2019 UPDATE

INFECTION PREVENTION and CONTROL

ISOLATION PRECAUTIONS
&
BLOODBORNE PATHOGENS

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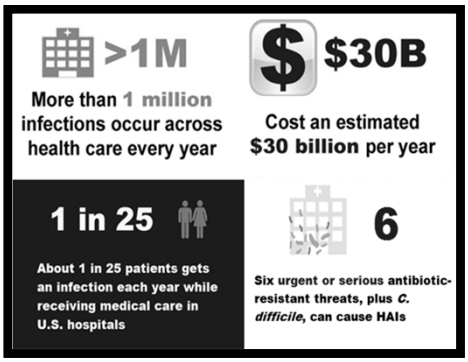
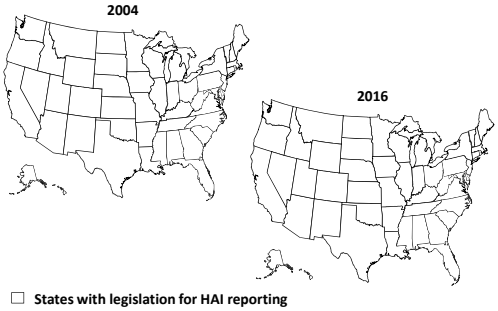
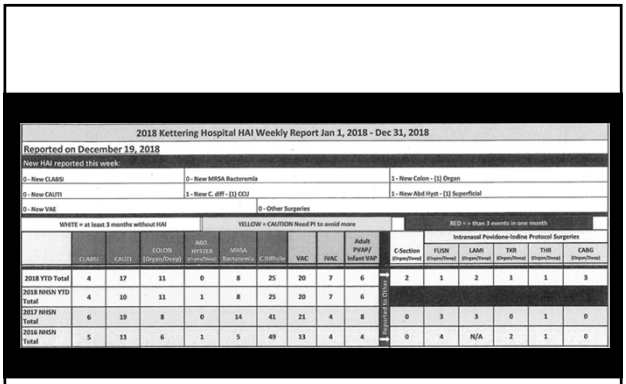
Healthcare-Associated Infections (HAIs)



States with Mandatory Public Reporting Policies for Healthcare-Associated Infections (HAIs)





1996 CDC ISOLATION GUIDELINES STANDARD PRECAUTIONS

Apply to <u>any healthcare encounter</u>:

- blood
- body fluids
- secretions
- excretions (except sweat)
- non-intact skin
- mucous membranes

Reduce risk to patients & HCP of transmissible infectious agents.

The Centers for Disease Control & Prevention says

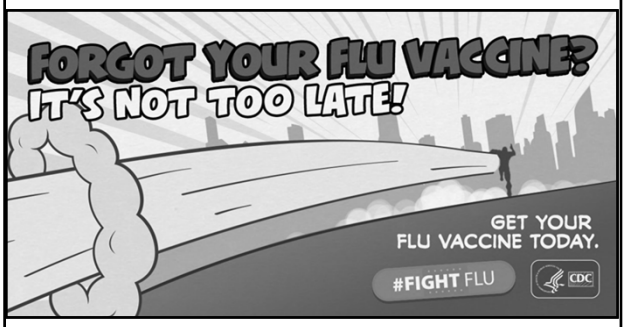
"the most common mode of transmission of pathogens is via the hands"

HAIs are:

1. 4th leading cause of death in America.
2. Cost the US healthcare system between $30 – 40 billion dollars each year.
3. Every year, an estimated 2,000,000 patients get a hospital-related infection.
4. 90,000 people die from their infection.
5. The HAI problem is closely related to Hand Hygiene.

Infections in the NEWS…

Welcome to FLU SEASON 2018-19!

