Keeping the Infection Out of the Injection

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No conflicts to report

Overview

• What is injection safety?
• Investigations linked to unsafe injection practices
• Common injection safety breaches
• Recommended injection and medication practices
• Injection safety resources
Injection Safety

- Measures taken to perform injections in a safe manner for patients and providers
- Prevent harms such as needlestick injuries
- Prevent transmission of infectious diseases from:
  - Patient to provider
  - Provider to patient
  - Patient to patient

http://www.cdc.gov/injectionsafety/

Guidelines

2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

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Guidelines for Outpatient Settings

Attention to Basic Infection Control Needs to Extend Across the Entire Healthcare Continuum

Transition of healthcare delivery
- Growth and shifts in care to settings where infection control infrastructure and oversight may be lacking
  - Doctor’s Offices
    - 2007: ~1 billion visits to office-based physicians
  - Hemodialysis
    - 2008: ~354,600 maintenance hemodialysis patients in the U.S.
    - 2008: ~5240 dialysis centers (82% increase since 1996)
  - Ambulatory Surgical Centers
    - 2009: ~5175 (240% increase since 1996)
  - Outpatient procedures represent % of all U.S. surgical operations
  - Nursing Homes
    - 2008: ~3.2 million Americans resided in nursing homes
  - Assisted Living Facilities
    - 2004: ~975,000 beds (≥2x growth since 1990s)

Healthcare-associated HBV/ HCV outbreaks by year reported - July 1998 to June 2009
- 51 outbreaks (42 non-hospital)
  - 17 long-term care
  - 16 outpatient settings
  - 8 hemodialysis
  - 9 hospital
- >75,000 persons potentially exposed
- 620 persons newly infected

Thompson et al. Annals of Int Med, 2009; and unpublished data
**HBV/HCV Outbreaks (n=16) in Outpatient Settings due to Unsafe Injection Practices, 2001-2010**

<table>
<thead>
<tr>
<th>State</th>
<th>Setting</th>
<th>Year</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY</td>
<td>Private MD office</td>
<td>2001</td>
<td>HCV</td>
</tr>
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<td>NY</td>
<td>Private MD office</td>
<td>2001</td>
<td>HBV</td>
</tr>
<tr>
<td>NE</td>
<td>Oncology clinic</td>
<td>2002</td>
<td>HCV</td>
</tr>
<tr>
<td>OK</td>
<td>Pain remediation clinic</td>
<td>2002</td>
<td>HCV+HCV</td>
</tr>
<tr>
<td>NY</td>
<td>Endoscopy clinic</td>
<td>2002</td>
<td>HCV</td>
</tr>
<tr>
<td>CA</td>
<td>Pain remediation clinic</td>
<td>2003</td>
<td>HCV</td>
</tr>
<tr>
<td>MD</td>
<td>Nuclear imaging</td>
<td>2004</td>
<td>HCV</td>
</tr>
<tr>
<td>FL</td>
<td>Alternative medicine clinic</td>
<td>2005</td>
<td>HBV</td>
</tr>
<tr>
<td>CA</td>
<td>Alternative medicine clinic</td>
<td>2005</td>
<td>HCV</td>
</tr>
<tr>
<td>NY</td>
<td>Endoscopy/surgery clinics</td>
<td>2006</td>
<td>HCV+HCV</td>
</tr>
<tr>
<td>NY</td>
<td>Pain remediation clinic</td>
<td>2007</td>
<td>HCV</td>
</tr>
<tr>
<td>NV</td>
<td>Endoscopy clinic</td>
<td>2008</td>
<td>HCV</td>
</tr>
<tr>
<td>NC</td>
<td>Cardiology clinic</td>
<td>2008</td>
<td>HCV</td>
</tr>
<tr>
<td>NJ</td>
<td>Oncology clinic</td>
<td>2009</td>
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Over the past decade, over 125,000 patients have had to be notified in the context of more than two dozen incidents and outbreaks involving unsafe injections...

**Outbreaks of bacterial and parasitic infections associated with unsafe injections, United States, 1999-2009**

- **17 outbreaks: 16 bacterial, 1 malaria**
  - 7 pain clinics; 4 oncology centers, 3 dialysis clinics
  - Joint/spine injections (8 outbreaks)
  - Saline/heparin flush procedures (7 outbreaks)
  - 74% of case-patients required hospitalization for medical or surgical treatment

New York City – Private Medical Practice, December 2001

Two patients aged >75 years developed acute hepatitis B
- Admitted same hospital
- Attended same private medical practice

