

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



Presenter

Lona Mody, MD, MSc

Amanda Sanford Hickey Professor of Medicine
University of Michigan
Ann Arbor VA Ann Arbor GRECC

Contributions by

Linda R. Greene, RN, MPS, CIC
University of Rochester Medical Center
Highland Hospital

Karen Jones, RN, MPH
St. John Hospital and Medical Center



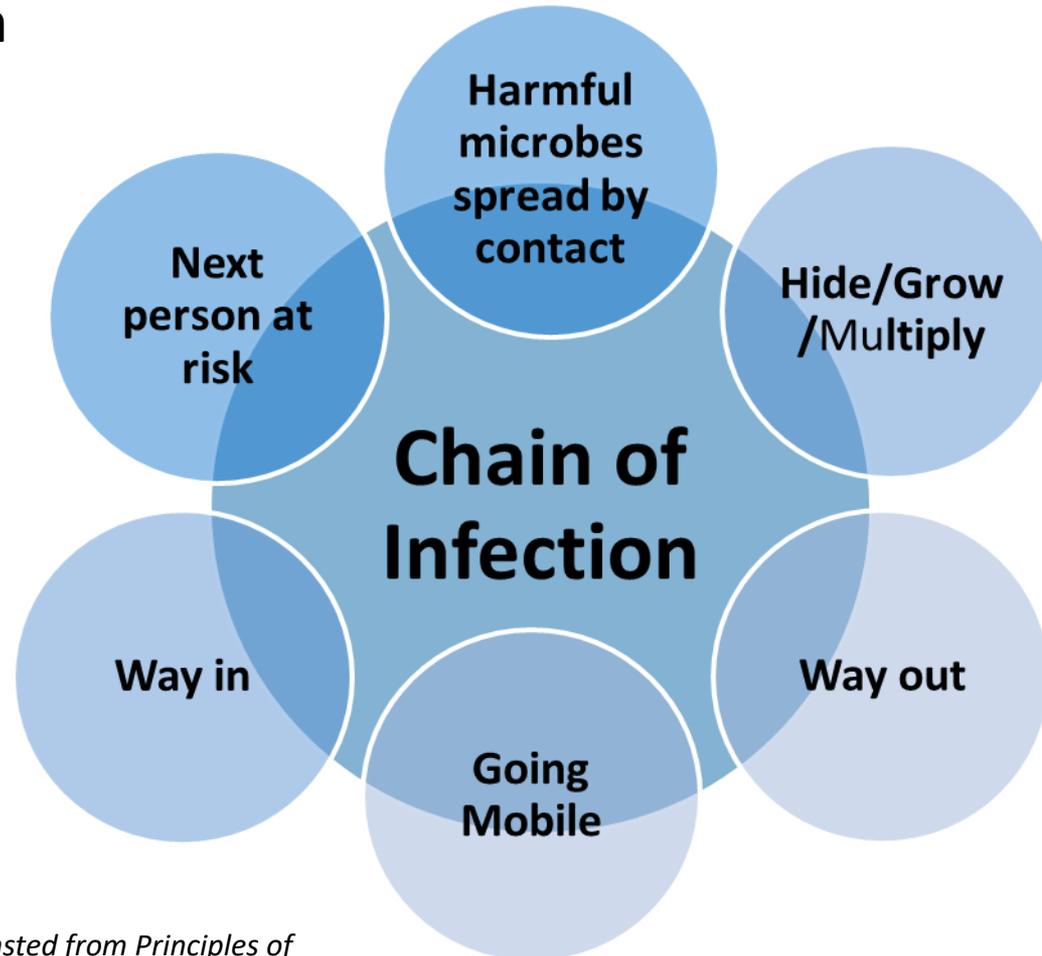
Learning Objectives

- 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



(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:

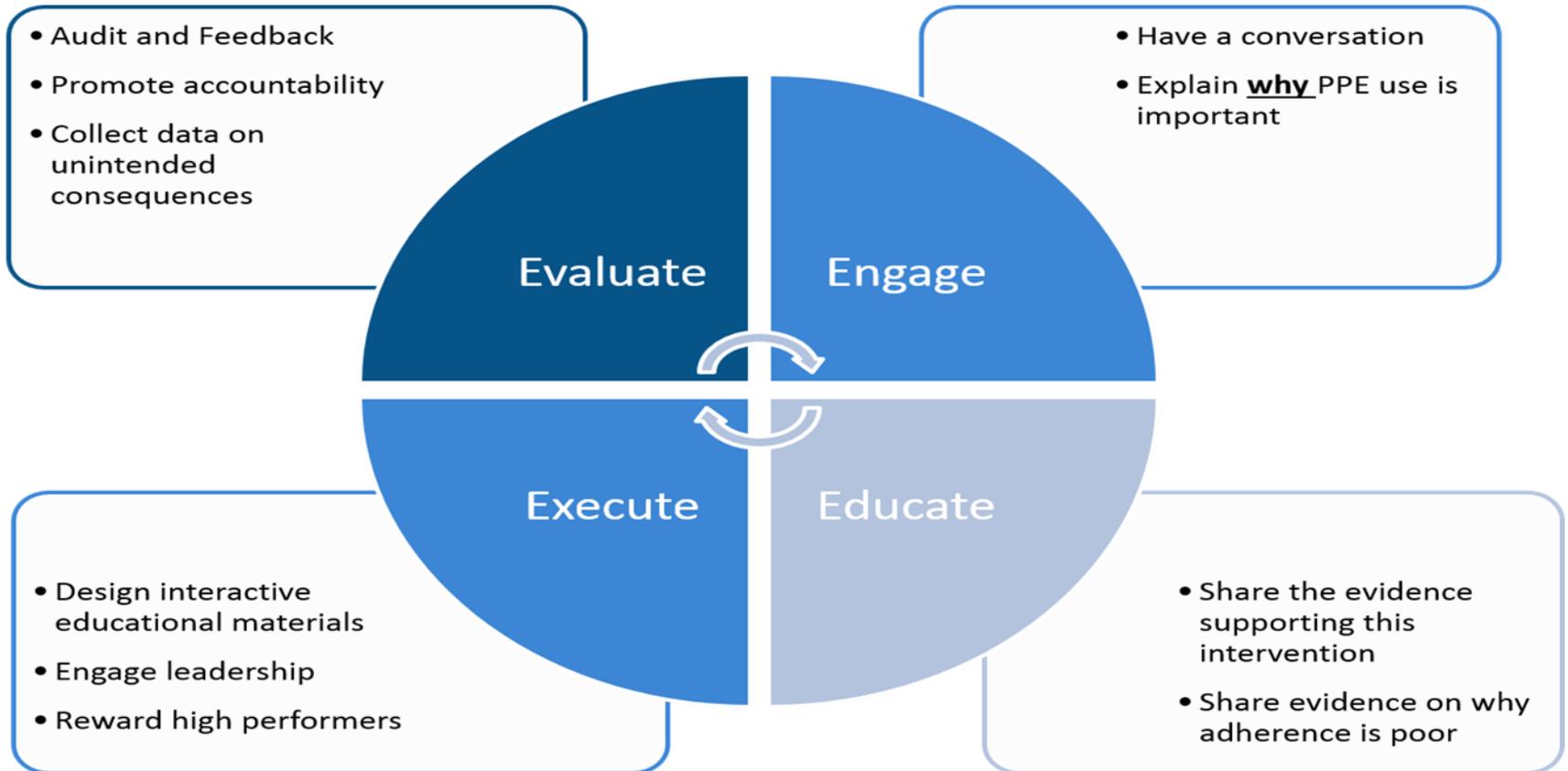
- Reassessment of knowledge and adherence to PPE
- Monitor trends of infections (e.g., MDROs)

Reinforcing Factors:

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



Apply 4 E Model



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?