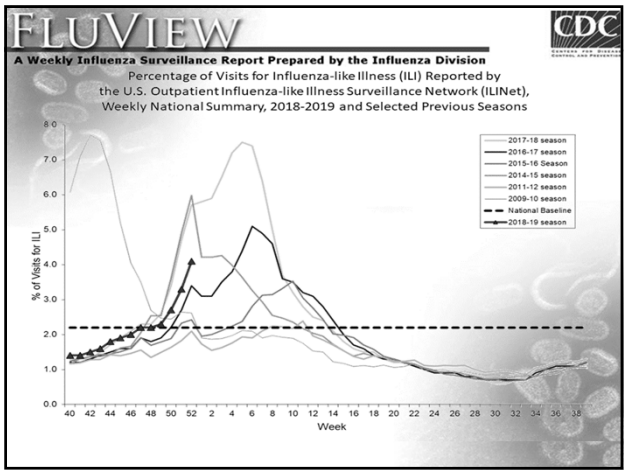


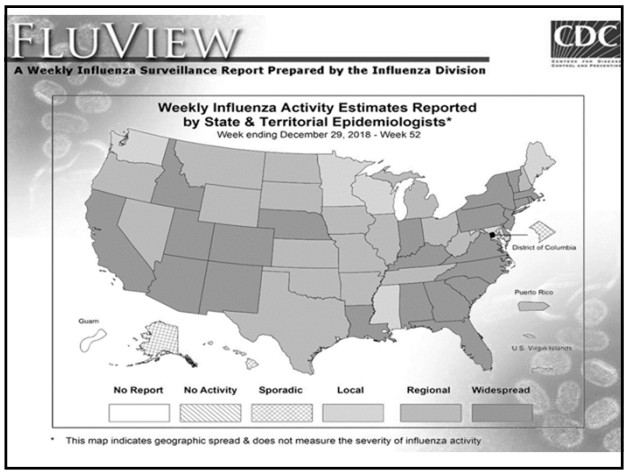
Types of Vaccinations Available

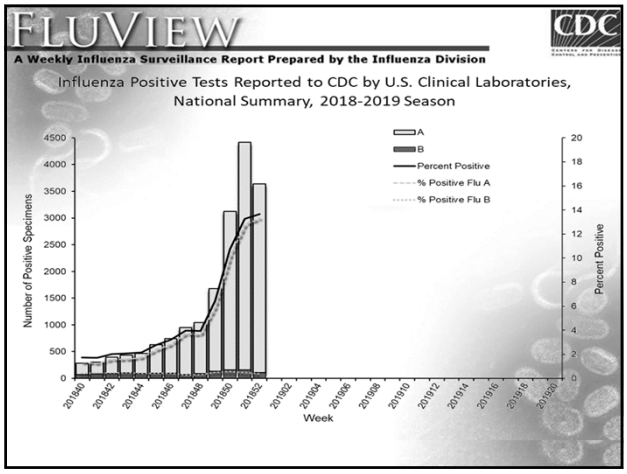
For the 2018-2019 flu season, providers may choose to administer any licensed, age-appropriate flu vaccine: injectable influenza vaccine (IIV3 or IIV4), recombinant influenza vaccine (RIV4), or live attenuated influenza vaccine (LAIV4):

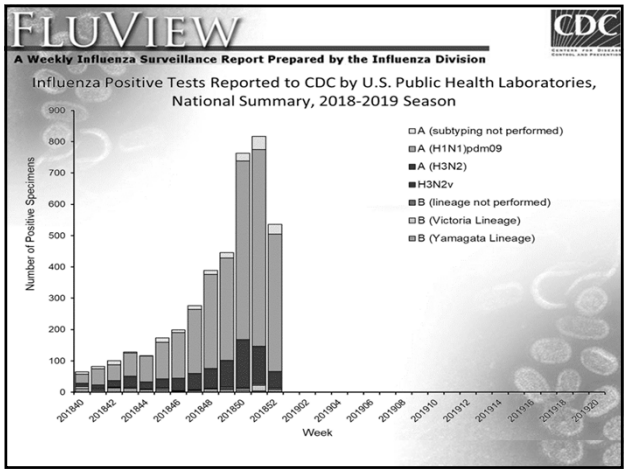
Vaccine type	Vaccine description	Recommended for
Trivalent (3-component) Injectable Vaccine (IIV3)	Contains the influenza A(H1N1), (H3N2) and influenza B viruses predicted to be most common	People 5 years & older
Quadrivalent (4-component) Injectable Vaccine (IIV4)	Contains the influenza A(H1N1), (H3N2) and two influenza B lineage viruses predicted to be most common	People 6 months & older
Live Attenuated Influenza Vaccine (LAIV)	Nasal spray flu vaccine; Contains the influenza A(H1N1), (H3N2) and two influenza B lineage viruses predicted to be most common	People 2 years through 49 years who are not pregnant
Adjuvanted Influenza Vaccine (aIIV3)	Designed to cause a stronger immune response, formulated with MF59 adjuvant; Contains the influenza A(H1N1), (H3N2) and influenza B viruses predicted to be most common	Adults 65 years and older
High-Dose Influenza Vaccine (HD-IIV3)	Designed to cause a stronger immune response, containing four times the antigen of a standard dose flu vaccine; Contains the influenza A(H1N1), (H3N2) and influenza B viruses predicted to be most common	Adults 65 years and older
Recombinant Influenza Vaccine (RIV4)	Produced without the use of the influenza virus or chicken eggs; Contains the influenza A(H1N1), (H3N2) and two influenza B lineage viruses predicted to be most common	Adults 18 years and older
Cell-Based Influenza Vaccine (ccIIV4)	Manufactured with cell-derived influenza A(H3N2) and B vaccine viruses; influenza A(H1N1) is egg-derived; Contains the influenza A(H1N1), (H3N2) and two influenza B lineage viruses predicted to be most common	People 4 years and older

