Welcomes You To

Infection Control Measures in Community-Based Care

Presented by Zeshan Chisty, MPH
HAI Collaborative Coordinator
Hawaii Department of Health

September 28, 2017
2:00 – 3:00 p.m.
Your Participation

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Questions/Comments:
- Submit questions and comments via the Questions panel.

Note: Today’s presentation is being recorded. Attendees will receive a link to the recording via email.
Infection Control Measures in Community-Based Care

Zeshan Chisty, MPH
Healthcare-associated infections collaborative coordinator
Objectives

1. Define the problem of healthcare-acquired infections (HAIs)
2. Outline the tenets of infection control
3. Learn about Legionella infections, as well as resources to help your facility reduce the risk of legionellosis
4. Review reporting requirements to the Department of Health
What is Infection Control?

- Infection control refers to policies and procedures used to minimize the risk of spreading infections, in health care facilities.

**What are healthcare-associated infections?**

- **Catheter-associated urinary tract infections**: When germs travel along a urinary catheter and cause an infection in your bladder or kidney.

- **Surgical site infections**: An infection that happens after surgery in the part of the body where the surgery took place.

- **Bloodstream infections**: When germs enter the blood by way of a catheter or tube that is placed in your vein.

- **Pneumonia**: Infection of the lungs.
HAIs: A Leading Cause of Morbidity and Mortality

• Between 1.6 and 3.8 million infections occur each year in long-term care facilities with nearly 388,000 deaths attributed to healthcare-associated infections (HAIs) (1)
• Costs associated with infections in long-term care facilities are significant
  – Estimates range from $673 million to $2 billion (1)
• About 1 in 25 hospital patients has at least one HAI
  – Estimated 722,000 in acute-care facilities in 2011
  – With about 75,000 deaths

(1) AJIC May 2011, Vol. 39:4, p.263
How do infections spread?

1. Contact Transmission: the most frequent mode of transmission of HAIs
   a. Direct contact: Person to Person (e.g. turning a resident, giving a resident a bath, or any other activity that requires direct contact with the resident) – Can also occur between residents and visitors
   b. Indirect contact: Inanimate objects – usually contaminated objects such as equipment and environmental surfaces (e.g. tables and doorknobs)
How do infections spread?

• Droplet Transmission: When someone coughs or sneezes they expel droplets. They travel a short distance and can come in contact with your eyes, nose or mouth. Can also contaminate the surrounding environment.
How do infections spread?

- **Airborne transmission**: Very small particles that contain microorganisms. Can stay suspended in the air for long periods. Once inhaled, it may cause illness. (e.g. Tuberculosis, Measles, Chickenpox)
- **Common vehicle transmission**: Applies to contaminated items such as food, water and medications.
- **Vector transmission**: Occurs when animals such as mosquitoes, flies and rats transmit microorganisms.

How to prevent HAIs?

- This is accomplished by providing a safe, sanitary and comfortable environment to help prevent the development and transmission of HAIs.

[Image of Hierarchy of Controls]

Standard Precautions

- A set of basic infection prevention practices intended to prevent transmission of infectious diseases from one person to another.
- Because we do not always know if a person has an infectious disease, standard precautions are applied to every person every time to assure that transmission of disease does not occur.
- Implementation of Standard Precautions constitutes the primary strategy for the prevention of transmission of HAIs among patients and healthcare workers (HCW).
Components of Standard Precautions

1. Hand hygiene
2. Personal protective equipment
3. Safe injection practices
4. Soiled patient-care equipment
5. Environmental control
6. Textiles and laundry
7. Needles and other sharps
8. Patient resuscitation
9. Patient placement
10. Respiratory hygiene/cough etiquette

Transmission-Based Precautions

• Used in addition to Standard Precautions
• Used for patients who are known or suspected to be infected or colonized with infectious agents that require additional control measures
  – Contact Precautions
  – Droplet Precautions
  – Airborne Precautions
Contact Precautions

- Used for organisms spread by direct or indirect physical contact with the patient or the patient's environment
  - Excessive wound drainage
  - Fecal incontinence or other bodily fluid discharge
  - Rash
- PPE Required
  - Gown
  - Gloves
- Example of organisms:
  - Salmonella
  - Clostridium difficile
  - Norovirus
Droplet Precautions

• Used for pathogens spread through close respiratory or mucous membrane contact with respiratory secretions
• PPE needed: Face mask
• Example of organisms:
  – *Bordetella pertussis*
  – Influenza virus
  – Adenovirus
  – Rhinovirus
Airborne Precautions

- Used for pathogens that remain infectious over longer distances when suspended in the air
- The patient should be placed in an airborne infection isolation room (AIIR) aka “negative pressure room”
- PPE Needed: Respirator
- Examples of Organisms:
  - Measles
  - Chickenpox
  - Tuberculosis
So Why All the Fuss About Hand Hygiene?

