Personal Protective Equipment (PPE): Coaching and Training Frontline Health Care Professionals
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Learning Objectives

• Review the basic principles of Personal Protective Equipment (PPE) use in health care settings

• Discuss models of engagement to enhance staff education for PPE use
Infection Transmission

Chain of Infection

- Harmful microbes spread by contact
- Hide/Grow/Multiply
- Next person at risk
- Way in
- Way out
- Going Mobile

(Adapted by R. Olmsted from Principles of Epidemiology in Public Health Practice, CDC, 2012)
Types of PPE in Health Care

**Gloves** – protect hands and allow efficient removal of organisms from hands

**Gowns and Aprons** – protect skin and clothing

**Face masks** – protect mucous membranes of mouth and nose

**Respirators** - prevent inhalation of infectious material

**Goggles** – protect eyes

**Face shields** – mucous membranes of face, mouth, nose and eyes
Principles for PPE Use

Don before contact with the patient
   – Generally before entering the room

Remove and discard PPE carefully

After doffing, immediately perform hand hygiene
PRECEDE Model

**Predisposing Aspects:**
- Assess HCW knowledge, attitudes, opinions, and practices pertaining to PPE use
- Share data on infections and MDROs at your institution

**Enabling Factors:**
- Educational in-services pertaining to PPE and how PPE use fits within the overall infection prevention
- PPE promotion campaigns
- Consistent availability of PPE at point of care

**Evaluate Outcomes:**
- Reassessment of knowledge and adherence to PPE
- Monitor trends of infections (e.g., MDROs)

**Reinforcing Factors:**
- Provide regular feedback to HCW and other providers on rates of PPE use
- Leadership engagement

*(Mody L et al., CID, 2011)*
Apply 4 E Model

- Audit and Feedback
- Promote accountability
- Collect data on unintended consequences

- Have a conversation
- Explain why PPE use is important

- Design interactive educational materials
- Engage leadership
- Reward high performers

- Share the evidence supporting this intervention
- Share evidence on why adherence is poor

(Prenovost P et al., BMJ, 2008; Saint S et al., ICHE, 2010)
Engage

Have a conversation

Use team meetings or huddles

Solicit feedback from staff:

– Why is PPE use important?
– What are the barriers to consistent PPE use?
– Use recent outbreaks as conversation starters

• Ebola epidemic
• C. diff outbreak

– Discuss facility-specific MDRO challenges
How Will You Help Engage Your Facility?

• Nominate unit champions
• Assess staff knowledge
• Use this as your Quality Improvement project
  • Audit adherence
  • Give positive feedback
• Hold unit level competitions, give some simple prizes to winners

(CDC, Transmission-Based Precautions, https://www.cdc.gov/infectioncontrol/basics/transmission-based-precautions.html#anchor_1564058318)
Take the Pledge...

I pledge to keep my hands clean by performing hand hygiene according to my facility’s policies to help stop the spread of germs.

- I will wash my hands before and after resident contact, and after certain procedures according to my facility’s policies, including:
  - Before I enter or leave a resident’s room or area
  - Before and after I touch a urinary catheter
  - After I touch any blood or bodily fluids
  - Before and after I wear a glove, mask, and goggles
  - When I wash my hands with soap and water:
    - Wet my hands with clean, running water, applying the amount of product recommended by the manufacturer to hands
    - Rub hands together vigorously for at least 20 seconds covering all surfaces of the hands and fingers
    - Rinse my hands with running water
    - Dry my hands using a clean disposable towel
    - Turn off the faucet with the disposable paper towel
  - When I clean my hands with alcohol-based hand sanitizer, I will:
    - Apply the product to the palm of one hand
    - Rub my hands together
    - Rub the product over all surfaces of my hands and fingers until my hands are dry

I welcome feedback on my hand hygiene and will help other staff, residents, and families practice good hand hygiene.

I pledge to keep the residents’ environment and equipment clean to help stop the spread of germs from one person to another.

I know surfaces that look clean may be contaminated with germs that can get on my hands. Some germs can live on surfaces for a long time and can make me and others sick. Cleaning and disinfecting must be done to help remove these germs. I understand the steps and will follow the manufacturer’s recommendations for chemicals to keep the resident’s environment clean and safe.

Step 1: I will clean surfaces and equipment to remove dirt and debris before and after using it on a resident.

