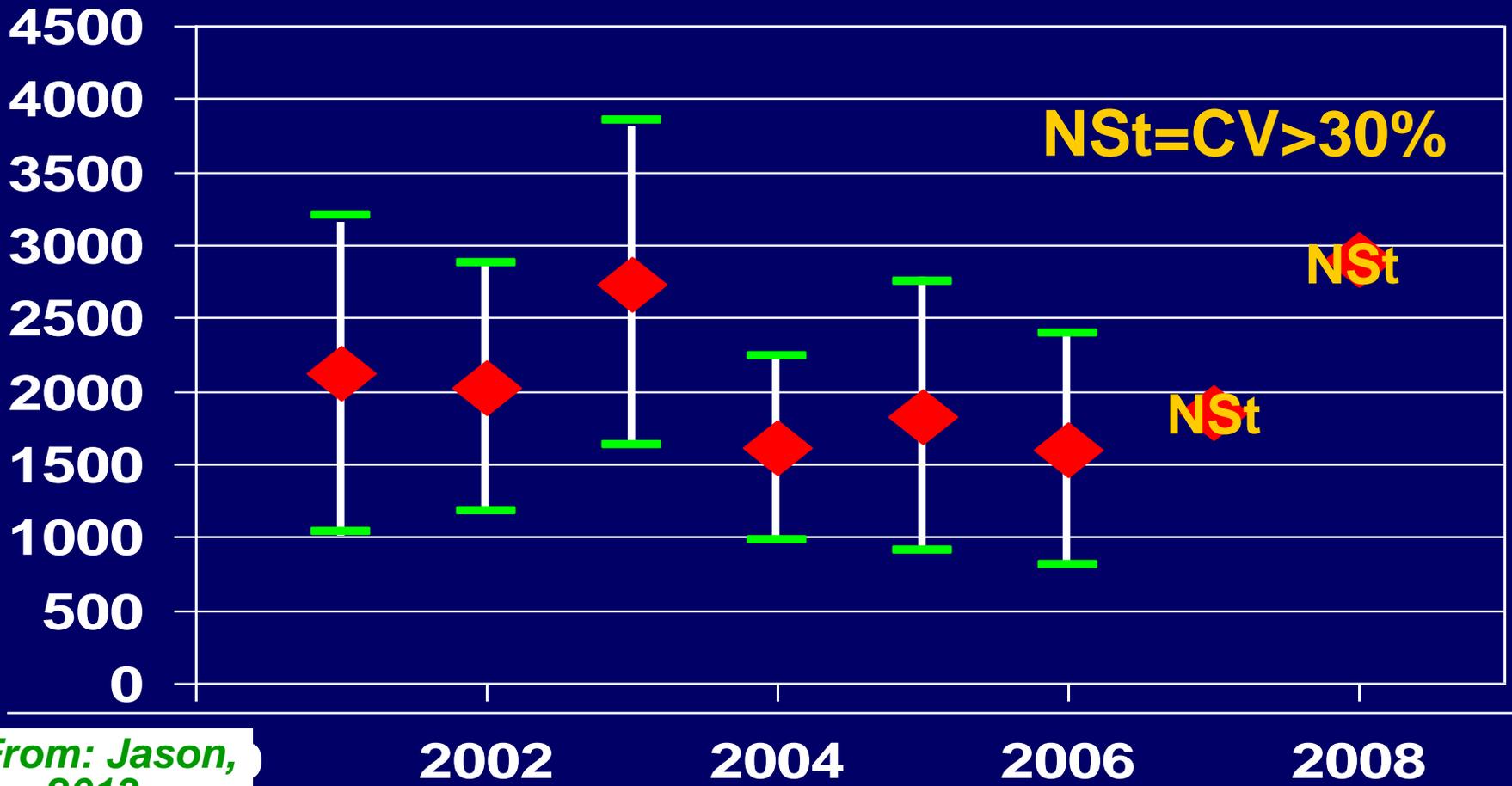
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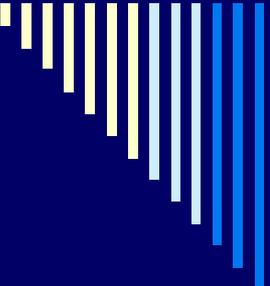
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- In NHAMCS, NAMCS, & NEISS, the numbers of community-acquired and work-related accidental needlestick/sharp injuries are not large and do not appear to be increasing.
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# Number of CANSI Treated in U.S. Emergency Departments, by Year, 2001-2008, NEISS-AIP



