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# **Healthcare-Related Outbreaks of Hepatitis B and C in the United States**

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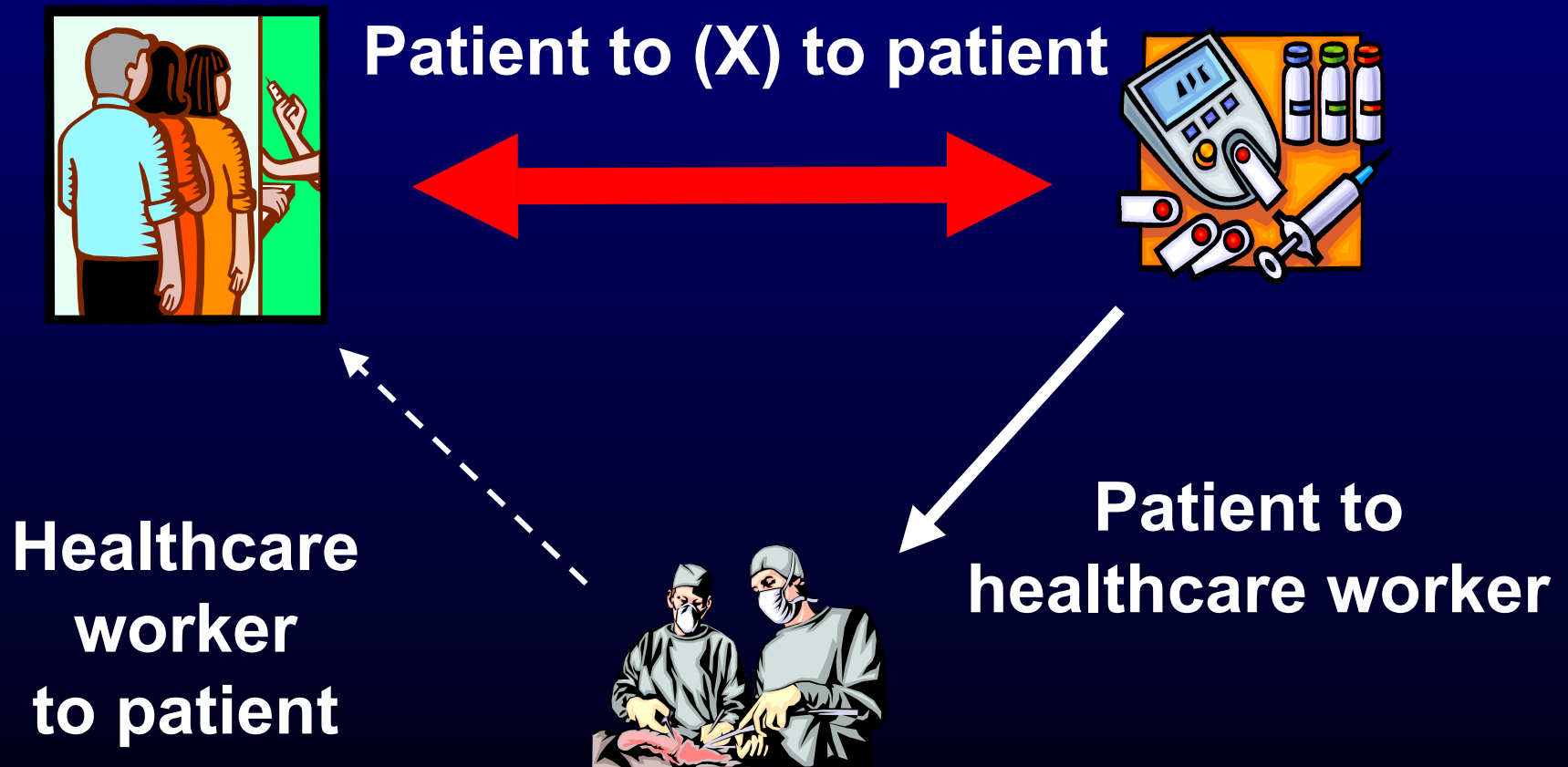
**Division of Viral Hepatitis**

**National Center for Infectious Diseases**

**Centers for Disease Control and Prevention**



# HBV & HCV Transmission in Health Care Settings



# HCW to Patient Transmission

# HBV Transmission from Infected HCWs to Patients

- Historically, there have been a number of reports of infected HCWs transmitting HBV during invasive procedures
  - Patients infected range from 1 to more than 50
  - Most occurred before prior to widespread use of barrier precautions (e.g. gloves by dentists)
- Only ~10 reports in past decade
  - Associated with HBV infected surgeons
  - None in dentists
  - Only one recent report in North America (2000)
    - 75 patients infected from procedures involving subdermal electrodes implanted by HBeAg positive technician