Most common mode of transmission of pathogens is via hands!

- Clean hands are the single most important factor in preventing the spread of pathogens and antibiotic resistance in healthcare settings.
- Hand hygiene reduces the incidence of HAIs.
- Feces from people can sometimes contain germs like *Salmonella*, *C. difficle*, and norovirus. After using the toilet, changing a diaper, touching a contaminated surface or helping a resident colonized/infected with one of these germs your hands could become contaminated.
# Hand Hygiene Adherence

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>Adherence Rate</th>
<th>Facility type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994 (1)</td>
<td>29%</td>
<td>Hospital - General and ICU</td>
</tr>
<tr>
<td>1995 (2)</td>
<td>41%</td>
<td>Hospital – General</td>
</tr>
<tr>
<td>1997 (3)</td>
<td>27%</td>
<td>Long-term-care facility</td>
</tr>
<tr>
<td>1998 (4)</td>
<td>30%</td>
<td>Hospital – General</td>
</tr>
<tr>
<td>2000 (5)</td>
<td>48%</td>
<td>Hospital – General</td>
</tr>
<tr>
<td>2008 (6)</td>
<td>17%</td>
<td>Long-term-care facility</td>
</tr>
<tr>
<td>2008 (7)</td>
<td>15%</td>
<td>Long-term-care facility</td>
</tr>
</tbody>
</table>

Factors for Poor Adherence with Hand Hygiene

- Handwashing agents cause irritation and dryness
- Sinks are inconveniently located/lack of sinks
- Lack of soap, paper towels, and alcohol sanitizer
- Too busy/insufficient time
- Understaffing/overcrowding
- Resident needs take priority
- Low risk of acquiring infection from residents

Adapted from Pittet D, Infect Control Hosp Epidemiol 2000;21:381-386.
Five moments for Hand Hygiene

- Developed by the WHO
- 1. Before Resident Contact
- 2. Before Aseptic Task
- 3. After Body Fluid Exposure Risk
- 4. After Resident Contact
- 5. After Contact with Resident Surroundings

General Rule of thumb as you enter or exit a resident’s room – WASH YOUR HANDS!!

http://www.who.int/gpsc/tools/Five_moments/en/
Hand Hygiene Technique - Handwash

• Duration of the entire procedure: 40-60 seconds
• Needs soap, running water, & paper towel
• If your forearms and wrists are visibly dirty, they must be cleaned

How to Handwash?
WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

1. Duration of the entire procedure: 40-60 seconds
2. Wet hands with water;
3. Apply enough soap to cover all hand surfaces;
4. Rub hands palm to palm;
5. Palm to palm with fingers interlaced;
6. Backs of fingers to opposing palms with fingers interlocked;
7. Rotational rubbing of left thumb clasped in right palm and vice versa;
8. Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;
9. Rinse hands with water;
10. Dry hands thoroughly with a single-use towel;
11. Use towel to turn off faucet;

Your hands are now safe.
Alcohol Sanitizer

- Alcohol-based sanitizer is the preferred method!
- Make sure it contains at least 60% alcohol
Hand Hygiene Technique - Handrub

- Wash hands when visibly soiled
- Not effective against *C. diff* or norovirus
- Duration of the entire procedure: 20-30 seconds
- [http://youtu.be/W2r2iqbEM5s](http://youtu.be/W2r2iqbEM5s)
Skin Care

- Lotions and creams can prevent and decrease skin dryness that happens from cleaning your hands.
- Use only hand lotions approved by your healthcare facility because they won’t interfere with hand sanitizing products.
- Get information from manufacturers regarding effects that hand lotions, creams, or alcohol-based handrubs may have on the effectiveness of antimicrobial soaps.

Guideline for Hand Hygiene in Health-care Settings. MMWR 2002; vol. 51, no. RR-16.
Fingernail Care and Jewelry

- Natural nail tips should be kept to ¼ inch in length
- Artificial nails should not be worn when having direct contact with high-risk patients
- Some studies have shown that skin underneath rings contains more germs than comparable areas of skin on fingers without rings
- Further studies are needed to determine if wearing rings results in an increased spread of potentially deadly germs

Guideline for Hand Hygiene in Health-care Settings. MMWR 2002; vol. 51, no. RR-16.
Residents and their loved ones can play a role in helping to prevent infections by practicing hand hygiene themselves as well as asking or reminding their healthcare providers to perform hand hygiene.