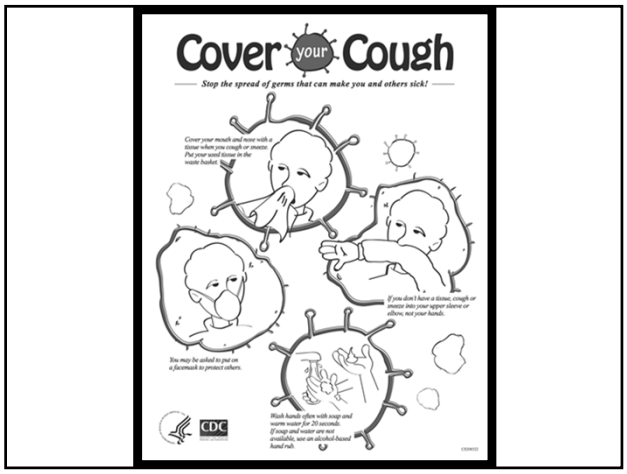
For more information, visit:
www.cdc.gov/flu


FLUVIEW
A Weekly Influenza Surveillance Report Prepared by the Influenza Division
Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2018-2019 and Selected Previous Seasons
% of Visits for ILI
Week
2017-18 season
2016-17 season
2015-16 Season
2014-15 season
2011-12 season
2009-10 season
National Baseline
2018-19 season


FLUVIEW
A Weekly Influenza Surveillance Report Prepared by the Influenza Division
Weekly Influenza Activity Estimates Reported by State & Territorial Epidemiologists*
Week ending December 29, 2018 - Week 52
District of Columbia
Puerto Rico
Guam
U.S. Virgin Islands
No Report
No Activity
Sporadic
Local
Regional
Widespread
* This map indicates geographic spread & does not measure the severity of influenza activity


FLUVIEW
A Weekly Influenza Surveillance Report Prepared by the Influenza Division
Influenza Positive Tests Reported to CDC by U.S. Clinical Laboratories, National Summary, 2018-2019 Season
Number of Positive Specimens
Percent Positive
Week
A
B
Percent Positive
% Positive Flu A
% Positive Flu B


FLUVIEW
A Weekly Influenza Surveillance Report Prepared by the Influenza Division
Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, 2018-2019 Season
Number of Positive Specimens
Week
A (subtyping not performed)
A (H1N1)pdm09
A (H3N2)
H3N2v
B (lineage not performed)
B (Victoria Lineage)
B (Yamagata Lineage)

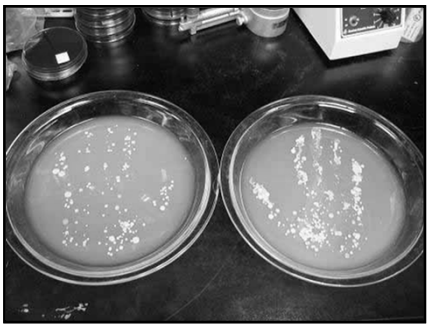

Cover your Cough
Stop the spread of germs that can make you and others sick!
Cover your mouth and nose with a tissue when you cough or sneeze. Put your used tissue in the waste basket.
If you don't have a tissue, cough or sneeze into your upper sleeve or elbow, not your hands.
You may be asked to put on a facemask to protect others.
Wash hands often with soap and warm water for 20 seconds. If soap and water are not available, use an alcohol-based hand rub.
CDC


VISITOR RESTRICTIONS
During flu season, help us protect our patients, their families and our employees.
Please follow these guidelines when visiting:
STOP
No children under 14 years old should come to the hospital unless they need medical care.
If you feel you have special circumstances, please talk to one of our nursing supervisors.
All visitors should be healthy. Do not visit if you feel sick or have symptoms of a cold, flu or another illness.
Cover your cough. Please request a mask if you are coughing frequently. Otherwise, when you sneeze or cough, cover your nose and mouth with a tissue, then throw the tissue in the trash, or cough or sneeze into your sleeve.
Wash your hands frequently.
KETTERING Health Network.
GDAHA
Thank you for your understanding and cooperation!

Dozens of studies indicate, hand hygiene is only achieved 50% of the time

November 2016 KMC Gemba Walk showed 58% Hand Hygiene Compliance.

A pair of healthcare workers hands …



before hand hygiene

A pair of healthcare workers hands …

after hand hygiene…

WARD off infection hand washing

- **W**et hands
- **A**pply soap
- **R**ub hands together for 15 seconds then rinse with warm water
- **D**ry hands with disposable towel then use towel to turn off faucet

When to use Hand Hygiene:

As you **ENTER** a patient's room

Before direct contact with patients

Before applying gloves then inserting:

- ✓ a central venous catheter
- ✓ urinary catheters
- ✓ peripheral vascular catheters
- ✓ any other invasive devices

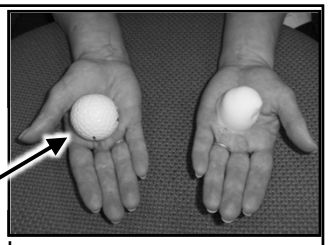
When to use Hand Hygiene:

After:

- Contact with body fluids, excretions, non-intact skin, wound dressings
- Contact with inanimate objects in the immediate vicinity of the patient
- Contact with contaminated body site moving to a clean body site
- Removing gloves