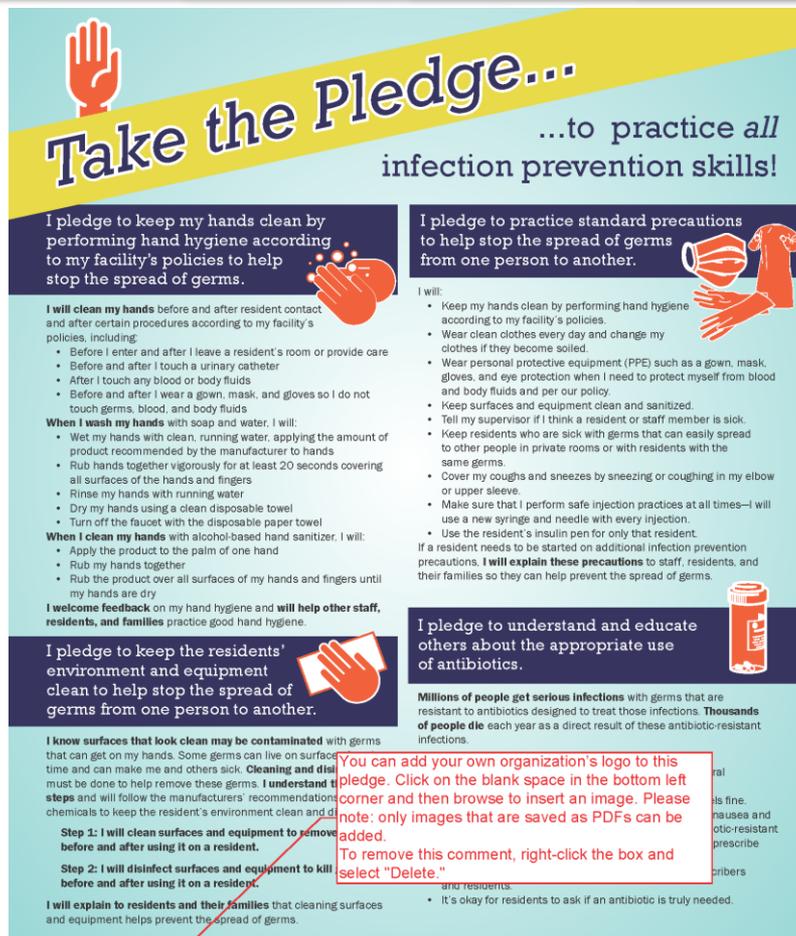
- Nominate unit champions
- Assess staff knowledge
- Use this as your Quality Improvement project
 - Audit adherence
 - Give positive feedback
- Hold unit level competitions, give some simple prizes to winners



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



Take the Pledge...



Take the Pledge... ...to practice *all* infection prevention skills!

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 clean my hands before and after resident contact and after certain procedures according to my facility's policies, including:

- Before I enter and after I leave a resident's room or provide care
- Before and after I touch a urinary catheter
- After I touch any blood or body fluids
- Before and after I wear a gown, mask, and gloves so I do not touch germs, blood, and body fluids

When I wash my hands with soap and water, I will:

- 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 surface 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 manufacturers' recommendations on chemicals to keep the resident's environment clean and safe.

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

Step 2: I will disinfect surfaces and equipment to kill germs 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.

I pledge to practice standard precautions to help stop the spread of germs from one person to another.

I will:

- Keep my hands clean by performing hand hygiene according to my facility's policies
- Wear clean clothes every day and change my clothes if they become soiled.
- Wear personal protective equipment (PPE) such as a gown, mask, gloves, and eye protection when I need to protect myself from blood and body fluids and per our policy.
- Keep surfaces and equipment clean and sanitized.
- Tell my supervisor if I think a resident or staff member is sick.
- Keep residents who are sick with germs that can easily spread to other people in private rooms or with residents with the same germs.
- Cover my coughs and sneezes by sneezing or coughing in my elbow or upper sleeve.
- Make sure that I perform safe injection practices at all times—I will use a new syringe and needle with every injection.
- Use the resident's insulin pen for only that resident.

If a resident needs to be started on additional infection prevention precautions, **I will explain these precautions** to staff, residents, and their families so they can help prevent the spread of germs.

I pledge to understand and educate others about the appropriate use of antibiotics.