If you see a fellow employee not perform hand hygiene before they enter or leave a resident’s room—remind them!
Respiratory hygiene/cough etiquette

- Use a tissue when you cough or sneeze. Throw away the tissue
- Don’t cough/sneeze into your hands. Use your elbow
- Can use a facemask or maintain 3 feet distance
- Always wash your hands!!

Cover your mouth and nose with a tissue when you cough or sneeze or cough or sneeze into your upper sleeve, not your hands.

Put your used tissue in the waste basket.
Personal protective equipment (PPE)

**SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)**

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. **GOWN**
   - Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
   - Fasten in back of neck and waist

2. **MASK OR RESPIRATOR**
   - Secure ties or elastic bands at middle of head and neck
   - Fit flexible band to nose bridge
   - Fit snug to face and below chin
   - Fit-check respirator

3. **GOGGLES OR FACE SHIELD**
   - Place over face and eyes and adjust to fit

4. **GLOVES**
   - Extend to cover wrist of isolation gown

**USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION**

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

**HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE)**

**EXAMPLE 1**

There are a variety of ways to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. Here is one example. Remove all PPE before exiting the patient room except a respirator, if worn. Remove the respirator after leaving the patient room and closing the door. Remove PPE in the following sequence:

1. **GLOVES**
   - Outside of gloves are contaminated!
   - If your hands get contaminated during glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
   - Using a gloved hand, grasp the palm area of the other gloved hand and peel off first glove
   - Hold removed glove in gloved hand
   - Slide fingers of ungloved hand under remaining glove at wrist and peel off second glove over first glove
   - Discard gloves in a waste container

2. **GOGGLES OR FACE SHIELD**
   - Outside of goggles or face shield are contaminated!
   - If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
   - Remove goggles or face shield from the back by lifting head band or ear piece
   - If the item is re-usable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container

3. **GOWN**
   - Gown front and sleeves are contaminated!
   - If your hands get contaminated during gown removal, immediately wash your hands or use an alcohol-based hand sanitizer
   - Unfasten gown ties, taking care that sleeves don’t contact your body when reaching for ties
   - Pull gown away from neck and shoulders, touching inside of gown only
   - Turn gown inside out
   - Fold or roll into a bundle and discard in a waste container

4. **MASK OR RESPIRATOR**
   - Front of mask/respirator is contaminated — DO NOT TOUCH!
   - If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
   - Grasp bottom ties or elastic of the mask/respirator, then the ones at the top, and remove without touching the front
   - Discard in a waste container

5. **WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE**

**PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE**
Key Points of PPE use

- Once PPE is on, keep hands away from face
- Avoid touching or adjusting other PPE

<table>
<thead>
<tr>
<th>IF:</th>
<th>Then:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves are damaged</td>
<td>Remove gloves and clean your hands</td>
</tr>
<tr>
<td>Moving <strong>from contaminated body site to clean body site</strong></td>
<td></td>
</tr>
<tr>
<td>Gloves look dirty or have blood or bodily fluids on them after completing a task</td>
<td></td>
</tr>
</tbody>
</table>
Key Points of PPE Removal

- Remember the outside of your PPE is contaminated.
- Be careful to avoid any contact between the soiled items and any area of the face or non-intact skin when taking off PPE.
- If your hands become contaminated during any step of the doffing process, immediately perform hand hygiene.
Remember: Wearing gloves is not enough to prevent the transmission of pathogens in healthcare settings.

- Wear gloves when contact with blood or other potentially infectious materials is possible
- Remove gloves after caring for a resident
- Do not wear the same pair of gloves for the care of more than one resident & do not wash gloves
- Preform Hand Hygiene BEFORE and AFTER wearing gloves

Unsafe Injection Practices

<table>
<thead>
<tr>
<th>Syringe reuse and misuse of medication vials have resulted in dozens of outbreaks and THE NEED TO ALERT MORE THAN 150,000 PATIENTS...</th>
<th>...to seek testing for bloodborne pathogens such as HEPATITIS B, HEPATITIS C AND HIV, ² and have led to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient illness and death</td>
<td>Legal charges/malpractice suits</td>
</tr>
<tr>
<td>Loss of clinician licenses</td>
<td>Criminal charges</td>
</tr>
</tbody>
</table>

In just one clinic, syringe reuse to access medication vials for multiple patients resulted in an outbreak and one of the largest public health alerts in U.S. history.

- 50,000 PEOPLE EXPOSED TO INFECTION
- $16~$20 million in costs
Steps to prevent unsafe practices

Steps Every Healthcare Provider Should Take

1. **For**
   - Needles and syringes should not be used for more than one patient or reused to draw up additional medication.