As you **EXIT** a patient's room

Alcohol Foam

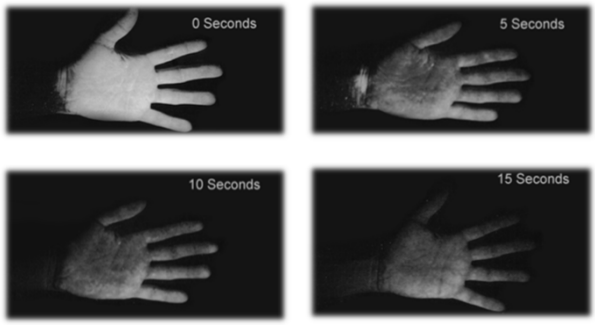


- Apply to palm of hand
- Use a Golf Ball size amount of alcohol foam (Volume depends on manufacturer)
- Rub hands together covering all surfaces until completely dry

The use of alcohol foam is preferred, but…DO NOT USE

- When hands are visibly soiled with body fluids or are dirty
- When caring for patients with suspected or confirmed Clostridium difficile, and are in "Contact with Handwashing"
- Before eating
- After using the restroom

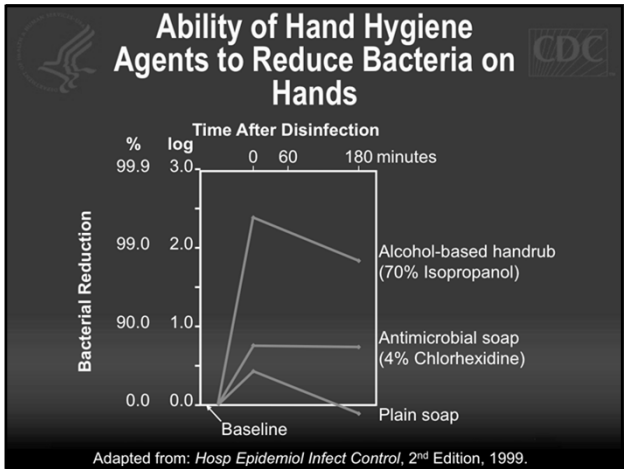
Take The Time To Wash Your Hands



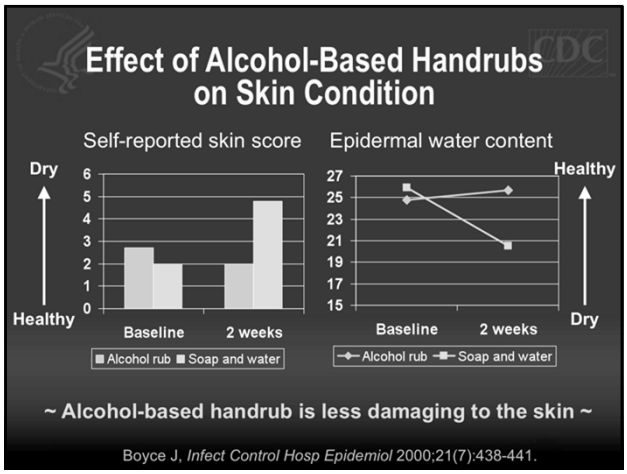
Seconds Count – Save A Life

Ohio Hospital Association

Ability of Hand Hygiene Agents to Reduce Bacteria on Hands



Effect of Alcohol-Based Handrubs on Skin Condition



Personal protective equipment

Work practice controls

Engineering controls

Housekeeping controls

PERSONAL PROTECTIVE EQUIPMENT

gloves
gowns
masks
goggles
face shields
shoe covers
hair covers
CPR resuscitator masks

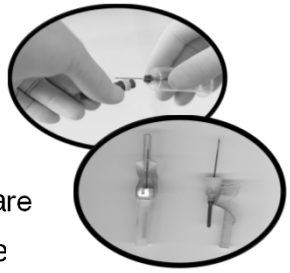
Gowns

- Gowns single use only.
- Tie to cover sides & back.
- Dispose in appropriate container.
- To remove, grasp around top and pull off turning inside out as it is removed so your clothing does NOT become contaminated.

Gloves

- Single use only.
- Must fit properly and cover wrist.
- Remove by grasping at wrist and turn inside out.
- Change gloves and wash hands if going from a dirty to a clean activity.
- Discard in regular trash, or in biohazard trash (red bag) if appropriate.
- Wash hands after gloves are removed.

WORK PRACTICE CONTROLS



Handle sharps with care

Practice good hygiene

-avoid splashing potentially infectious fluids
-keep food/beverages away from patient areas
-wash hands frequently
-change white coat or scrubs if soiled

ENGINEERING CONTROLS

…are designed to eliminate hazards at the source.