# Factors related to HBV transmission from Infected HCWs to Patients

- HCW being HBeAg positive
  - No reports in US of transmission from HCWs with precore mutant strain that prevents HBeAg expression
    - No current US recommendations for ongoing monitoring of HBV DNA levels
- Exposure-prone procedures
  - Those that include digital palpation of a needle tip in a body cavity or the simultaneous presence of the HCW's fingers and a needle or other sharp instrument in a poorly visualized or highly confined anatomic site

# Prevention of HBV Transmission from Infected HCWs

- Adhere to standard precautions
  - Appropriate use of protective barriers, hand washing, and care in use and disposal of needles and other sharps
- No restriction of practice for duties/procedures not identified as exposure-prone
- Exposure-prone invasive procedures
  - Know your HBeAg status
  - HBeAg positive HCWs should seek counsel from an expert review panel to determine under what circumstances (if any) to continue to perform these procedures

# Reports of HCW to Patient Transmission of HCV in the United States (n=4)

<u>Type of HCW</u>	<u>Year</u>	<u>Cases</u>	<u>Reported Mode</u>
OP surgical tech	1991-92	~40	IDU*
Anesthesiologist	1994	1/347 (0.3%)	Possible IDU*
Cardiac surgeon	2003	14/937 (1.5%)	Exposure prone procedures
Nurse anesthetist	2004	15/142 (10.6%)	Possible IDU*

\* Contaminated needles or narcotics used for self-injection

# HCW to Patient Transmission of HCV in the US

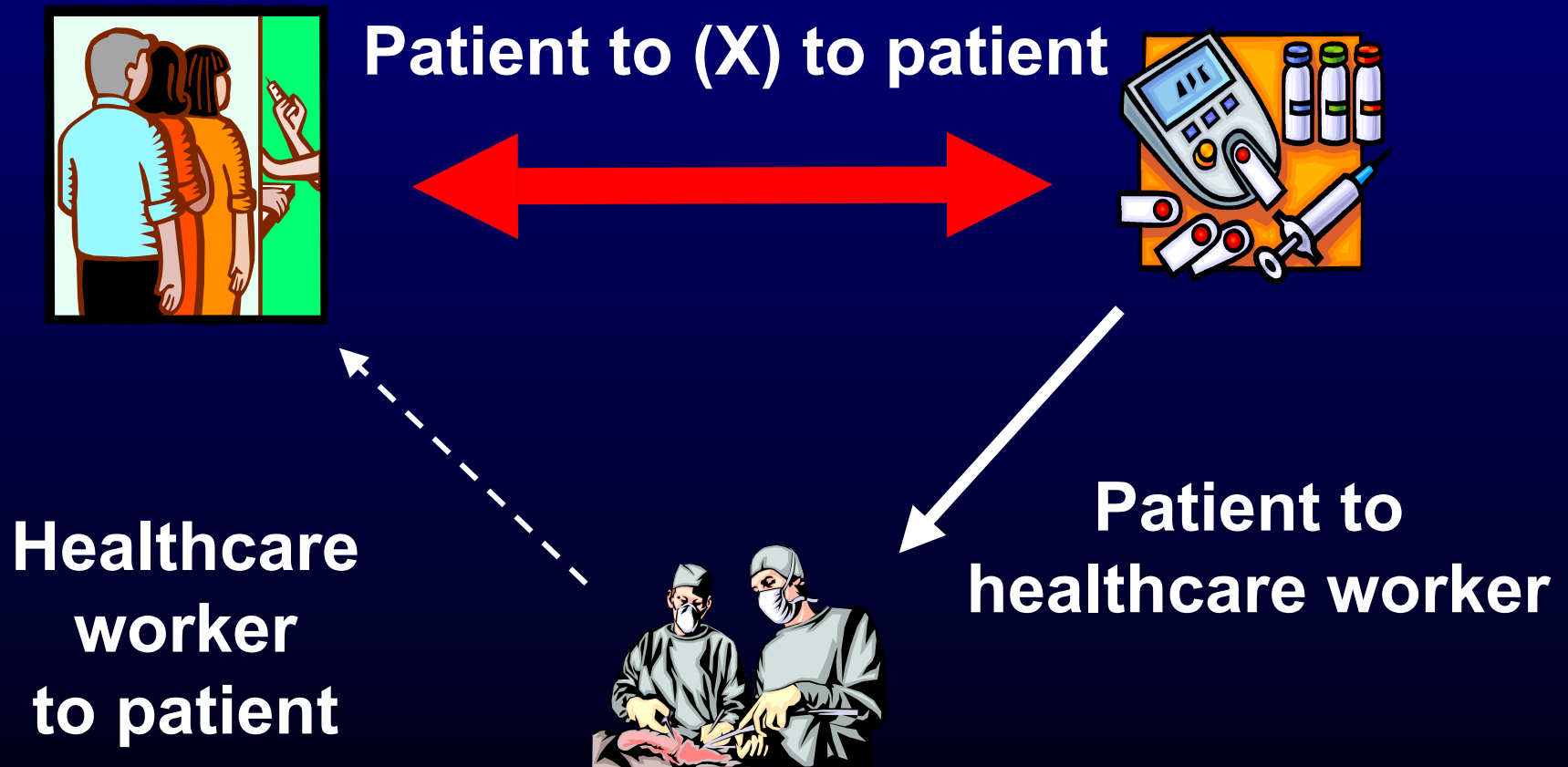
- Rare
  - Most (three of four) not related to performing invasive procedures
- Most appear related to HCW substance abuse
  - Reuse of needles or sharing narcotics used for self-injection
- In U.S., no restrictions routinely recommended for HCV-infected HCWs
  - HCV-infected HCWs that are epidemiologically implicated in transmission despite adequate precautions should have practices evaluated



