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Consideration for Use of Enhanced Barrier Precautions in Skilled Nursing Facilities

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Preface

The Healthcare Infection Control Practices Advisory Committee (HICPAC) is a federal advisory committee chartered to provide advice and guidance to the Centers for Disease Control and Prevention (CDC) and the Secretary of the Department of Health and Human Services (HHS) regarding the practice of infection control and strategies for surveillance, prevention, and control of healthcare-associated infections, antimicrobial resistance and related events in United States healthcare settings. At the November 2019 HICPAC meeting, CDC asked HICPAC for input on topics related to the care of nursing home populations and the implementation and scope of Enhanced Barrier Precautions (EBP).

HICPAC formed a workgroup to develop this input. The Long-Term Care/Post-Acute Care (LTC/PAC) Workgroup provided updates and obtained HICPAC feedback at the November 2020, March 2021, and June 2021 HICPAC Meetings. At the June 2021 meeting, HICPAC voted to finalize the white paper based on expert opinion for broader use of EBP beyond targeted multidrug-resistant organisms, including pathogens that affect every nursing home in the United States such as *S. aureus* (both methicillin sensitive and resistant).

Executive Summary

1. Multidrug-resistant organism (MDRO) transmission is common in skilled nursing facilities, contributing to significant morbidity and mortality for residents and increased costs for the health care system.
2. Enhanced Barrier Precautions (EBP) is an approach of targeted gown and glove use during high contact resident care activities, designed to reduce transmission of *S. aureus* and MDROs.
3. EBP may be applied (when Contact Precautions do not otherwise apply) to residents with any of the following:
    - Wounds or indwelling medical devices, regardless of MDRO colonization status
    - Infection or colonization with an MDRO.
4. Effective implementation of EBP requires staff training on the proper use of personal protective equipment (PPE) and the availability of PPE with hand hygiene products at the point of care.

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Background

Residents in skilled nursing facilities are disproportionately affected by multidrug-resistant organism (MDRO) infections.[1] In regional point prevalence surveys, *S. aureus* and MDRO colonization prevalence among residents in skilled nursing facilities is estimated at greater than 50%, with new acquisitions occurring commonly.[2,3] Skilled nursing facilities have been implicated in regional outbreaks of MDROs that are classified as urgent threats by the Centers for Disease Control and Prevention (CDC), including carbapenem-resistant organisms and *Candida auris*.[4-7] Infections caused by MDROs are problematic as treatment options are limited.

Resident-to-resident pathogen transmission in skilled nursing facilities occurs, in part, via healthcare personnel, who may transiently carry and spread MDROs on their hands or clothing during resident care activities.[8,9] Residents who have complex medical needs involving wounds and indwelling medical devices are at higher risk of both acquisition and colonization by MDROs.[9,10] Residents who are MDRO colonized are not often recognized by healthcare personnel based on available clinical cultures or medical history.[11]

In 2019, CDC introduced a new approach to the use of personal protective equipment called Enhanced Barrier Precautions (EBP). This new approach recommends gown and glove use for certain residents during specific high-contact resident care activities associated with MDRO transmission.[12,13] CDC interim guidance recommends EBP as a strategy in nursing homes to interrupt the spread of "novel or targeted MDROs" (e.g., carbapenem-resistant organisms or *C. auris*). Based on available evidence and expert opinions, this white paper aims to provide a consideration for broader use of EBP beyond targeted MDROs, including pathogens that affect every nursing home in the United States such as *S. aureus* (both methicillin sensitive and resistant).

Consideration for Use of Enhanced Barrier Precautions in Skilled Nursing Facilities

Enhanced Barrier Precautions can be applied (when Contact Precautions do not otherwise apply) to residents with any of the following:

- Wounds or indwelling medical devices, regardless of MDRO colonization status
- Infection or colonization with an MDRO

Consistent with 2019-2020 CDC EBP interim guidance, examples of indwelling medical devices include central line, urinary catheter, feeding tube, and tracheostomy/ventilator; examples of high contact resident care activities include dressing, bathing/showering, transferring, providing hygiene, changing linens, changing briefs or assisting with toileting, device care or use, and wound care.[14]

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The consideration to expand EBP as a routine approach to infection control is based on the recognition that Standard Precautions, which requires the use of gown and glove in situations of expected exposure to blood, body fluids, skin breakdown, or mucous membranes, often have not been successfully implemented in nursing home settings.[15,16] Furthermore, Contact Precautions are not widely adopted by nursing homes because they are considered stigmatizing to residents[17] in part due to required resident room restriction, and thus Contact Precautions are typically reserved for residents with short-term pathogen-specific infections rather than long-term pathogen colonization. Lastly, nursing homes are unable to routinely identify residents in the facilities colonized with MDROs, or are unaware of colonization status or endemic rates of MDROs within their facilities, hampering approaches to gown and glove use that only target residents with known MDRO colonization.[18]

Available evidence suggests that the routine use of EBP for residents with wounds or indwelling medical devices would reduce the transmission of *S. aureus* and MDROs. In a randomized clinical trial, routine use of EBP among residents with indwelling medical devices reduced acquisition of MDROs including methicillin-resistant *S. aureus*, and reduced catheter-associated urinary tract infections.[16] In a separate quasi-experimental study, routine use of EBP during high-risk care of residents with wounds or indwelling medical devices was associated with a significant decrease in acquisition and transmission of both methicillin-susceptible and methicillin-resistant *S. aureus*.[19] Interruption of *S. aureus* and MDRO transmission likely occurs through at least two potential mechanisms: preventing contamination of healthcare personnel clothing by MDRO-colonized residents, and providing protection against MDRO acquisition for non-colonized, susceptible residents.