New York City – Private Medical Practice
• Notification of >1000 patients; >200 tested
• 38 patients with acute HBV infection
• HBV sequenced from 28 patients was identical
• All staff members negative for HBV markers
• Associated with injection of vitamins and steroids
  - 2 or 3 medications together in one syringe
  - Needles and syringes were NOT reused

Samandari et al. ICHE 2005 26(9):745-50

FACT: Medication should not be prepared in areas that are potentially contaminated
FACT: Multidose vials should only be used when no alternative is available and should be patient dedicated

Storage of multidose vials and preparation of injections in same area that used needles and syringes were dismantled and discarded

Ref: Samandari et al. ICHE 2005, 26: 745-750
Photo: Don Weiss / NYCDOHMH
Nebraska – Oncology Clinic, 2002

- September 2002 – 4 patients recently diagnosed HCV infection reported to Health Department
  - All regularly had cancer chemotherapy at one clinic
- Nurse drew blood from indwelling IV catheter, then reused same syringe to perform saline flush
  - Solution from 500cc bag used for multiple patients
  - New syringe was used for each patient
- 99 clinic-acquired HCV infections identified
  - All genotype 3a (uncommon in U.S.)

Macedo de Oliveira et al., Annals of Internal Medicine, 2005, 142:898-902

Nebraska – Oncology Clinic

- Feb 2001 – 3 patients approached hospital infection control committee
  - Hospital cited independent ownership and operation and forwarded concerns to oncologist
  - April 2001 – clinic applies to be a research center. Breaches identified. Oncologist fires nurse. Regulatory authorities not notified.
  - Oncologist flees the country
  - 2004 - oncologist’s and nurses’ professional licenses revoked
  - Evelyn McKnight, an HCV-infected patient writes a book and establishes HonorReform.
Nebraska – Oncology Clinic

• Outcomes
  – 6 deaths from HCV, not cancer
  – 33 antiviral therapy, 28 achieved sustained response
  – 1 sexually acquired HCV
  – 89 lawsuits, $16M paid from Nebraska Excess Liability Fund


Nevada – Endoscopy Center, 2007

• January 2008 – cluster of 3 acute HCV infections identified in Las Vegas
• All 3 patients underwent procedures at the same endoscopy clinic (ECSN) during the incubation period

MMWR 2008 57(19);513-517

The Nevada outbreak: mechanism

• Two breaches contributed to transmission:
  – Re-entering propofol vials with used syringes
  – Using contents from these single-dose vials on more than one patient

MMWR 2008 57(19):513-517
Nevada - Endoscopy Center

• Clinic immediately advised to stop unsafe injection practices (reuse of syringes and propofol vials)
• Unsafe practices had been commonly used by some staff at the clinic for at least 4 years
• Health department began notifying 40,000 persons to recommend HBV, HCV, HIV screening
• A total of 8 cases were directly linked to ECSN; an additional 101 were possibly linked

FACT: Vials should never be entered with a used needle or syringe
FACT: Single-dose vials or bags of intravenous fluid should never be used for more than one patient

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Antony at 78: The biggest Nevada colonoscopy scandal

Two years later, there is still no resolution, or punishment

Police recommend criminal charges

Feds’ blitz: 30 days, 50 clinics
HBV Transmission Associated with Assisted Blood Glucose Monitoring

Officials Release Findings In GlenCare Investigation

In 2007-08 study

It was found that residents were at risk for HBV transmission.


cases, six deaths

The investigation identified unsafe practices, including sharing of reusable fingerstick lancing devices approved for single patient use only and shared use of blood glucose meters without cleaning and disinfection between patients.

Outbreaks (n=26) of HBV infection associated with Assisted Monitoring of Blood Glucose - 1990 to present, US

Deaths from Acute Hepatitis B Virus Infection Associated with Assisted Blood Glucose Monitoring in an Assisted-Living Facility — North Carolina, August–October 2010

Sharing of blood glucose monitoring equipment in assisted-living facilities has resulted in at least 16 outbreaks of hepatitis B virus (HBV) infection in the United States since 2004 (1,2).