Step 2: I will disinfect surfaces and equipment to kill before and after using it on a resident.

I will explain to residents and their families that cleaning surfaces and equipment helps prevent the spread of germs.

You can add your own organization’s logo to this pledge. Click on the blank space in the bottom left corner and then browse to insert an image. Please note: only images that are saved as PDFs can be added.

To remove this comment, right-click the box and select “Delete.”

Signed: __________________

Date: __________________

(APIC Take the Pledge is available at: http://www.apic.org/Resource_/TinyMceFileManager/Resources/APIC_HRET_Take_the_Pledge_FINAL_5-15.pdf)
<table>
<thead>
<tr>
<th>Contamination After Care</th>
<th>MRSA</th>
<th>VRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>18-24%</td>
<td>12-63%</td>
</tr>
<tr>
<td>Gown</td>
<td>6-14%</td>
<td>4-37%</td>
</tr>
<tr>
<td>Hands After Glove Removal</td>
<td>3%</td>
<td>0-4%</td>
</tr>
</tbody>
</table>

(Snyder G et al., ICHE, 2008; Roghmann M et al., ICHE 2015; Grabsch E et al., ICHE, 2006; Zachary K et al., ICHE, 2001)
Healthcare Contamination Varies by Type of Care

(Roghmann M et al., ICHE, 2015)
Execute

• Engage senior leaders

• Share content at your next in-service

• Make posters of your staff engaging in positive behaviors, hang them up in key common areas

• Hold live demonstrations on appropriate PPE use

Role model positive behaviors
Demonstrate Appropriate PPE Use

Don PPE correctly and in the correct order

Remove and dispose of PPE correctly and without contamination

Remember hand hygiene before and after!

Simulate contamination

(e.g. fluorescent glow solution, iodine solution, chocolate syrup, etc.)
Contamination During PPE Removal

(Tomas M et al., JAMA Intern Med, 2015)
Hand Hygiene Monitoring Tool

Audit Tool: Hemodialysis hand hygiene observations
(Use a “✓” for each ‘hand hygiene opportunity’ observed. Under ‘opportunity successful’, use a “✓” if successful, and leave blank if not successful)

| Discipline | Hand hygiene opportunity | Opportunity successful | Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):
|------------|--------------------------|------------------------|----------------------------------------------------------|
| P-physician | Hand hygiene opportunity | Opportunity successful | Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):
| N-nurse    | Hand hygiene opportunity | Opportunity successful | Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):
| T-technician| Hand hygiene opportunity | Opportunity successful | Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):
| S-student  | Hand hygiene opportunity | Opportunity successful | Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):
| D-dietitian| Hand hygiene opportunity | Opportunity successful | Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):
| W-social worker | Hand hygiene opportunity | Opportunity successful | Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):
| O-other    | Hand hygiene opportunity | Opportunity successful | Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):

Duration of observation period = __________ minutes Number of successful hand hygiene opportunities observed = __________

Total number of patients observed during audit = __________ Total number of hand hygiene opportunities observed during audit = __________

** See hand hygiene opportunities on back page

(WHO: http://www.who.int/gpsc/5may/Observation_Form.doc?ua=1
TIP Toolkit: http://infectionpreventioninaging.org/resources/
Key Points

Safe PPE use has captured national attention

Appropriate use is critical to prevent transmission of pathogens

Apply innovative models such as 4E or PRECEDE Models to enhance staff training and education
References


Clean Hands Save Lives. Observation Form. World Health Organization, WHO. Revised 2009. Available at http://www.who.int/gpsc/5may/Observation_Form.doc?ua=1


Hand Hygiene Monitoring Tool. Tip Toolkit. Available at http://infectionpreventioninaging.org/resources


Take the Pledge. Association for Professionals in Infection Control. Available at: http://www.apic.org/Resource_/TinyMceFileManager/Resources/APIC_HRET_Take_the_Pledge_FINAL_5-15.pdf


Welcome to today’s training module, titled “Personal Protective Equipment: Coaching and Training Frontline Health Care Professionals.” During this training module, we will review strategies to coach and train frontline health care professionals in the use of personal protective equipment and health care precautions to prevent healthcare-associated infections or HAIs.
This module was developed by national infection prevention experts devoted to improving patient safety and infection prevention efforts.
There are two main objectives for this module. The first is to review the basic principles of personal protective equipment, also known as PPE, use in health care settings. The second is to discuss models of engagement to enhance staff education for PPE use. Understanding these two core objectives will set the groundwork to improve the culture of safety related to infection prevention in your health care organization.
Correct use of appropriate PPE is an essential component to disrupt the chain of infection and stop disease transmission. Helping personnel understand infection transmission can facilitate correct PPE use to break the chain of infection.