Sharps Safety

- Use sharps containers.
- Do not overfill containers.
- Do not recap needles.
- Use forceps to remove needle from syringe.
- Do not bend, break, cut or manipulate sharps.
- Never handle broken glass--use forceps, or a dust pan and broom…

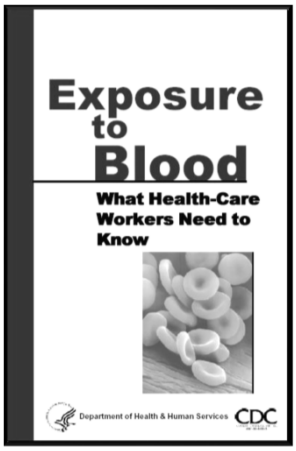
HOUSEKEEPING CONTROLS

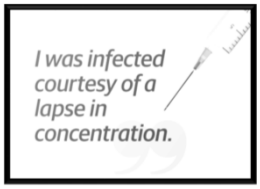
- Do not over fill trash containers.
- Do not push trash down with hands or feet.
- Hold trash away from body when transporting.
- Discard all infectious waste in biohazard containers.
- Decontaminate work surfaces with an appropriate disinfectant.

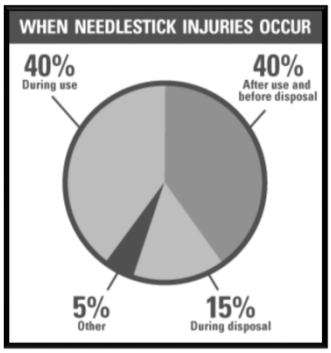
Hepatitis B

Hepatitis C

Human Immunodeficiency Virus







OSHA
Occupational Safety and Health Administration

Risk of Infection following exposure:

HBV (30%)

Percutaneous	1-43%
Mucocutaneous	1-6%

HCV (3%)

Percutaneous	0.3-1.8%
Mucocutaneous	unknown (very small)

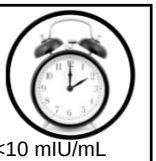
HIV (0.3%)

Percutaneous	0.3%
Mucocutaneous	< 0.1%

Document the Injury

- Report immediately for evaluation and testing to:
  Employee Health or
  if closed to Emergency Department
- EARLY PEP most effective!

PEP Recommended

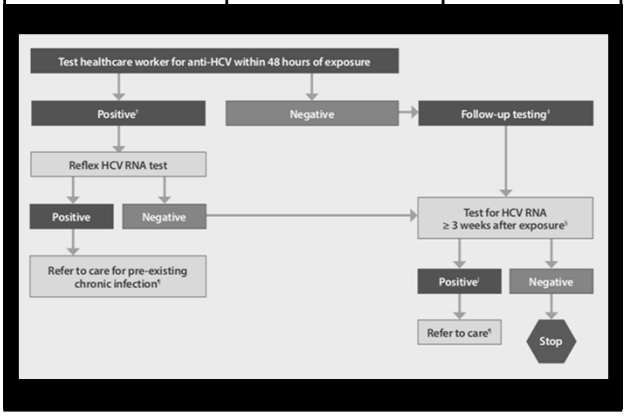


HBV
- If source HBsAg+ and HCP HBsAb <10 mIU/mL
- Use of HBIG and/or HBV vaccine

HCV
- Follow up HCV testing
- No current recommendations for prophylaxis with immune globulin or antiviral agents

HIV
- 4 weeks antiretroviral drug protocol
- Consider possible HIV resistance of source

Hepatitis C followup



PEP FOLLOWUP

HCP to report:

- Any PEP medication side effects
- Signs or symptoms of possible acute HIV infection within 12 weeks of exposure

Recommended laboratory testing:

- Anti-HIV at baseline, 6 weeks, 3 months, and 6 months (for all HIV-exposed HCP)
- CBC, renal & hepatic panels at baseline and 2 weeks to monitor for toxicity

Transmission Based Precautions

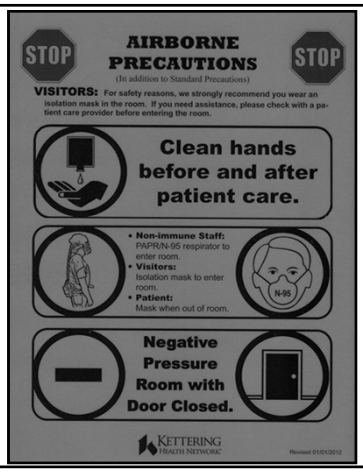
- Contact
- Contact with Handwashing Only
- Droplet
- Airborne
- Neutropenic

INFECTION PREVENTION is everyone's business

Droplet Transmission

Droplets are generated by talking, coughing, and sneezing.

Microorganisms in droplets (10um) are propelled a short distance through the air and deposited on conjunctiva, nose, and mouth mucosa.