- Eight cases, six deaths
- The investigation identified unsafe practices, including sharing of reusable fingerstick lancing devices approved for single patient use only and shared use of blood glucose meters without cleaning and disinfection between patients.
Practices Associated with HBV Transmission During Assisted Monitoring of Blood Glucose

- Use of multi-use fingerstick devices on multiple persons
- Failure to clean and disinfect blood glucose testing meters between each use
- Failure to change or use gloves, or perform hand hygiene between procedures

Patel et al. ICHE 2009; 30:209-14
Thompson et al. JAGS 2010

FACT: Fingerstick devices must be dedicated to one person
FACT: Whenever possible, blood glucose meters should not be shared; if shared, the device should be cleaned and disinfected (with bleach) after every use
FACT: Insulin pens must be dedicated to one person; pens for multiple patients should be stored separately
FACT: Staff must engage in hand hygiene and remove gloves after each patient

MMWR 2005; 54:220-3 www.cdc.gov/injectionsafety

Too Close to Home

New Jersey Investigations
New Jersey – Oncology Office, 2009

- February 2009 – 2 patients, 60 and 77 years of age, reported to local health department with acute HBV infection
  - Both received care at the same oncology practice
  - Neither had traditional risk factors
- Review of NJ Communicable Disease Reporting and Surveillance System (CQRS) revealed 3 additional cases linked to the oncology practice
  - None had traditional risk factors
- Office inspected on March 3 & 10
- 60 – 80 patients seen per day; 12 - 15 received infusions

FACT: Medication should not be prepared in areas that are potentially contaminated
FACT: Syringes should not be unwrapped or filled in advance

FACT: Environmental surfaces must be kept clean
FACT: Vacutainer holders should not be reused
FACT: Potentially contaminated items should not come in contact with other patient-care items (i.e., gauze)
New Jersey – Oncology Office

IV bags used as sources of fluid to flush catheters for multiple patients

FACT: IV bags should not be opened or spiked in advance
FACT: IV bags should not be used as a source of fluid for multiple patients

New Jersey – Oncology Office

Single use vials stored and used on subsequent days for multiple patients

FACT: Single use vials do not have preservative and should not be used for more than one time or for more than one patient

New Jersey – Oncology Office

Medication prepared using unwrapped syringes in room where CBCs were processed

FACT: Syringes should not be unwrapped prior to use
FACT: Medication should not be stored or prepared in potentially contaminated areas
• 6000 letters sent to 4600 patients
• 29 outbreak-associated cases identified; 68 others possible
• 11 of 13 specimens with detectible HBV DNA had 99.9% to 100% identical nucleotides indicating a common source
• Incubation period ranged Aug 2007 – Mar 2009
• Office practice was closed on Mar 3, 2009
• Physician’s license to practice medicine revoked
New Jersey - Acute Care Hospital, 2010

- 1 patient, 65 years of age, diagnosed with acute hepatitis C infection
  - No traditional risk factors elicited
  - Had ambulatory gynecologic surgery during the incubation period

New Jersey - Acute Care Hospital

- Chart review performed of patients who had surgery performed on the same day
- Chart review identified a patient with known chronic HCV who had surgery prior to index case
- Commonalities included 2 surgical nurses, 1 anesthesiologist, the anesthesia cart, and propofol
- Only the anesthesiologist performed invasive procedures on both patients, only common medication was propofol, anesthesia cart was used for both

FACT: Medication should not be prepared in areas that are potentially contaminated or on potentially contaminated surfaces
FACT: Single-dose vials or bags of intravenous fluid should never be used for more than one patient

Inspection revealed:
- No policies for stocking or cleaning carts between cases
- No pharmacy accounting system to ensure appropriate use of single-dose vials
- Preparation of medication in patient care area on top of cart
New Jersey – Acute Care Hospital

- CDC quasispecies analysis revealed maximum nucleotide identities of 100% indicating common source
- ~ 80 patients of anesthesiologist notified to be tested
- No additional cases identified
- Facility policies amended; litigation pending

Other NJ Experiences

- Healthcare-associated HBV in a patient of a residential healthcare facility undergoing podiatry procedure at a private office, 2010
  - Inspections revealed breaches at both the residential facility and the podiatry office
  - > 1,000 patients notified
- Outbreak of HCV at a dialysis center, 2009
  - 16 cases identified from 2005 - 2009
- Staph infections associated with knee arthroscopy in an ambulatory surgery center, 2009
- Outbreak of Klebsiella associated with a private hematology-oncology practice, 2011
- Strep salivarius meningitis following epidural injection, 2011

Why are there lapses in basic infection control?

- Lack of awareness
- Poor/insufficient training
- Economics
- Lax or nonexistent policies and procedures
Common Themes and Findings

- Investigations were resource-intensive and disruptive
  - Notification, testing, and counseling of hundreds of patients

- Delayed recognition and missed opportunities
  - Prolonged transmission
  - Growing reservoirs of infected patients

- IC programs lacking or responsibilities unclear
  - Clinic space rented from a hospital (NE)

- Entirely preventable
  - Standard precautions + aseptic technique

Injection practices among clinicians in United States health care settings

- Survey of 5,500 U.S. healthcare professionals (primarily RNs)
- 1 percent “sometimes or always” reuse a syringe on a second patient
- 1 percent “sometimes or always” reuse a multidose vial after accessing it with a reused syringe
- 6 percent use single-dose/single use vials for more than one patient

