Outbreaks Associated with Unsafe Injection and Medication Practices… and How We Can Prevent Them

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Pharmacy OneSource Webinar
June 20, 2012
Objectives

- Describe several outbreaks associated with unsafe injection and medication handling practices
- List the common practices that resulted in transmission of pathogens in these outbreaks
- Explain how these outbreaks could have been prevented
- Identify resources that can be used to promote safe injection practices
Health care should provide no avenue for transmission of bloodborne pathogens; however...

- Transmission of hepatitis B virus (HBV) and hepatitis C virus (HCV) in health-care settings is increasingly recognized public health problem

- During 2008–2011, 31 outbreaks of HBV or HCV in US health-care settings were reported to CDC
  - ~250 persons infected
  - ~88,000 persons notified of potential risk

- Many associated with unsafe injection and medication practices

Hepatitis C Outbreak in Hematology/Oncology Clinic -- Nebraska, 2002

- Gastroenterologist reported 4 patients with recent HCV infection to health department
  - All received chemotherapy at same clinic
- Close to 1,000 patients tested: 99 infected
- Why?
  - A HCW routinely used same syringe to draw blood from patients' central vascular catheter (CVC) and draw catheter-flushing solution from 500-cc saline bags used for multiple patients

MMWR 2003; 52(38);901-06
Hepatitis C Outbreak in Nevada Endoscopy Center, 2008 (1)

- Local health officials in Las Vegas received reports of 3 cases of hepatitis C in 3-day period (usually only 4 cases/year)
  - All had procedures at same endoscopy clinic

- Investigators observed:
  - Syringes or needles reused to draw medication from vial from which medication was then drawn and administered to multiple persons

MMWR 2008;57(19):513-517
Hepatitis C Outbreak in Nevada Endoscopy Center, 2008 (2)

- For at least 4 years, unsafe injection practices commonly used among some staff that administered anesthesia
- Health department notified approximately 40,000 persons who had anesthesia at clinic from Mar. 2004 - Jan. 2008 to undergo screening for HCV, HBV, and HIV infections

MMWR 2008;57(19):513-517
Hepatitis C Outbreak in NV Endoscopy Center, 2008 (3)

- Potentially exposed > 50,000 patients to Hepatitis C and other infectious diseases
  - 8 acute hepatitis C cases linked directly
  - 101 hepatitis C cases possibly linked

- WHY?
  - Reuse of syringes for more than one patient
  - Reuse of single-use vials of propofol for multiple patients
  - Poor hand hygiene practices

Barie PS. JAMA 2010;303 (22):2295-2297
Hepatitis C Outbreak in Nevada Endoscopy Center, 2008 (4)

- Associated costs: $16.3 - $21.9 million
- Extensive media coverage
- Resulted in multiple lawsuits and criminal action

Barie PS. JAMA 2010;303 (22):2295-2297
Hepatitis C Outbreak in Nevada Endoscopy Center, 2008 (5)

This event has its own Wikipedia page
How This Happened......

FIGURE 2. Unsafe injection practices and circumstances that likely resulted in transmission of hepatitis C virus (HCV) at clinic A — Nevada, 2007

1. Clean needle and syringe are used to draw medication.
2. When used on an HCV-infected patient, backflow from the injection or removal of the needle contaminates the syringe.
3. When again used to draw medication, a contaminated syringe contaminates the medication vial.
4. If a contaminated vial is subsequently used for other patients, they can become infected with HCV.

Source: MMWR May 16, 2008 / 57(19);513-517
Hepatitis C Outbreak in Florida Holistic Clinic, 2009*

- 8 patients tested positive for hepatitis C
  - Patients were undergoing chelation therapy to remove toxic metals from their bodies

- Outbreak believed to have been caused by nurse who contaminated vials of saline used during therapies
  - Nurse linked to outbreak publically named in May, 2010; license suspended

* St. Petersburg Times May 27, 2010
Hepatitis B Outbreak in Hematology-Oncology Office Practice, NJ, 2009

- 2 women (60 and 77 yrs) diagnosed with acute hepatitis B; both received chemotherapy at same physician's office
- Health care-associated transmission suspected
- Investigation:
  - 2,700 patients notified
  - 29 HBV cases identified

Hepatitis B Outbreak in Hematology-Oncology Office Practice, NJ, 2009

- WHY?
  - Common-use saline bags for more than one patient
  - Reuse of single-dose vials
  - Poor hand hygiene
  - Meds prepared in blood processing area