Airborne Transmission

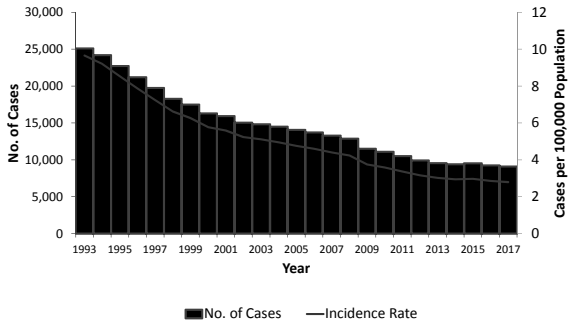
- Microbes eg, AFB in small droplet nuclei (<5um) or dust particles.
- Dispersed widely by air currents and remain suspended for prolonged periods of time.
- Requires special PPE respiratory protection.
- Requires special air handling and ventilation: negative pressure room or portable HEPA filter

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Division of Tuberculosis Elimination

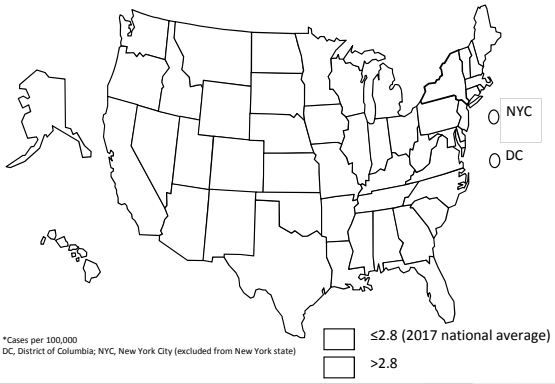
Tuberculosis in the United States 1993–2017

National Tuberculosis Surveillance System

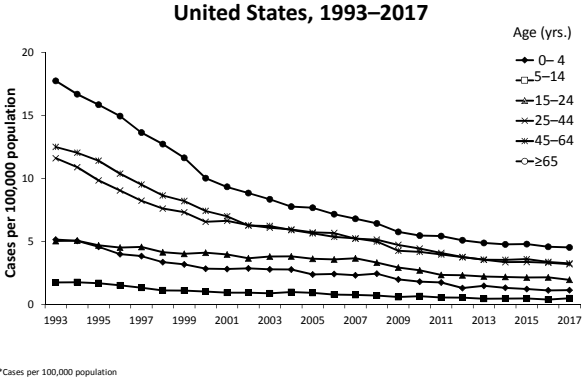
Reported Tuberculosis (TB) Cases and Rates United States, 1993–2017



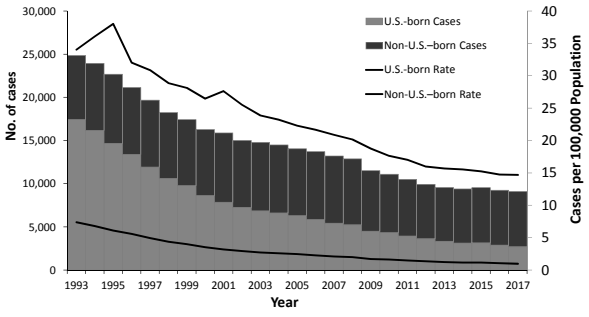
TB Case Rates,* United States, 2017



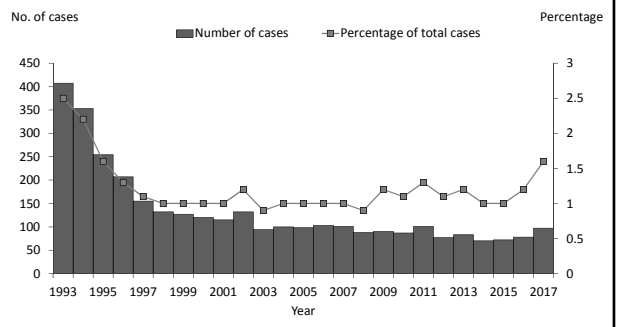
TB Case Rates* by Age Group, United States, 1993–2017



TB Cases and Rates Among U.S.-Born versus Non-U.S.–Born Persons, United States, 1993–2017

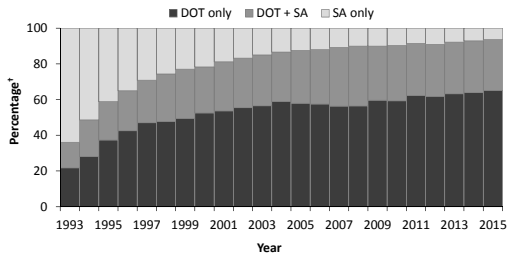


Primary MDR-TB, United States, 1993–2017*



* Based on initial isolates from persons with no prior history of TB; multidrug-resistant TB (MDR-TB) is defined as resistance to at least isoniazid and rifampin.

Mode of Treatment Administration Among Persons Reported with TB, United States, 1993–2015*



DOT, directly observed therapy; SA, self-administered therapy.
* Data available through 2015 only.
† Percentage of total cases among persons alive at diagnosis, with an initial regimen of one or more drugs prescribed and excluding cases with unknown mode of treatment administration.

Contact Transmission

Direct:

Between body surfaces resulting in transfer of microorganisms

Indirect:

Between a susceptible host and a contaminated intermediate object

Colonized or Infected: What is the Difference?