# Risk of HCV Transmission

- Can we identify specific persons who are more likely to transmit and for whom we should modify our recommendations?
  - Titer of HCV RNA higher in HCV-infected persons before anti-HCV seroconversion
    - Does this “window” period correlate with transmission?

# HBV & HCV Transmission in Health Care Settings



# **Viral Hepatitis Transmission Related to Healthcare Procedures in the United States**

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- **No association in case-control studies**
- **Uncommon in national & sentinel surveillance**
  - **Sentinel Counties routinely investigates healthcare-related exposures**
- **Transmission recognized primarily in context of outbreaks**
  - **Mostly due to unsafe injection practices**
    - **Reuse of syringes and needles**
    - **Contaminated multiple dose medication vials**

# Outbreaks of Healthcare-Related Viral Hepatitis Transmission, United States

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## HBV

- Contaminated equipment
  - Hemodialysis
  - EEG electrodes
- Unsafe injection practices
  - Finger stick devices
  - Multiple dose medication vials
  - Jet injector
  - Acupuncture
  - Reuse of syringes/needles for therapeutic injections

## HCV

- Contaminated equipment
  - Hemodialysis
- Unsafe injection practices
  - Plasmapheresis
  - Multiple dose medication vials
  - Reuse of syringes/needles for therapeutic injections
  - Home infusion therapy

# Settings Associated w/ Recent US Outbreaks of Healthcare-Related Viral Hepatitis Transmission

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- Most common in the past five years:
  - Ambulatory care
    - Involve a few to >100 patients
    - Most associated with multiple dose vials/anesthesia medications and/or reuse of syringes & needles
  - Longterm care
    - Involve few patients (<10)
    - All associated glucose monitoring and hepatitis B virus infection
- Infrequent in past five years:
  - Inpatient
    - Involve few patients (<5)
    - Most associated with multiple dose vials/anesthesia medications
  - Dialysis (historically common)
  - Dental

# Recent Outbreaks of Healthcare-Related Viral Hepatitis Associated with Unsafe Injection Practices/Failure to Follow Appropriate Aseptic Technique

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- **Endoscopy Clinic: New York City, 2001\***
  - 19 HCV infections likely due to contamination of multiple-dose anesthetic vials from reinsertion of used needles
- **Private Medical Practice: New York City, 2001\***
  - 38 HBV infections associated with unsafe injection practices
- **Oncology Clinic: Nebraska, 2002\***
  - 99 HCV infections associated with syringe reuse leading to contamination of common saline bag
- **Pain Remediation Clinic: Oklahoma, 2002\***
  - 71 HCV and 31 HBV infections unsafe injection practices
- **Chelation Therapy: Florida, 2005**
  - Ongoing investigation (6 HBV infections to date) – failure to follow appropriate aseptic technique

\*Transmission of hepatitis B and C viruses in outpatient settings--New York, Oklahoma, and Nebraska, 2000-2002. MMWR 2003;52:901-6.



# HCV Infection at a Pain Remediation Clinic

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- Six patients with unexplained HCV infection treated in the same pain remediation clinic
- Lookback investigation for entire two year time period of clinic operation
  - Serologic results on 795/908 (88%)
    - 71 (9%) clinic-associated HCV infections
    - 31 (4%) clinic-associated HBV infections
    - No HIV infections detected

Comstock et al. *Infection Control and Hospital Epidemiology* 2004; 25(7):576-583.