- Results:
  - Office practice was closed
  - Physician's license suspended

S aureus Infections in Outpatient Pain Clinic, 2009

- 3 patients hospitalized with severe S aureus (MSSA) infections after receiving epidural injections at WV outpatient pain clinic
  - Epidural abscess, bacteremia, presacral abscess, meningitis

- Investigation revealed:
  - 8 patients with severe infections
  - Syringes reused to access shared medication vials
  - No formal staff training

S. aureus Joint Infections in Primary Care Clinic, GA, 2009

- 5/15 patients developed S. aureus joint infections patients after corticosteroid injections
  - All required hospitalization/prolonged antibiotics

Investigation revealed:
- Mishandling of multi-dose vials used for >1 patient
  - Handling in immediate patient treatment area; failure to store according to manufacturer instructions
- Poor hand hygiene
- Incorrect cleaning/disinfection of equipment

Polymicrobial Bloodstream Infections (BSI) in Pediatric Oncology Clinic, 2007

- 6 patients treated at new clinic developed symptoms of BSI in 12-day period
  - Blood cultures grew various pathogens

Investigation:
- All patients had a central vascular catheter
- 7 more infections; 13 total (10 symptomatic)
- 43% of 30 BMT patients developed BSI

Polymicrobial BSI in Pediatric Oncology Clinic, GA, 2007 (2)

Why?

- Preservative-free, single-dose saline vials used for >1 patient
  - 50-mL vials used to predraw flush solutions for several patients prior to their arrival
  - Vials accessed multiple times, not discarded consistently at end of the day, and not dated
- Practice led to contamination of saline vials with multiple organisms

K pneumoniae and E aerogenes BSI - Pain Remediation Clinic, NY, 2008

- Cluster of gram-negative BSI after sacroiliac joint steroid injection at outpatient facility
  - 4 confirmed and 5 suspected cases
- Investigation revealed:
  - Contents from single-dose vials used for >1 patient
  - Injection site not cleaned properly prior to injection
  - Lack of hand hygiene before procedures

What common unsafe practices were associated with these outbreaks?

a. Use of single-patient infusion bags for multiple patients
b. Reuse of needles or syringes for more than one patient
c. Improper handling of multi-dose vials
d. Use of single-dose vials for multiple patients
e. All of the above
This isn’t about numbers….it's about people
WHY DID THESE OUTBREAKS OCCUR?
Unsafe Injection Practices Resulting In Transmission (1)

- Using same syringe to administer medication to more than one patient
  - Even if needle changed or injection administered through IV tubing
- Accessing medication vial with syringe that has already been used to administer medication to a patient, then reusing contents from that vial for another patient

http://www.cdc.gov/injectionsafety/providers/provider_faqs.html
Unsafe Injection Practices Resulting In Transmission (2)

- Using common bag of saline or other IV fluid for more than one patient, and
  - Leaving IV set in place for dispensing fluid
  - Accessing bag with a syringe that has already been used to flush a patient’s IV or catheter

http://www.cdc.gov/injectionsafety/providers/provider_faqs.html
Unsafe Injection Practices Resulting In Transmission (3)

- Using medications packaged as single-dose or single-use for more than one patient
- Contaminating a multidose vial

http://www.cdc.gov/injectionsafety/providers/provider_faqs.html
Unsafe Injection Practices Resulting In Transmission (4)

- Failing to use aseptic technique when preparing and administering injections
- Poor hand hygiene
- Preparing medications in patient care area

http://www.cdc.gov/injectionsafety/providers/provider_faqs.html
What have we learned?

- Transmission of life-threatening infectious agents in healthcare facilities can and does occur.
- Multiple outbreaks associated with unsafe injection and medication practices have occurred:
  - Affected thousands of patients; led to significant morbidity, mortality, and costs
- ALL of these outbreaks preventable
WHAT CAN WE DO TO PREVENT TRANSMISSION OF PATHOGENS?
Prevent Contamination of Infusate

- Perform hand hygiene before handling vials and IV solutions, and preparing or administering medications
  - use either soap and water or alcohol based hand sanitizer
- Use aseptic technique in all aspects of parenteral medication administration, medication vial use, and injections

Prevent Contamination of Infusate

- Do not store needles and syringes unwrapped because sterility cannot be ensured
- Store and prepare medications and supplies in clean area on clean surface
- Discard all opened vials, IV solutions, and prepared or opened syringes involved in emergency situation