From: Jason, 2013



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Total Number of Documented Reports of  
HBV, HCV, or HIV Transmission from Non-  
healthcare-associated Accidental NSI

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Pathogen

Number

**Worldwide**

**U.S.**

**HBV**

**3**

**0**

**HCV**

**3**

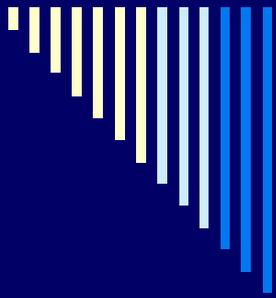
**0**

**HIV**

**0**

**0**

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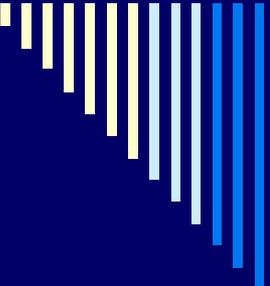


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# **Why Are Infections from Non-Healthcare-Associated NSI So Rare?**

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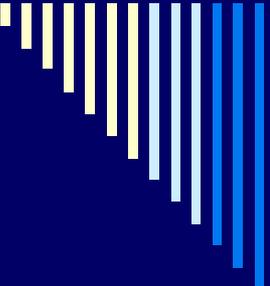


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# HBV, HCV, and HIV Infection and U.S. Sanitation Workers

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- Like all U.S. citizens, a sanitation worker can be infected with any of these viruses and not necessarily know it.
  - This is the case, **whether or not** the worker has had a NSI.
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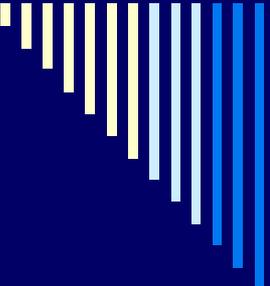


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# How Employers Could Deal with Employees' Perceived Risk of Infection from a NSI

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- Educate employees concerning the real level of risk associated with NSI.
  - In practical ways, demonstrate concern and commitment to employees' health and to decreasing employees' actual health risks.
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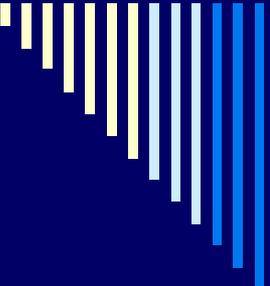
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## Addressing Concerns About Waste Management-Associated NSI

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### Waste management employers could:

- Sponsor an independent prospective study of NSI and other sharp injuries occurring in their employee population.
  - Educate employees concerning the study results and provide accurate information on the actual risks associated with NSI.
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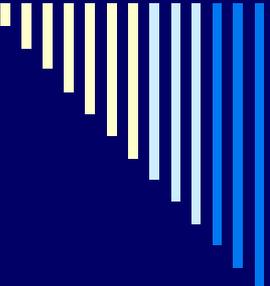
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## Addressing Sanitation Workers' Risks of Bloodborne Infections

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Aside from the issue of NSI, sanitation/waste management employers could provide, at no cost, to all employees:

- **HBV, HCV, and HIV testing**
  - **Diphtheria-tetanus boosters, as needed**
  - **HBV vaccination**
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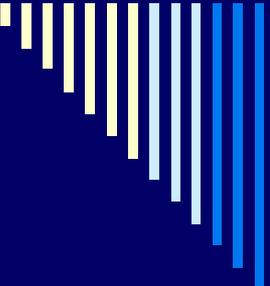


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# Determinants of the Risk of Infection from a NSI

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- Viability of contaminating organisms
  - Inoculum and infectivity
  - Invasiveness of the injury
  - Likelihood that source is infected
  - Immune status of host
  - Receipt or non-receipt of appropriate PEP
-