# HCV Infection at a Pain Remediation Clinic

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- **Outpatient clinic affiliated with a hospital**
  - Responsibility for infection control oversight unclear
- **Nurse anesthetist routinely used a single syringe with multiple medication doses on all patients during a session**
  - Usual practice over many years
- **Prior to outbreak identification nurse anesthetist was reported for poor practice**
  - First report not acted upon
  - Second report - formal reprimand but no patient notification
- **Probable mechanism of transmission: routine use of single needle/syringe to administer medication to multiple patients**



# HCV Infection at a Pain Remediation Clinic

## Day A

Patient #	anti-HCV +	Genotype
1	NO	
2	NO	
3	NO	
4	NO	
5	NO	
6	NO	
7	YES	1a
8	NO	
9	NO	
10	YES	1a
11	YES	1a
12	YES	1a
13	YES	1a
14	YES	1a
15	YES	1a
16	YES	ind
17	YES	1a
18	YES	ind
19	YES	1a
20	YES	2b
21	YES	UNK
22	NOT TESTED	
23	NO	
24	YES	1a

## Day B

Patient #	anti-HCV +	Genotype
1	NO	
2	NO	
3	YES	2b
4	YES	1a
5	YES	1a
6	YES	1a
7	NO	
8	YES	1a
9	YES	1a
10	YES	1a
11	YES	ind
12	YES	1a
13	YES	1a
14	YES	ind
15	YES	1a
16	NO	
17	YES	
18	YES	ind
19	NO	
20	YES	1a
21	NOT TESTED	

# Common Themes in Recent Outbreaks Associated with Unsafe Injections

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- **Not detected by current surveillance systems**
  - All identified by alert clinicians
- **Occurred in outpatient settings**
- **Associated with unsafe injections/failure to follow appropriate aseptic technique**
  - “Obvious” violations in standard procedures
  - Preventable with basic infection control practices
  - HCWs not aware that practices were in error

# Outbreaks of Viral Hepatitis Associated With Fingerstick Blood Sampling Procedures in the United States

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# Blood Glucose Monitoring via Fingersticks

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- Fingersticks = Percutaneous Exposures
- Risks for bloodborne pathogen transmission
  - HBV, HCV, and HIV
    - HBV stable in the environment
  - Settings in which multiple persons require FS
- Common in long-term care settings
  - Diabetes >18% among persons aged ≥60 years

# U.S. Reports of HBV Outbreaks Associated with Blood Glucose Monitoring

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- 1990 – California – Hospital
  - 26 cases of acute HBV infection
  - Associated with shared fingerstick devices
    - Disposable platform not changed between patients
- **CDC/FDA recommendation:** Restrict fingerstick devices to individual patients
- 1996 – Ohio – Nursing Home – 9 cases
- 1996 – New York City – Hospital – 13 cases
- Pen-like FS devices with disposable end caps
  - Reuse of end caps (OH)
    - Used and unused caps in same box (NYC)
    - Failures to change gloves between patients (NYC)
- **CDC recommendation:** Restrict FS devices to individuals + change gloves between patients

# Recent Reports of HBV Outbreaks Associated with Shared Fingertick Devices

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- 1999 – Virginia – Assisted Living Center – 4 cases
- 1999 – California – Nursing Home – 4 cases
- 2003 – California – Assisted Living Center – 8 cases
  - Roundtable setting; no glove use or handwashing
- 2003 – Mississippi – Nursing Home – 15 cases
  - One glucometer and FS device per nurses station
  - Licensure evaluation led to increased FS procedures

# Recent Outbreaks Associated with Other Blood Glucose Monitoring Supplies

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- 1999 – California – Skilled Nursing Facility – 5 cases
- 2002 – California – Subacute Hospital – 3 cases
  - Ventilator-dependent patients; FS 4x daily
- 2003 – North Carolina – Nursing Home – 8 cases

- Dedicated fingerstick devices
- Contamination of other shared diabetes care equipment including glucometers



**Transmission of Hepatitis B Virus Among Persons Undergoing Blood Glucose Monitoring in Long-Term-Care Facilities — Mississippi, North Carolina, and Los Angeles County, California, 2003–2004**

BOX 1. Recommended practices for preventing patient-to-patient transmission of hepatitis viruses from diabetes-care procedures in long-term-care settings

**Diabetes-care procedures and techniques**

- Prepare medications such as insulin in a centralized medication area; multidose insulin vials should be assigned to individual patients and labeled appropriately.
- Never reuse needles, syringes, or lancets.