Millions of people get serious infections with germs that are resistant to antibiotics designed to treat those infections. **Thousands of people die** each year as a direct result of these antibiotic-resistant infections.

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)



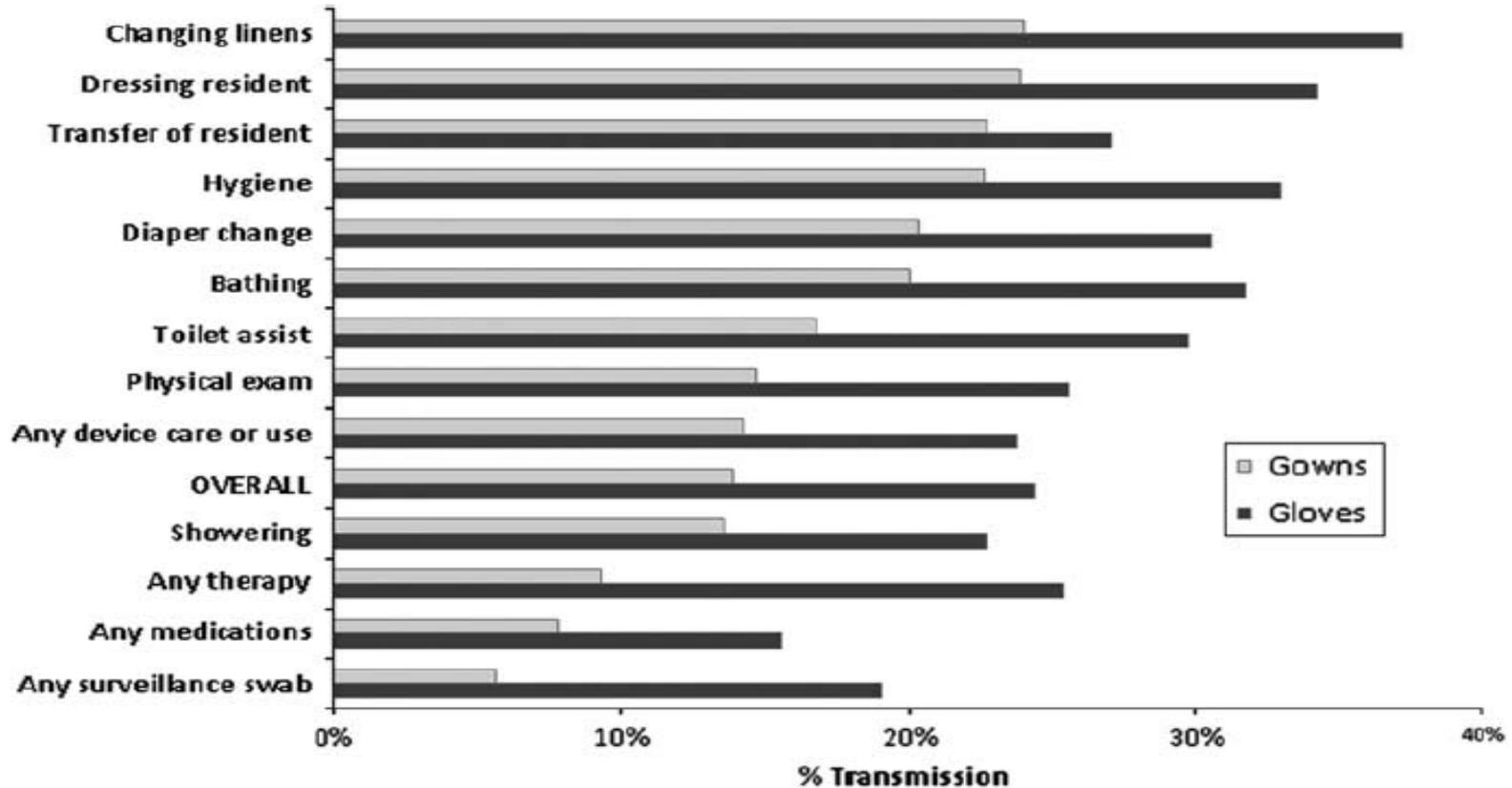
Educate: Share evidence

Contamination After Care	MRSA	VRE
Gloves	18-24%	12-63%
Gown	6-14%	4-37%
Hands After Glove Removal	3%	0-4%