2. **For**
   - Do not administer medications from a single-dose vial or IV bag to multiple patients.

3. **For**
   - Limit the use of multi-dose vials, and dedicate them to a single patient whenever possible.

4. **For**
   - Speak up if you see a colleague not following safe injection practices.
• Patient environment can facilitate transmission of bacteria and viruses:
  – By direct contact
  – On hands of healthcare personnel
  – Contaminated surfaces
• Ensure that you are using the correct product (e.g. C. difficile)
Terminology

• Cleaning
  – General removal of debris (dirt, food, feces, blood, etc.)
  – Reduces amount of organic matter that contributes to proliferation bacteria and viruses

• Disinfection
  – Removes most organisms present on surfaces that case infection or disease

• Sterilization
  – The killing or removal of all organisms
High Touch Surfaces in Patient Rooms

- Must be cleaned then disinfected on a regular basis
- Examples include:
  - Bedrails
  - Telephones
  - TV remote
  - IV pump/poles
  - Toilet
  - Light switches
  - Doorknobs
  - Chairs
Get Vaccinated!

- Recommended Vaccines for Healthcare Workers:
  - Hepatitis B
  - Influenza
  - MMR (Measles, Mumps & Rubella)
  - Varicella (Chickenpox)
  - Tdap (Tetanus, Diphtheria & Pertussis)
  - Meningococcal
Ways to prevent the spread of infections:

• Wash your hands.
• Ensure that the environmental surfaces, equipment and instruments are cleaned according to established protocols and policies.
• Make sure that you and your residents are vaccinated.
• Properly handling of waste (both hazardous and regular)
• Follow bloodborne pathogens exposure protocols
• Safe handling of sharps
• If you are feeling ill, stay at home
Legionnaires’ Disease / Pontiac Fever

Ecology

- Natural environments
  - Fresh water
  - Intracellular parasites of amoebae
- Manmade water systems
- *Legionella pneumophila* is able to multiply in water temperatures ranging from 25°C to 42°C (77° - 108°F)
  - Optimal growth conditions: Stagnant aquatic environments at 35°C (95° F).
Epidemiology

• Disease Occurrence
  – Est. 8,000 – 18,000 hospitalized cases annually in the U.S.
  – Underreporting: Many cases simply diagnosed as community-acquired pneumonia
  – Majority of cases reported to the CDC are sporadic
  – One in five reported cases associated with travel

• History
  – 1976: Outbreak of severe pneumonia at American Legion Convention
  – Source identified as the hotel’s rooftop cooling tower
A total of 2,809 confirmed Legionnaires’ Disease cases reported:
- 468 (17%) possible HAI
- 85 (3%) definite HAI
- 68 (80%) associated with LTCFs
- 15 (18%) associated with hospitals

16 of 21 jurisdictions reported definite cases of health care-associated Legionnaires’ disease (LD) in 2015.
Transmission

• Mode of transmission
  – Infection occurs directly from the environment, following inhalation of aerosolized water

• Pathogenesis
  – Legionnaires’ Disease: Human immune cells called alveolar macrophages look very similar to protozoa. When in human lungs, Legionella invades and grows within alveolar macrophages, mistaking them for their natural host and causing disease.
Legionellosis

- **Incubation period**
  - Legionnaires’ Disease: Symptom onset ranges from 2 to 14 days after being exposed to the bacteria.
  - Pontiac Fever: Fever typically develops 24-72 hours after exposure.

- **Symptoms**
  - Legionnaires’ Disease: Flu-like symptoms initially – including headache, myalgia, malaise – followed by high fever and symptoms of pneumonia such as coughing and difficulty breathing.
  - Patients often require hospitalization.
  - CFR: 5-30%.
  - LD-related mortality is higher among older adults compared with younger persons.

- **Pontiac Fever**: Mild, self-limited flu-like illness.
  - Duration of symptoms: Typically 2-5 days.
Legionellosis

- Epidemiologic Risk Factors
  - Chronic lung disease
  - Smoking history
  - Weakened immune system
  - Renal or hepatic failure
  - Diabetes
  - Systemic malignancy
  - Age >50 years
  - Recent travel with an overnight stay outside of the home
  - Exposure to whirlpool spas
  - Recent repairs or maintenance work on domestic plumbing
Diagnosis

- **LEGIONNAIRES’ DISEASE**
  - Most cases of LD develop pneumonia, which is diagnosed by physical exam or by confirmatory findings on chest x-ray.