- Raise awareness of ongoing problem
- Avoid shared equipment including glucometers
- Preference for auto-disabling single use lancets
- Hand hygiene and gloves
- Reduce percutaneous procedures to minimum necessary for appropriate diabetes management
- Train, assess, and monitor staff
- Assure staffing adequate for all scheduled diabetes care



# Challenges in the Longterm Care Setting

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- Multiple residents requiring glucose monitoring
- Standing orders for frequent fingersticks
- HCWs' time constraints, lack of training and oversight, and high turnover
- Suboptimal infection control
- Recommendations not adopted
- Residual risks beyond FS devices
  - Other shared devices

# Priority Activities To Prevent Healthcare-Related Viral Hepatitis Transmission (I)

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- **Improve detection of cases/clusters**
  - Solicit reports
  - Follow-up of acute cases  $\geq 60$  years old reported in National Surveillance
- **Evaluation of reported acute cases  $\geq 60$  years of age**
  - Overall risk of infection is reduced in older adults given lower frequencies of high risk behaviors (e.g. injection drug use, multiple sex partners)
  - ~5% of cases are in people  $\geq 60$  years of age

# Evaluation of Reported Cases of Acute Hepatitis B and Hepatitis C Cases $\geq$ 60 Years of Age

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- **Sentinel Surveillance cases  $\geq$ 60 years old**
  - Hospitalization or same day surgery reported by 35% of acute hepatitis B and 42% of acute hepatitis C cases
- **National Surveillance acute hepatitis B cases  $\geq$ 70 years old**
  - 38% reported being hospitalized
  - 19% reported surgery
- **National Health Interview Survey  $\geq$  65 years old**
  - 9% reported a hospitalization in the prior six months
- **Healthcare-related exposures might be the source of infection for a considerable proportion of older persons**

# Priority Activities To Prevent Healthcare-Related Viral Hepatitis Transmission (II)

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- **Case - control study to examine risk factors for acute hepatitis B & hepatitis C in persons  $\geq$  60 years old**
  - Evaluate healthcare-related exposures
  - Begin enrolling subjects this year
- **Reinforce basic infection control principles and document best practices**
  - Review article on viral hepatitis in ambulatory care settings published in CID in June
  - MMWR describing outbreaks associated with glucose monitoring
- **Re-examine current approaches**
  - Healthcare Infection Control Practices Advisory Committee ambulatory healthcare working group

Robert A. Weinstein, Section Editor

# Viral Hepatitis Transmission in Ambulatory Health Care Settings

I. T. Williams, J. F. Perz, and B. P. Bell

Epidemiology Branch, Division of Viral Hepatitis, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia

**Table 1. Recommended infection-control and safe injection practices to prevent patient-to-patient transmission of bloodborne pathogens.**

## Injection safety

Use a sterile, single-use, disposable needle and syringe for each injection and discard intact in an appropriate sharps container after use.

Use single-dose medication vials, prefilled syringes, and ampules when possible. Do not administer medications from single-dose vials to multiple patients or combine leftover contents for later use.

If multiple-dose vials are used, restrict them to a centralized medication area or for single patient use. Never reenter a vial with a needle or syringe used on one patient if that vial will be used to withdraw medication for another patient. Store vials in accordance with manufacturer's recommendations and discard if sterility is compromised.

Do not use bags or bottles of intravenous solution as a common source of supply for multiple patients.

Use aseptic technique to avoid contamination of sterile injection equipment and medications.

## Patient-care equipment

Handle patient-care equipment that might be contaminated with blood in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of microorganisms to other patients and surfaces.

Evaluate equipment and devices for potential cross-contamination of blood. Establish procedures for safe handling during and after use, including cleaning and disinfection or sterilization as indicated.

## Work environment

Dispose of used syringes and needles at the point of use in a sharps container that is puncture-resistant and leak-proof and that can be sealed before completely full.

Maintain physical separation between clean and contaminated equipment and supplies.

Prepare medications in areas physically separated from those with potential blood contamination.

Use barriers to protect surfaces from blood contamination when blood samples are obtained.

Clean and disinfect blood-contaminated equipment and surfaces in accordance with recommended guidelines.

## Hand hygiene and gloves

Perform hand hygiene (i.e., hand washing with soap and water or use of an alcohol-based hand rub) before preparing and administering an injection, before and after donning gloves for obtaining blood samples, after inadvertent blood contamination, and between patients.

Wear gloves for procedures that might involve contact with blood and change gloves between patients.

## Administrative

Infection-control measures should be tailored to the individual practice setting.

Responsibility for oversight and monitoring should be clearly designated.

Periodic reviews of staff practices should be conducted.

Procedures and responsibilities should be established for reporting and investigating breaches in infection-control policy.

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