(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

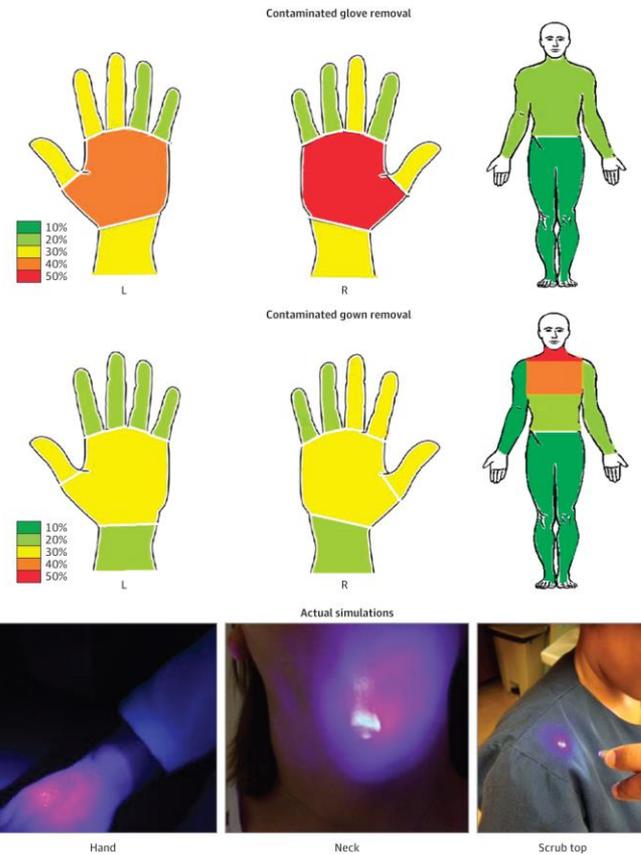
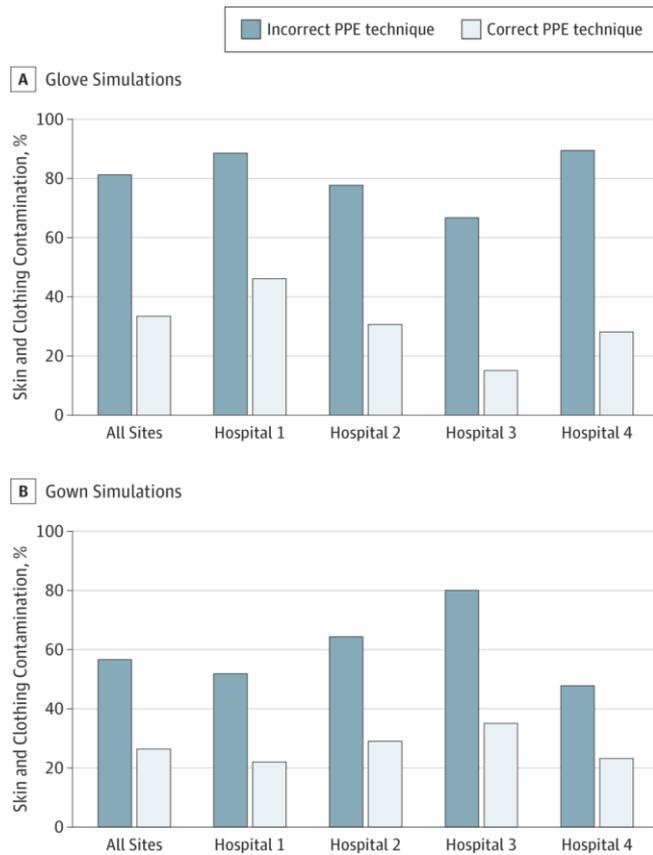
Remember hand hygiene before and after!

Simulate contamination

(e.g. fluorescent glow solution, iodine solution , chocolate syrup, etc.)