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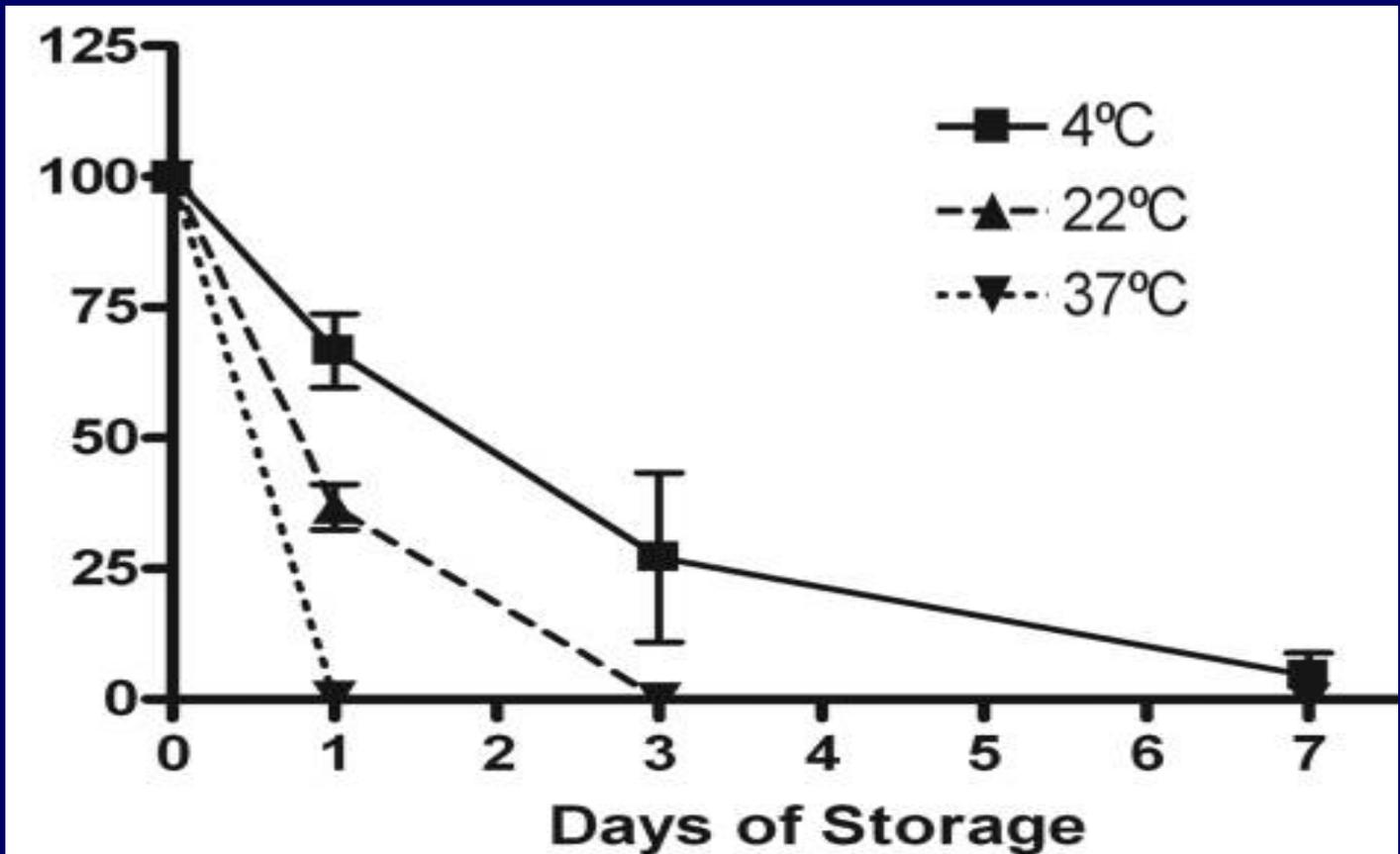
# Determinants of the Risk of Infection from NSI

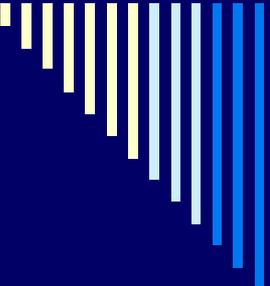
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# Survival of HCV In a Low Void Volume (Insulin) Syringe

Percent HCV+ Syringes



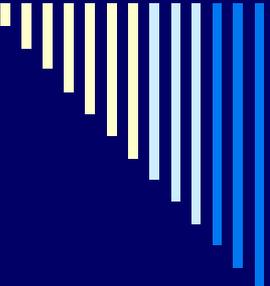


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## Rates of Transmission from NSI Involving a Known Positive Source: HBV, HCV, and HIV

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➤ HBV

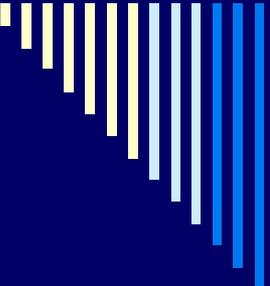
To a non-immunized host: ~23%-62%  
(Reduced with PEP)