As a review, infectious agents live and grow in a reservoir, like a patient’s GI tract, nose or wounds. Pathogens exit the reservoir via a portal of exit. This might be in feces, by coughing or sneezing, or by wound drainage. Microbes can “go mobile” and move from place to place – they may be transmitted by health care worker’s hands, contaminated environmental surfaces or equipment that is shared among the patients. Once a harmful microbe reaches that person it only takes a portal of entry, a way in, to infect somebody else. That person can serve as a reservoir.
Personal protective equipment –or PPE as I mentioned earlier– are worn to disrupt this chain of infection. PPE should be selected based on the type of precautions the patient is under. And, staff should always follow Standard Precautions in addition to any transmission-based precautions when caring for patients. It is important that all staff are trained in correct PPE use, including when to use different types of PPE, both putting on and taking off procedures, reviewing where different PPE items are kept and how supplies should be restocked if they are running low. During staff training it is essential to review your hospital’s policies for initiating various precautions.
This slide shows a couple key points to emphasize with staff during training. First, when indicated, you should put on the appropriate PPE before any contact with the patient. Many times this will be directly before entering the patient’s room. Hand hygiene should be done before putting on PPE. After providing care, PPE for contact precautions should be removed carefully; as this is often when the contamination occurs. PPE, for contact precautions, should be removed at the doorway of the patient’s room or immediately outside the room. Lastly, hand hygiene should be performed immediately after removing the PPE. For more about hand hygiene, please review the Hand Hygiene course.
The remainder of this module will explore innovative strategies that can be used to enhance your staff training and education around PPE use.

I will begin by discussing the PRECEDE Model and how it can be adapted for strengthening your PPE program and staff training. In this model we can break the educational diagnosis stage into predisposing aspects, enabling factors and reinforcing factors. These issues, if identified, modified and strengthened will lead to behavior change and sustained program success.
Predisposing aspects are personnel’s beliefs, attitudes and opinions about PPE practices. Enabling factors are elements in the environment that empower staff to model a certain behavior, in this instance proper PPE use. This includes PPE placement, access and ease of use. Lastly we reinforce desired behaviors with regular feedback on appropriate PPE use, leadership engagement, behavior modeling and rewards for consistent and effective PPE use.

Furthermore, evaluating outcomes will inform you if your efforts are successful.
Similarly, a 4E Model is a framework to guide leaders in their change efforts. To successfully implement and lead change, educators need to Engage, Educate, Execute and Evaluate, the 4Es. We will discuss each of these Es in more detail on the following slides.
How can you engage staff about improving and enhancing PPE practice at your hospital or in your unit? It can begin with a simple conversation.

Use existing team meetings or huddles to solicit staff feedback on the PPE practices and policies at your facility and emphasize the importance of PPE. Hospital or unit specific outbreaks, MDRO challenges and data can help illustrate the importance of PPE and initiate this conversation. It is important to remember that you don’t have to come up with all the answers. Ask staff what they believe are the barriers for consistent PPE use.
What do staff think would help them and their colleagues more effectively and consistently use appropriate precautions? By engaging staff and gathering their input and feedback you will help create staff ownership of the policy, which will then strengthen behavior change and lead to sustainability.
In addition to talking to staff, it is important to nominate champions who can spearhead the initiative in your hospital or the unit. Unit or project champions can help engage staff on a daily basis with the project. To learn about using champions, consider reviewing the course on Uber Adaptive Strategies for Infection Prevention.

Engage staff by assessing their baseline knowledge of your PPE policies and procedures. This can be done through a simple assessment quiz or by PPE demonstrations. We will discuss audits and evaluation of staff PPE skills in more detail in the fourth module of this course. Finally, consider holding unit level competitions to engage staff and motivate buy-in.
APIC has developed an infection prevention tool, titled “Take the Pledge.” This tool contains information on infection prevention skills to help stop the spread of infections. This tool can be printed, displayed or disseminated as appropriate in your facility to engage staff on new and existing infection prevention practices and policies within your hospital.
Educate is the second of the 4Es of effective leadership. Here we address the question “What do the staff need to know?” That is, why is PPE important? How will patient outcomes improve by using PPE appropriately? How does this affect my daily work?