Although published studies[16,19] have not explicitly applied EBP to residents with known MDRO colonization (e.g., MRSA) in the absence of wounds or indwelling medical devices, skilled nursing facilities may consider placing residents with known MDRO colonization on EBP to control MDRO transmission, if Contact Precautions do not apply.[20] This consideration, based on available evidence and expert opinions, expands EBP beyond the 2019-2020 CDC EBP interim guidance that focused EBP on 'novel or targeted' MDROs, to MDROs that are more common in skilled nursing facilities, such as MRSA. This consideration comes with limitations. (1) The duration of colonization varies by MDRO type and the resident's medical condition, and thus the optimal duration of EBP in the setting of MDRO colonization without wounds or indwelling medical devices is unknown. (2) The designation of a pathogen as 'MDRO' for the purpose of EBP implementation is based on local epidemiology and public health prioritization; thus, this consideration does not explicitly list specific pathogens to target for EBP. An expanded MDRO indication for EBP provides skilled nursing facilities with an additional option other than Contact Precautions to control epidemiologically important MDROs in their facilities.

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Framework for Applying Enhanced Barrier Precautions in Skilled Nursing Facilities

Implementation Approaches

General implementation considerations for EBP are available from the CDC.[20] The application of EBP to routine care of residents with wounds or indwelling medical devices requires that staff participate in initial and on-going training on the facility's expectations about hand hygiene and gown and glove use, along with proof of competency regarding appropriate use and donning and doffing technique for PPE. Facilities should develop a method to identify residents with wounds or indwelling medical devices, and post clear signage outside of resident rooms indicating the type of PPE required and defining high risk resident care activities. Gowns and gloves should be available outside of each resident room, and alcohol-based hand rub should be available for every resident room (ideally both inside and outside of the room). A trash can (or laundry bin, if applicable) large enough to dispose of multiple gowns should be available for each room. Facilities with rooms containing multiple residents should provide staff with training and resources to ensure that they change their gown and gloves and perform hand hygiene in between care of residents in the same room.

Cost Considerations

Implementation of routine EBP would incur costs including PPE (gowns/gloves), training, staff time to don and doff PPE, and signage materials. Potential savings would include avoidance of infections and hospitalizations. An economic analysis of a randomized controlled trial involving the use of EBP in a bundle to prevent catheter-associated urinary tract infections estimated net savings of approximately $15,000 per year per facility, but the savings would accrue to payers and not to skilled nursing facilities.[21] Centers for Medicaid and Medicare and private insurers/commercial plans may need to consider the implementation and cost of EBP in payment models.

Considerations During Shortages of Gowns or Gloves

When PPE supply chains are strained during extraordinary circumstances such as the COVID-19 pandemic, facilities may encounter shortages of gowns or gloves. Neither extended use nor re-use of gowns and gloves is recommended for mitigating shortages in the context of EBP.

To optimize PPE supply, facilities can consider substituting disposable gowns with washable cloth isolation gowns that have long sleeves with cuffs. Healthcare personnel can reduce PPE consumption by bundling multiple care activities in the same resident interaction.

In addition, facilities can identify situations where PPE overuse is occurring. For example, staff may be overusing gloves to assist or care for residents who are not on transmission-based precautions to eat, during bed making, or when transporting bagged linen or trash. Dietary staff

should be instructed to prioritize gloves for food handling but not for delivering or retrieving meal trays for residents who are not on transmission-based precautions, nor when transporting meal carts.

Lastly, when there are not enough gowns and gloves for implementation of EBP as recommended, facilities may temporarily prioritize EBP for residents with wounds over residents with indwelling medical devices alone. Risk of healthcare personnel self-contamination with *S. aureus* and MDROs is higher during care of residents with wounds, compared to residents with indwelling medical devices alone.[12,13] Facilities implementing EBP based on a resident's MDRO colonization or infection status may also prioritize EBP for novel or targeted MDROs over other MDROs.

Facilities should include procedures for PPE shortages in their emergency preparedness plan and/or facility assessment. During PPE shortages, facilities should document all actions taken to remedy the shortage.

Unresolved Questions

The presence of wounds or indwelling medical devices is readily identifiable by healthcare personnel and thus is a practical criterion for identifying nursing home residents at risk for MDROs. However, further studies are needed to address if risk scores based on functional status or other resident characteristics can more efficiently identify residents without wounds or indwelling medical devices who would benefit from EBP.