To an immune host: 0%

➤ HCV: ~1.8% (range: 0%–10%)

➤ HIV: ~0.2-0.5% (Varies with exposure  
parameters and reduced with PEP)

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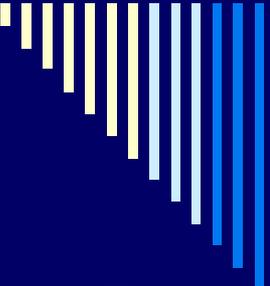


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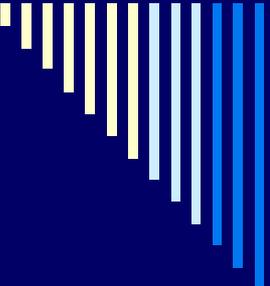
## Healthcare-associated NSI: Historic Perspective

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**Jagger et al., 1988: NSI in personnel at U VA,  
326 injuries over a 10-month period**

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- Disposable syringes accounted for highest proportion (35%) but lowest rate (6.9/100,000 syringes) of injuries
  - Devices requiring disassembly had up to 5.3 X the rate for disposable syringes
  - 1/3 of injuries were related to recapping
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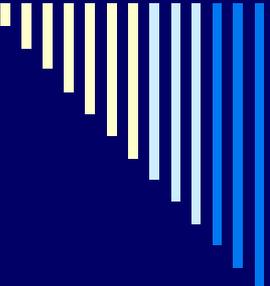


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# What to Consider in Determining the Risk of Infection from a NSI

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- What type and gauge was the needle?
  - Had the needle entered a patient's vasculature?
  - Does the needle/syringe have visible blood?
  - How deep was the puncture wound and was it into a blood vessel?
  - If the needle had been discarded, was the blood dry?
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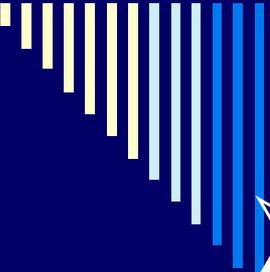


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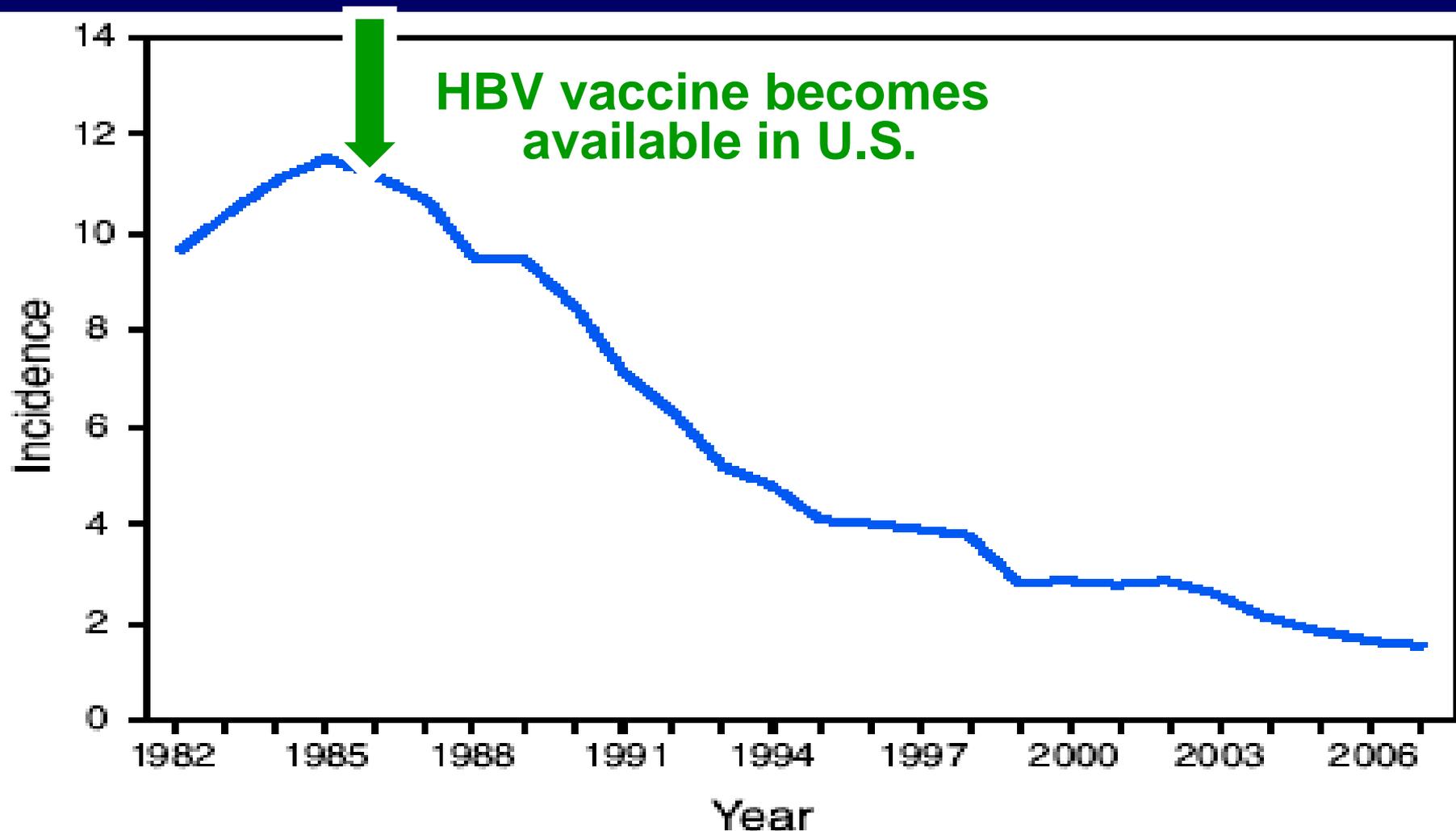