- People who carry bacteria without evidence of infection (fever, increased white blood cell count) are colonized
- If an infection develops, it is usually from bacteria that colonize patients
- Bacteria that colonize patients can be transmitted from one patient to another by the hands of healthcare workers

* Bacteria can be transmitted even if the patient is not infected

The Inanimate Environment Can Facilitate Transmission

~ Contaminated surfaces increase cross-transmission ~

Abstract: The Risk of Hand and Glove Contamination after Contact with a VRE (+) Patient Environment. Hayden M, ICAAC, 2001, Chicago, IL.

Recovery of VRE from Hands and Environmental Surfaces

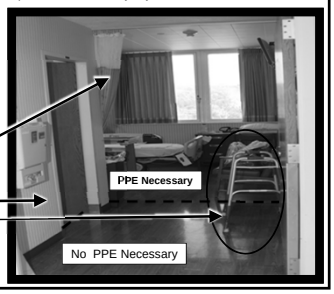
- Up to 41% of healthcare worker's hands sampled (after patient care and before hand hygiene) were positive for VRE[1]
- VRE were recovered from a number of environmental surfaces in patient rooms
- VRE survived on a countertop for up to 7 days[2]

[1] Hayden MK, *Clin Infect Diseases* 2000;31:1058-1065.
[2] Noskin G, *Infect Control and Hosp Epidemi* 1995;16:577-581.

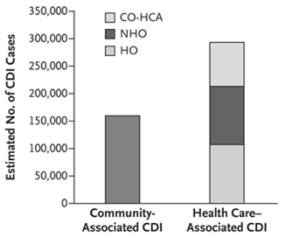
VIEW ONLY ZONE
CONTACT & CONTACT w HANDWASHING

The area at the entrance where a HCW can observe and converse with a patient without putting on PPE.

- In general the View Only Zone is within the swing of the door
- With an extended entrance, the View Only Zone stops at end of the entryway.
- Bathrooms are not included in View Only Zone.
- DO NOT TOUCH ANYTHING while in the View Only Zone.
- If you need to touch anything within the Zone or go beyond the Zone to touch the patient or environment, you must apply proper PPE.
  e.g. curtain
  walls
  walker



Estimated Annual U.S. Burden



Estimated U.S. Burden of CDI, According to the Location of Stool Collection and Inpatient Health Care Exposure, 2011.

CO-HCA: Community onset healthcare-associated
NHO: Nursing home onset
HO: Hospital onset

- **453,000 CDI cases[1]**
  - **293,000 healthcare-associated**
    - **107,000 hospital-onset**
    - **104,000 nursing home-onset**
    - **81,000 community-onset, healthcare-facility associated**
  - **160,000 community-associated**
    - **82% associated with outpatient healthcare exposure**

Overall, 94% of CDI cases related to healthcare

- **29,000 deaths**
- **$4.8 billion in excess healthcare costs[2]**

1. Lessa et al. N Engl J Med 2015; 372(9):825-834.
2. Dubberke et al. Clin Infect Dis 2012; 55:S88-92.

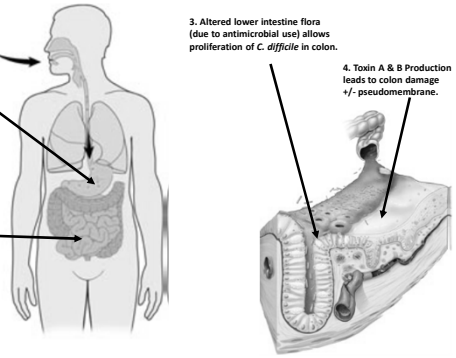
Pathogenesis of CDI

1. CDI spores survive in the environment for long periods of time. Following ingestion, they traverse the acidic environment of the stomach.

2. Spores germinate within the intestine.

3. Altered lower intestine flora (due to antimicrobial use) allows proliferation of *C. difficile* in colon.

4. Toxin A & B Production leads to colon damage +/- pseudomembrane.



Sunenshine & McDonald Cleve Clin J Med 2006; 73(2):187-197.

Epidemiology: Host Factors

Advanced age

- Incidence higher among females, whites, and persons > 65 years[1]
- Death more common in persons > 65 years (5x greater risk)[2]

Underlying illness and medical history

- 79% of 7421 patients with CDI had a comorbid condition[2]
- 38% of 585 patients with NAP1 strain had ED visit in previous 12 weeks[2]
- Tube feeds[3]

Immunosuppression

- Inflammatory bowel disease[2]
- Immune-suppressive treatment[2]
- Hematological malignancy/stem cell transplant (15-25x greater risk)[4]

1. Lessa et al. N Engl J Med 2015; 372(9):825-834.
2. See et al. Clin Infect Dis 2014; 58(10):1394-1400.
3. Bliss et al. Ann Intern Med 1998; 129:1012-1019.
4. Kombuj et al. Infect Control Hosp Epidemiol 2016; 37:8-15.