The contribution of EBP to the prevention of respiratory virus transmission is unknown. Appropriate use of gown and gloves can interrupt fomite-related transmission of some predominantly respiratory pathogens (e.g., adenovirus and possibly SARS-CoV-2),[22,23] but healthcare personnel should continue to follow PPE guidance for the care of residents with suspected or confirmed COVID-19.[24]

Other approaches to MDRO control in skilled nursing facilities may include universal decolonization strategies such as skin and nasal antisepsis.[25] At this time, there are no studies comparing the effectiveness of EBP versus a universal decolonization approach; multiple approaches may be needed for optimal MDRO control.

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Contributors

HICPAC Members

Deverick Anderson, MD, MPH, Duke University Medical Center; Hilary Babcock, MD, MPH, Washington University School of Medicine in St. Louis; Nicolas Daniels, MD, MPH, Mayo Clinic; Elaine Dekker, RN, Priscilla Chan and Mark Zuckerberg San Francisco General Hospital and Trauma Center; Mohamad Fakih, MD, MPH, Ascension; Judith Guzman-Cottrill, DO, Oregon Health and Science University; Michael Lin, MD, MPH, Rush University Medical Center; Lisa Maragakis, MD, MPH, The Johns Hopkins University School of Medicine; Michael Anne Preas, RN, University of Maryland Medical Center; JoAnne Reifsnyder, PhD, MBA, MSN, Genesis HealthCare

HICPAC Ex Officio Members

Megan Hayden, RN, MS, CNS, CIC, CPH, Center for Medicare & Medicaid Services; Jonathan Merrell, RN, BSN, MBA, Indian Health Service; Melissa Miller, MD, BSN, MS, Agency for Healthcare Research and Quality; Tara N. Palmore, MD, National Institute of Health; Judy Trawick, Health Resources and Services Administration

HICPAC Liaison Representatives

Holly Carpenter, BSN, RN, American Nurses Association; Paul Conway, American Association of Kidney Patients; Eve Cuny, MS, Organization for Safety, Asepsis, and Prevention; Karen DeKay, MSN, RN, CNOR, CIC, Association of Perioperative Registered Nurses; Kris Ehresmann, RN, MPH, Association of State and Territorial Health Officials; Ashley Fell, MPH, Council of State and Territorial Epidemiologists; Han Hinkle, PhD, MPH, National Rural Health Association; Keith Kaye, MD, MPH, Society for Healthcare Epidemiology of America; Alan Kliger, MD, American Society of Nephrology; Chris Lombardozzi, MD, America's Essential Hospitals; Lisa McGiffert, Patient Safety Action Network; Ronnell Myburgh, Rn, MBA, DNVGL Healthcare; Toju Ogunremi, BSc, MSc, Public Health Agency of Canada; Mark Russi, MD, MPH, American College of Occupational and Environmental Medicine; Sanjay Saint, MD, MPH, Society of Hospital Medicine; Robert G. Sawyer, MD, Surgical Infection Society; Benjamin Schwartz, MD, National Association of County and City Health Officials; Andrea Shane, MD, MPH, Pediatric Infectious Disease Society; Christa Shorr, DNP, MSN, Society of Critical Care Medicine; Sarah Smathers, MPH, CIC, FAPIC, Association of Professionals of Infection Control and Epidemiology, Inc.; Pamela Truscott, MSN, RN, American Health Care Association; Margaret VanAmringe, MHS, Joint Commission; Stephen Weber, MD, Infectious Diseases Society of America; Elizabeth Wick, MD, American College of Surgeons

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Long-Term Care/Post-Acute Care Workgroup Members

Deborah P. Burdsall, RN, PhD, Association for Professionals in Infection Control and Epidemiology; Erin Epson, MD, California Department of Public Health; Robin L. Jump, MD, PhD, Case Western Reserve University; Vivian Leung, MD, Connecticut Department of Public Health; Michael Y. Lin (Co-lead), MD, MPH, Rush University Medical Center; Lona Mody, MD, MSc, University of Michigan; David A. Nace, MD, MPH, University of Pittsburgh; JoAnne Reifsnyder (Co-lead), PhD, MSN, MBA, RN, Genesis HealthCare, Inc.; Mary-Claire Roghmann, MD, MS, University of Maryland; Pamela Truscott, RN, MSN, American Health Care Association/National Center for Assisted Living; Denise Winzeler, RN, BSN, LNHA, American Association of Post-Acute Care Nursing

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Michael Bell, MD; Sydnee Byrd, MPA; Koo Chung, MPH; Melissa Schaefer, MD; Kara Jacobs Slifka, MD, MPH; Nimalie Stone, MD: Division of Healthcare Quality Promotion (DHQP), Centers for Disease Control and Prevention

Declarations of Interest

None of the Workgroup members reported financial or intellectual interests related to the topics in this document.

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