Pugliese et al. 2010. AJIC. Available at: http://www.cdc.gov/injectionsafety or http://www.ajicjournal.org/article/PIIS0196655310008539/abstract
Multi-state ASC evaluation

• Objectives
  – Describe infection control practices in a sample of ASCs in additional states
  – Determine whether use of an infection control work sheet (ICWS) improved survey effectiveness

• Methods
  – Inspections in a sample of 68 ASCs in Maryland, North Carolina, and Oklahoma from June-October 2008
  – Used ICWS
    • Emphasis on observations
    • Focus on staff who performed procedures of interest
    • Case tracer methodology
  – Presence of infection control lapses in each of the infection control areas assessed was documented

Results of multi-state pilot infection control assessments

• Median of 5.4 years between pilot and most recent inspection (0.6-12.6 years)
• 68% (46/68) of ASCs had at least one lapse in infection control
• 18% (12/68) had lapses in 3 or more of the 5 infection control categories assessed

Infection control lapses

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Infection control lapses

- 28% of ASCs used single-dose vials for multiple patients

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IV.H.4. Use single-dose vials for parenteral medications whenever possible.

IV.H.5. Do not administer medications from single-dose vials or ampules to multiple patients or combine different contents but later use in the same patient if the vial or ampule is not opened.


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http://www.cdc.gov/hicpac/Disinfection_Sterilization/acknowledg.html

Infection control lapses just as important.....


Administrative
Tailor infection-control measures to individual practice setting
Clearly designate responsibility for oversight and monitoring
Periodically review staff practices (e.g., at least annually)
Establish procedures and responsibilities for reporting and investigating breaches in infection-control policy

How much can we see?

Asymptomatic infection
Under-reporting of cases
Under-recognition of healthcare as risk
Difficulty identifying single healthcare exposure
Barriers to investigation
Resource constraints

Newsday
2001 HEPATITIS OUTBREAK
DOCTOR DID IT
State: Anesthesiologist
Contaminated
Vial of Medication
With Biliary Needle
SUMMARY

Improper use of syringes, needles, and medication vials can result in:

- Transmission of life-threatening infections to patients
- Notification of patients of possible exposure to bloodborne pathogens and recommendation for testing
- Referral of providers to licensing boards for disciplinary action
- Malpractice suits filed by patients
All healthcare providers are urged to carefully review their infection control practices and the practices of all staff under their supervision. Healthcare providers must understand disease reporting requirements and have good working relationships with local public health agencies.

Public health professionals need to be aware of the possibility of healthcare-associated infections when investigating reportable diseases and outbreaks.

Healthcare consumers need to be advocates for safe injection practices.

Key Take-Home Messages

- All healthcare providers are urged to carefully review their infection control practices and the practices of all staff under their supervision. Healthcare providers must understand disease reporting requirements and have good working relationships with local public health agencies.
- Public health professionals need to be aware of the possibility of healthcare-associated infections when investigating reportable diseases and outbreaks.
- Healthcare consumers need to be advocates for safe injection practices.
Thank You

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Some Frequently Asked Questions
Q: Is it OK to use the same syringe to give intramuscular (IM) or subcutaneous (SC) injections to more than one patient if I change the needle between patients?

A: NO. Once they are used, the syringe and needle are both contaminated and must be discarded. Use a new sterile syringe and needle for each patient.

Q: If I used a syringe only to infuse medications into an IV tubing port that is several feet away from the patient’s IV catheter site, is it OK to use the same syringe for another patient?

A: NO. Everything from the medication bag to the patient’s catheter is a single interconnected unit.

Q: Are these recommendations new?

A: NO. These recommendations are part of established guidance.
Q: How can healthcare providers ensure that injections are performed correctly?

A: To help ensure that staff understand and adhere to safe injection practices, consider the following:
- Designate someone to provide ongoing oversight for infection control issues
- Develop written infection control policies
- Provide training
- Conduct quality assurance assessments

Q: Can I reuse a syringe during a procedure for a patient who requires additional medication as long as the vial will not be used for another patient?

A: It is preferable to always use a new sterile syringe to withdraw medications, even if the medication will only be used for one patient. This provides an extra layer of protection for patients and is encouraged

Q: Why can't I just visually inspect syringes to determine whether they are contaminated or can be used again?

A: Pathogens including HCV, HBV, and human immunodeficiency virus (HIV) can be present in sufficient quantities to produce infection in the absence of visible blood. Just because you don't see blood or other material in a used syringe or IV tubing, e.g., does not mean the item is free from potentially infectious agents.