Contamination During PPE Removal



(Tomas M et al., JAMA Intern Med, 2015)



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

- CDC Dialysis Collaborative. Audit Tool: Hemodialysis Hand Hygiene Observations. Centers for Disease Control and Prevention, CDC. Available at <https://www.cdc.gov/dialysis/PDFs/collaborative/Hemodialysis-Hand-Hygiene-Observations.pdf>
- 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
- Grabsch EA, Burrell LJ, Padiglione A, et al. Risk of environmental and healthcare worker contamination with vancomycin-resistant enterococci during outpatient procedures and hemodialysis. *Infect Control Hosp Epidemiol*. 2006; 27(3): 287-93.
- Hand Hygiene Monitoring Tool. Tip Toolkit. Available at <http://infectionpreventioninaging.org/resources/>
- Mody L, Bradley SF, Galecki A, et al. Conceptual model for reducing infections and antimicrobial resistance in skilled nursing facilities: focusing on residents with indwelling devices. *Clinical Infectious Diseases*. 2011; 52(5): 654-651.
- Principles of Epidemiology in Public Health Practice, Third Edition.
An Introduction to Applied Epidemiology and Biostatistics. Centers for Disease Control and Prevention, CDC. Reviewed May 18, 2012. Accessed July 1, 2016. Available at <http://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson1/section10.html>
- Pronovost PJ, Berenholtz SM, Needham DM. Translating evidence into practice: a model for large scale knowledge translation. *BMJ*. 2008; 337: a1714.
- Roghamann MC, Johnson JK, Sorkin JD, et al. Transmission of Methicillin-Resistant Staphylococcus aureus (MRSA) to Healthcare Worker Gowns and Gloves During Care of Nursing Home Residents. *Infect Control Hosp Epidemiol*. 2015; 36(9): 1050-7.
- Saint S, Kowalski CP, Banaszak-Holl J, et al. The importance of leadership in preventing healthcare-associated infection: results of a multisite qualitative study. *Infect Control Hosp Epidemiol*. 2010; 31(9): 901-7.
- Siegel JD, Rhinehart E, Jackson M, et al. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Available at: <http://www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf>
- Snyder GM, Thom KA, Furuno JP, et al. Detection of methicillin-resistant Staphylococcus aureus and vancomycin-resistant enterococci on the gowns and gloves of healthcare workers. *Infect Control Hosp Epidemiol*. 2008; 29(7): 583-9.
- 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
- Toma ME, Kundrapu S, Thota P, et al. Contamination of Health Care Personnel During Removal of Personal Protective Equipment. *JAMA Intern Med*. 2015; 175(12): 1904-10.
- Zachary KC, Bayne PS, Morrison VJ, et al. Contamination of gowns, gloves, and stethoscopes with vancomycin-resistant enterococci. *Infect Control Hosp Epidemiol*. 2001; 22(9): 560-4.



Speaker Notes



Speaker Notes: Slide 1

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.



Speaker Notes: Slide 2

This module was developed by national infection prevention experts devoted to improving patient safety and infection prevention efforts.



Speaker Notes: Slide 3

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.



Speaker Notes: Slide 4

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.



Speaker Notes: Slide 5

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.



Speaker Notes: Slide 6

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.



Speaker Notes: Slide 7

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.



Speaker Notes: Slide 7 Continued

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.



Speaker Notes: Slide 8

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.



Speaker Notes: Slide 9

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.



Speaker Notes: Slide 9 Continued

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.



Speaker Notes: Slide 10

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.



Speaker Notes: Slide 11

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.



Speaker Notes: Slide 12

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.



Speaker Notes: Slide 12 Continued

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.



Speaker Notes: Slide 12 Continued

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.



Speaker Notes: Slide 13

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.



Speaker Notes: Slide 14

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.



Speaker Notes: Slide 14 Continued

- Second, consider how you will provide education and program roll 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.



Speaker Notes: Slide 15

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.



Speaker Notes: Slide 15 Continued

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.



Speaker Notes: Slide 16

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.



Speaker Notes: Slide 17

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.



Speaker Notes: Slide 18

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.



Speaker Notes: Slide 19

No Notes.