Staff education should also include sharing the evidence. You may choose to share hospital, unit specific or national evidence for the importance of PPE. This table highlights the level of contamination that can occur after caring for a patient who is colonized or infected with MRSA and VRE.
Studies have shown that gloves can be contaminated after 18-24 percent of care interactions for patients colonized or infected with MRSA, and up to 63 percent of care interactions in patients colonized or infected with VRE. Gown contamination for MRSA occurs up to 14 percent of the time, and VRE contamination up to 37 percent of the time. Despite glove use, hands can be contaminated after glove removal, which is why hand hygiene following removal of PPE is so critical.
These studies also reveal that certain procedures and patient care interactions are considered high risk for contamination. For example, staff contact with endotracheal tubing, the head or the neck of the patient and the presence of a feeding tube or picc line leads to contamination with both MRSA and VRE (Snyder et al. 2008). Our own studies from University of Michigan and University of Maryland, show that providing wound care can lead to increased contamination (Roghmann). Furthermore, staff who care for colostomy or ileostomy patients are at an increased risk for VRE contamination (Zachary et al 2001). It is important that during staff training and education, you highlight these risk factors for healthcare personnel contamination.
More data from our study reveals that different types of care activities have different levels of transmission risk. In this particular study, investigators at University of Michigan and University of Maryland, showed that when swabbing gowns and gloves of health care personnel after providing care to MRSA colonized patients, there were several high-risk care activities that increased MRSA contamination on gowns and gloves. These included changing linens, assisting with dressing, transferring, providing hygiene or bathing, and assisting with toileting or a brief change. On the other hand, giving medications or performing glucose monitoring were found to be lower-risk care activities for MRSA transmission.
The third E of effective leadership is Execute. How will you implement PPE training and modifications?

This slide includes a couple of key strategies to help you execute PPE improvements in your hospital or your unit.

• First, it is important to engage senior leaders and garner their support and buy-in. Please review the Uber Adaptive Course module on Engaging Leaders for additional tips and strategies.
• Second, consider how you will provide education and program role out. You could have staff review modules 1 and 2 about Standard Precautions and Transmission-Based Precautions. Or you can develop your own education and training as part of an in-service.

• Third, make posters highlighting key concepts and changes and hang them in key common areas. You can personalize these posters by taking photographs of your staff engaging in positive behaviors.

• Fourth, consider holding live demonstrations on appropriate gown, glove and face mask use.
During live demonstrations it is important that staff can perform the following key components of effective PPE use.

• Staff should be able to put on PPE correctly and in the correct order and remove and dispose of PPE correctly and without contamination.

• It is also important to emphasize hand hygiene before and after PPE use. Remind staff that PPE use is not a replacement for consistent hand hygiene.
During demonstrations consider simulating pathogen contamination with fluorescent glow solution, iodine solution or chocolate syrup. Simulating contamination can help staff visualize importance of proper use and removal and highlight how easy it is to accidentally contaminate yourself, if you are not careful.
A study by Tomas in 2015 found that contamination of skin or clothing occurred in 46 percent of PPE simulations. More importantly, contamination was more common following contaminated glove removal than contaminated gown removal. Contamination was also more likely when observers identified lapses in proper donning and doffing technique; 70 percent contaminated during an observed lapse in technique versus only 30 percent contamination occurred when no lapse was observed.
The last E is evaluation. As we discussed with the PRECEDE model, it is important to evaluate your change efforts. This slide shows three tools for PPE auditing. The one on the left by the WHO, the one on the bottom is by the CDC and the one on the top right, my team has used for some of our patient-oriented research studies. These tools may be helpful in evaluating the staff’s efforts to improve PPE use. Evaluation and auditing is discussed in greater detail in the next module on Auditing PPE Use.
As I wrap up this module, I would like to leave you with three key points about training, educating and engaging staff on PPE use. First, highlight that with the Ebola crisis, national attention has been brought on the importance of PPE and the appropriate use is critical to prevent transmission and spread of pathogens. Second, by diligently using PPE, staff can be part of this national effort. Lastly, consider applying an innovative approach, like the 4E or PRECEDE models, to enhance staff training and engagement.
No Notes.