Epidemiology: Modifiable Risk Factors

Exposure to antibiotics

High Risk:

- Fluoroquinolones [1]
- 3rd and 4th generation cephalosporins, clindamycin, carbapenems[2]

Exposure to *C. difficile* spores

- Spores can remain viable for months[3]
- Contamination is increased in rooms of patients with active CDI [4,5]
- Hands of patients and personnel are easily contaminated[5]

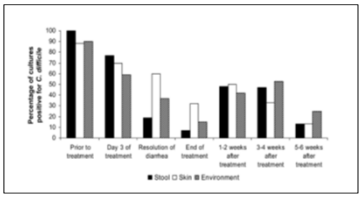
Gastric acid suppression

- Data, though inconsistent, implicate proton pump inhibitor (PPI) use[1,4,6,7]
- More study is needed to link restriction of PPI use with decreased CDI incidence[8]

1. Pepin et al. Clin Infect Dis 2005; 41(9):1254–1260.
2. Hensgens et al. J Antimicrob Chemother 2012; 67(3):742-748.
3. Weber & Rutala. Infect Control Hosp Epidemiol 2011; 32: 207-209.
4. Dubberke et al. Am J Infect Control 2007; 35:315-318.
5. Shaugnessy et al. Infect Control Hosp Epidemiol 2011; 32;201-206.
6. Linney et al. Can J Hosp Pharm 2010; 63(1):31–37.
7. Buendgens et al. J Crit Care 2014; 69(4):e11-15.
8. Dubberke et al. Infect Control Hosp Epidemiol 2014; 35(6):628-645.

Contact Precautions (CP)

- Contamination of the environment is highest prior to treatment[1]
- **Presumptive CP**, while CDI test results are pending, may be used as a special approach whenever indicated by risk assessment[2]



- Patients who have been treated may have asymptomatic shedding[3]
- **Prolonging the duration of CP** until discharge is a special approach based on evidence of continued shedding of spores after diarrhea resolves (especially up to 4 weeks after treatment ends)[2]

1. Bobulsky et al. Clin Infect Dis 2008; 46(3):447-450
2. Dubberke et al. Infect Control Hosp Epidemiol 2014; 35(6):628-645
3. Sethi et al. Infect Control Hosp Epidemiol 2010: 31(1):21-27

Antimicrobial Stewardship

Exposure to any antimicrobial is the single most important risk factor for *C. difficile* infection (CDI).

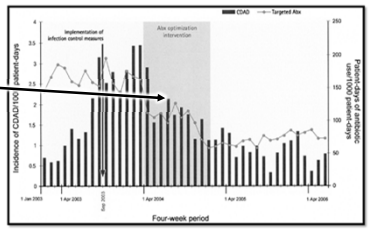
- **Antibiotic exposure has lasting impact on the microbiome.**
  - Risk of CDI is elevated (7-10 fold) during and in the 3 months following antimicrobial therapy[1,2]
  - 85-90% of CDI occurs within 30 days of antimicrobial exposure[1]
- **Target high risk antibiotics for CDI prevention**
  - Fluoroquinolones[3]
  - 3rd/4th generation cephalosporins, carbapenems[2]

1. Chang et al. Infect Control Hosp Epidemiol 2007; 28(8):926–931.
2. Hensgens et al. J Antimicrob Chemother 2012; 67(3):742-748.
3. Hsu et al. Am J Gastroenterol 2010; 105(11):2327–2339.

Stewardship Approach: Feedback

Non-restrictive feedback resulted in statistically significant reductions in incident CDI.

Reductions in CDI attained through antimicrobial stewardship surpassed those attained through infection control measures.



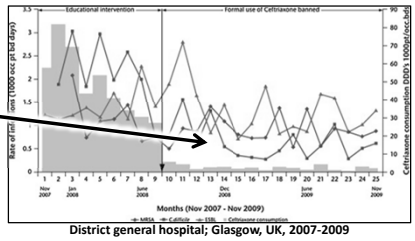
Tertiary Hospital in Quebec, 2003-2006

Valiquette et al. Clin Infect Dis 2007; 45:S112-121.

Stewardship Approach: Restriction

Restricting the use of ceftriaxone was associated with reduced rates of CDI.

Formal restriction implemented



District general hospital; Glasgow, UK, 2007-2009

Fig. 1 Hospital-acquired methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile* and extended-spectrum β-lactamase (ESBL)-producing coliform rates following a restrictive antibiotic policy in a district general hospital over 2 years. pt/occ.bds, patient-occupied bed-days; DDDs, defined daily doses.

Dancer et al. Intl J Antimicrob Agents 2013; 41(2):137-142.


CONTACT
DROPLET
STOP
CONTACT/DROPLET PRECAUTIONS
(In addition to Standard Precautions)
STOP
VISITORS: For your safety, we strongly recommend that you wear an isolation mask, gown and gloves in the room. If you need assistance, please check with a patient care provider before entering the room.
Clean Hands Before and After Patient Care.
• Staff & Visitors: Gown, gloves & mask to enter room.
• Patient: Mask when out of room.
• Use dedicated or disposable equipment when possible.
• Clean and disinfect shared equipment.
• Eye protection as appropriate.
KETTERING HEALTH NETWORK
Revised: 09-27-12