**LABORATORY TESTING FOR LEGIONNAIRES’ DISEASE**

Urinary antigen assay **AND** culture of respiratory secretions on selective media are the preferred diagnostic tests for Legionnaires' disease.

http://www.cdc.gov/legionella/clinicians/diagnostic-testing.html
Diagnosis

• **PONTIAC FEVER**
  o Urine antigen or paired sera can be used to confirm infection. However, a negative result does not necessarily rule out Pontiac fever.
  o Often diagnosed clinically in association with other laboratory-confirmed legionellosis cases.
  o Culture cannot be used to diagnose Pontiac fever.
Treatment

- Legionnaires’ Disease: Fluoroquinolones or azithromycin are recommended antimicrobial agents for treating Legionella pneumonia.

- Pontiac Fever: Antibiotics apparently do not affect recovery time and therefore shouldn’t be prescribed to treat this self-limited illness.
Prevention

• No vaccine
• Ensure water systems are maintained:
  – Hot tubs
  – Hot water tanks and heaters
  – Large plumbing systems
  – Cooling towers
  – Decorative fountains
1. Conduct facility risk assessment
2. Implement water management program
3. Specify testing protocols

CDC Toolkit

- Includes:
  - A simple assessment to determine if an entire building or parts of it are at increased risk for growing and spreading *Legionella*
  - A basic walkthrough of the elements of a *Legionella* water management program
  - Scenarios describing common water quality problems and examples of how to respond to them to reduce the risk for *Legionella*
  - Special sections and considerations for those who work in healthcare facilities

https://www.cdc.gov/legionella/maintenance/wmp-toolkit.html
Preventing the first case

A *Legionella* water management program routinely consists of:

1. Establishing a water management program team.
2. Describing the building water systems using words and diagrams.
3. Identifying areas where *Legionella* could grow and spread.
4. Deciding where control measures should be applied and how to monitor them.
5. Establishing ways to intervene when control limits are not met.
6. Making sure the program is running as designed and is effective.
7. Documenting and communicating all the activities.

www.cdc.gov/legionella/WMPtoolkit
• Physicians, laboratory directors, and healthcare providers to report:

  – having a client affected by or suspected of being affected by a disease or condition declared to be communicable or dangerous to the public health by the director of health shall report the incidence or suspected incidence of such disease or condition to the department of health in writing or in the manner specified by the department of health.
• **Legionella is categorized as an urgently reported disease**

• **Urgent Reports:** Diseases or conditions that are suspicious or presenting with novel symptoms that may or may not be part of a known disease or disease complex, labeled “urgent” shall be reported by telephone as soon as a provisional diagnosis is established. The telephone report shall be followed by a written report submitted by mail or fax within three days to the Disease Outbreak Control Division, Disease Investigation Branch on Oahu, or to the District Health Office on the neighbor islands.
Case Reporting/Notification

- During regular work hours – reports are received by a single point of contact: “Officer of the Day”
  - Disease reporting line: 586-4586

- District Health Offices have Epi. Specialists taking calls.
• After hours, weekends: “Standby Duty Officer” take calls for urgent category reports. Routine reports can be called in during regular work days.

• DIB Physician’s Exchange Telephone Number: 566-5049
  – Take calls 24/7; message is given to the Standby Officer
  – Standby Officer will call you back
More Information

• For more information please contact:
  – Zeshan Chisty  
    (808) 587-6377  
    Zeshan.Chisty@doh.hawaii.gov

• Additional Resources:
  – http://www.cdc.gov/handhygiene/
  – http://www.who.int/gpsc/en/
  – Infection Control Practices in Assisted living Communities:  
    http://www.gnjournal.com/article/S0197-4572(09)00411-X/fulltext
Infection Control Assessments

- Inventory all facilities and identify HAI/infection control policy and procedures
  - Infection control point of contact
  - Available HAI data
  - Current regulatory/licensing oversight
  - Establish relationship between HDOH and facility
- Using modified CDC tools
- HDOH Contractors:
  - **Dianne Okumura**: LTCFs, ASCs, Dialysis, Inpatient Psychiatric
  - **Kelley O’Leary**: ALFs, ARCHs, select outpatient settings
- Results will be used to understand gaps in infection control and develop trainings
  - 59% of ALFs have participated
  - 66% of ARCH II and EXPs have participated
Questions?
Type your questions into the Questions tab of your Control Panel.

Zeshan Chisty, MPH
HAI Collaborative Coordinator
Hawaii State Department of Health

www.hah.org
On behalf of the Healthcare Association of Hawaii and the Hawaii State Department of Health, thank you for attending today’s webinar:

Infection Control Measures in Community-Based Care

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