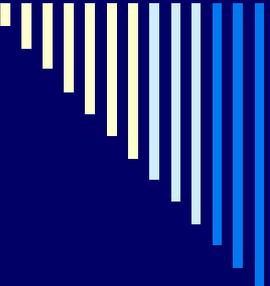
# HBV Vaccine and U.S. Sanitation Workers

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- HBV vaccine prevents HBV infection and is available to all U.S. citizens.
  - HCWs provide an example of the effectiveness of HBV vaccine
    - In 1983, before vaccine :
      - > 10,000 HCW cases
    - In 2001: <400 occupational cases
    - This represents a 95% decrease, even though an estimated 73,000 people in U.S. were infected
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# Incidence of Acute HBV, per 100,000 U.S. Population, 1982-2006



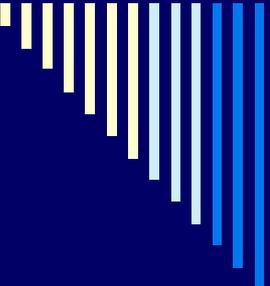


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# Ongoing Revolutionary Changes in HCV Therapy

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- An estimated 3-4 million U.S. persons are chronically infected with HCV.
  - Around half are unaware of their status.
  - New direct-acting oral agents capable of curing hepatitis C virus (HCV) infection are being approved for use in the United States.
  - These changes offer the potential of a cure for most U.S. patients within the next decade.
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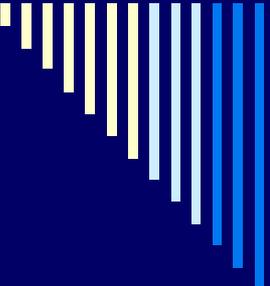


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# HIV in the U.S.

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- An estimated 1,2 million Americans are living with HIV.
  - Of these, approximately 240,000 are unaware of their HIV-positive status.
  - HIV is currently not curable but it is treatable.
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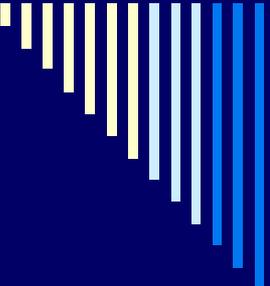


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- HCV testing is recommended for all U.S. citizens born between 1945-1965 and is available to everyone.
  - The U.S. Preventive Services Task Force recommends that clinicians screen all persons aged 15–65 years for HIV infection at least once, regardless of their risk .
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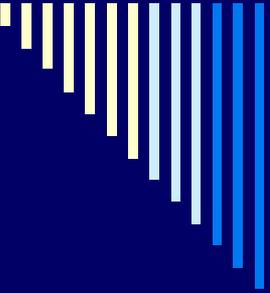


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# What to Consider in Determining an Sanitation Worker's Infection Risk from a NSI

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- Has the worker received HBV vaccine?
  - Has the worker been previously infected with HBV, HCV, &/or HIV?
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