Single-dose Vials: Safe Practices

- Use single-dose medication vials, pre-filled syringes and ampoules when possible
- Do not administer medications from single-dose vials or ampoules to multiple patients
- Do not combine leftover contents for later use
- Store vials in accordance with manufacturer's recommendations and discard if sterility compromised or questionable

HICPAC Guideline for Isolation Precautions, 2007
Multidose Vials: Safe Practices (1)

- If multidose vials must be used, restrict to centralized medication area or for single patient use
- Do not keep multidose vials in immediate patient treatment area
- Store in accordance with manufacturer's recommendations; discard if sterility compromised or questionable

HICPAC Guideline for Isolation Precautions, 2007
Multidose Vials: Safe Practices (2)

- Cleanse tops of multidose vials and neck of glass ampoules with 79% alcohol
- Do not combine leftover contents for later use
- **Always use a new syringe and needle for each entry into multidose vial**

HICPAC Guideline for Isolation Precautions, 2007
IV Solutions: Safe Practices

- Do not use bags or bottles of intravenous solution as a common source of supply for multiple patients
- Always use a new syringe and needle for each entry into an IV bag

HICPAC Guideline for Isolation Precautions, 2007
Say It Again….

- Vials labeled by manufacturer as “single dose” or “single use” should only be used for a single patient
  - Typically lack antimicrobial preservatives; can become contaminated and serve as a source of infection
- Ongoing outbreaks provide evidence that inappropriate use of single-dose/single-use vials causes patient harm
- In times of critical need, contents from unopened single-dose/single-use vials can be repackaged for multiple patients
  - Should only be done by qualified personnel in accordance with United States Pharmacopeia General Chapter <797>

Safe Injection and Medication Practices: They all say the same thing…..

**DO NOT:**
- Administer medications from same syringe to multiple patients, even if needle changed
- Reuse a needle, even on same patient
- Refill a syringe once it has been used, even for same patient
- Use infusion or intravenous administration sets on more than one patient
- Reuse a syringe or needle to withdraw medication from multidose medication vial
- Re-enter a single-use medication vial, ampoule or solution
These recommended practices should be used in all healthcare settings
RESOURCES
Safe Injection Practices Coalition
One and Only Campaign

- Message is:
  - ONE needle
  - ONE syringe
  - ONLY ONE time

http://www.oneandonlycampaign.org
Injection Safety

Injected medicines are commonly used in healthcare settings for the prevention, diagnosis, and treatment of various illnesses. Unsafe injection practices put patients and healthcare providers at risk of infectious and non-infectious adverse events and have been associated with a wide variety of procedures and settings. This harm is preventable. Safe injection practices are part of Standard Precautions and are aimed at maintaining basic levels of patient safety and provider protections. As defined by the World Health Organization, a safe injection does not harm the recipient, does not expose the provider to any avoidable risks and does not result in waste that is dangerous for the community. Visit the page on CDC’s role in safe injection practices.

Public Health Education Resources

Information for Providers
Slide presentations, FAQs...

Information for Patients
Patient Resources, FAQs, Syringe

Preventing Unsafe Injection Practices
Guidelines,

Assisted Monitoring of Blood Glucose

Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care

http://www.cdc.gov/injectionsafety

AICC
Frequently Asked Questions (FAQs) regarding Safe Practices for Medical Injections

Pages in this Set of Frequently Asked Questions
1. Background
2. General
3. Medication Preparation
4. Medication Administration
5. Single-dose/Single-use vials
6. Multi-dose vials
7. References

http://www.cdc.gov/injectionsafety/providers/provider_faqs.html
Evidence-Based Guidelines

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

Jane D. Siegel, MD; Emily Riddle; Linda Chiarello, RN MS; the Hospital Infection Control Practices Advisory Committee
Discusses acceptable practices & what not to do:

- Aseptic technique
- IV Solutions
- Flushing
- Syringes
- Vials
- Staff competency
- Assessing compliance

Summary

- Multiple outbreaks have been associated with unsafe injection and medication practices
- Common unsafe practices associated with these outbreaks have been identified
- We know how to prevent these outbreaks
- We must promote use of safe injection and medication handling practices
References


References


References


Additional Resource:
  - USP Chapter <797> and supporting chapters can be purchased at http://www.usp.org/products by selecting “USP on Compounding”
Time for Questions....