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Antibiotic Resistant Organisms: Time for a Rewind

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Agenda

This session will include:

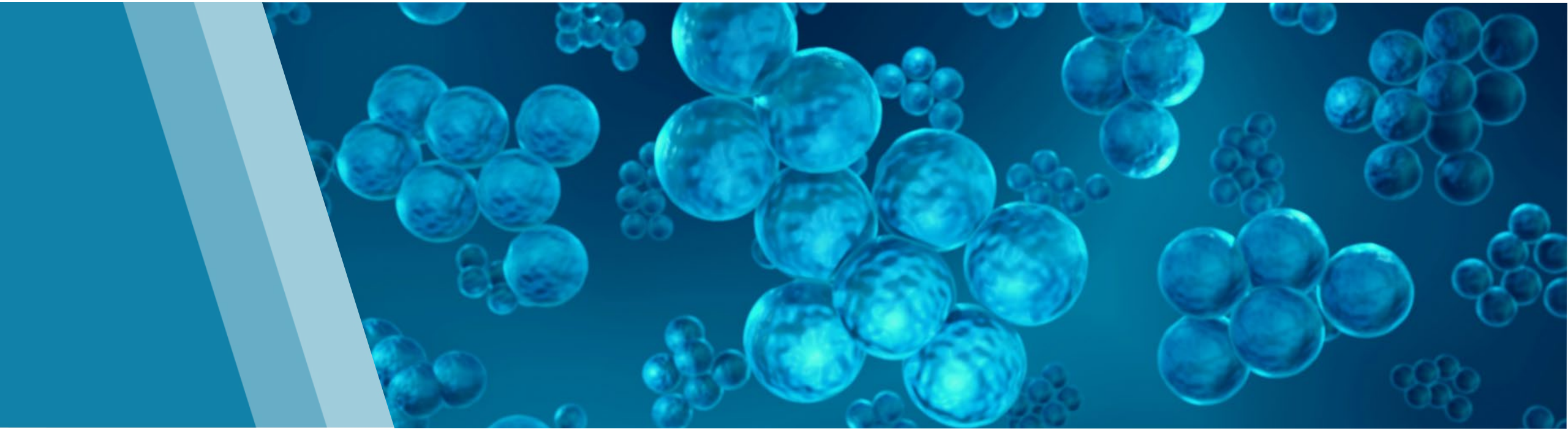
- A booster on Antibiotic Resistant Organisms (AROs) and best practices for managing patients/residents/clients with AROs
- A discussion of resources to support ARO best practices
- A question and answer period

Objectives

By the end of this session, participants will be able to:

- Understand the risk factors, screening, and case management for different antibiotic-resistant organisms (AROs)
- Be aware of the various PHO resources available for AROs
- Understand how and when to use these resources effectively
- Apply their knowledge of AROs within their own healthcare setting
- Know where to find out about implementation supports offered by PHO

AROs – A Booster



AROs

- AROs are germs that have developed resistance to the action of several antibiotics, making them difficult to treat
  - Methicillin Resistant *Staphylococcus aureus*
  - Vancomycin Resistant Enterococci
  - Extended-Spectrum Beta-Lactamase
  - Carbapenemase-producing *Enterobacteriaceae*
  - *Candida auris*
- Can cause both colonization and infection

ARO Concerns

- Lead to delays in correct treatment
- Increase length of hospitalization
- Common cause of healthcare associated infections
- Higher rates of morbidity and mortality
- Resistance is developing faster than new antibiotic discovery

Common Risk Factors for AROs

- Exposure to a healthcare setting
- Long length of stay
- Invasive medical procedures or devices
- Intense care needs
- Severity of other illness
- Use of antibiotics/antifungals
- Contact with a case
- History of ARO(s)

Methicillin Resistant *Staphylococcus aureus* (MRSA)

MRSA

- *Staphylococcus aureus* is a common bacteria that lives on the skin and mucous membranes of ~20% of healthy adults
  - Most common cause of health care associated infections
- **MRSA** is *S. aureus* that has developed resistance to antibiotics
- Most commonly spread on the hands of healthcare workers

MRSA Case Scenario (1/3)

MRSA in Long-term Care Homes (LTCHs)

- One of your residents has been transferred back to their room from a recent admission to the local hospital.
- The discharge summary from the hospital states that the resident's admission swab was positive for MRSA.
- Resident has shared the room with 1 other resident for several years.
- The resident remains asymptomatic and was not previously known to be colonized with MRSA.

MRSA Case Scenario (2/3)

What Will be Your First Step in Managing MRSA in the LTCH?

1. Initiate Contact Precautions for the resident with MRSA
2. Swab the roommate for MRSA
3. Transfer the resident to the hospital for MRSA management

MRSA Case Scenario (3/3)

How Would You Accommodate the Resident with MRSA ?

1. Move the resident to a single room
2. Move the roommate to a different room
3. Provide the resident with their own toileting facilities
4. Prohibit them from participating in group activities (like dining room)

Vancomycin Resistant Enterococci (VRE)

What is VRE?

- **Enterococci** are common gut bacteria
- **VRE** are Enterococci that have become resistant to vancomycin
- Majority of individuals who have VRE are colonized and do not show signs or symptoms of infection

Extended-Spectrum Beta-Lactamases (ESBL)

ESBL

- **Extended-Spectrum Beta-Lactamase** is an enzyme produced by bacteria that can break down commonly used antibiotics
- **ESBL-producing bacteria** most often colonize the lower GI tract
- Common ESBL-producing bacteria include:
  - *Escherichia coli (E. coli)*
  - *Klebsiella pneumoniae*
- Routine screening is determined based on local epidemiology

*If the prevalence of ESBL is high in the community (based on PHU data), there is some value in routinely screening. This can be discussed at IPAC committee meetings.

Carbapenemase-Producing *Enterobacteriaceae* (CPE)

CPE (1/2)

- ***Enterobacteriacaeae***:
  - Family of gram-negative bacteria commonly found in the gastrointestinal tract
    - Examples include *Escherichia coli (E. coli)* and *Klebsiella* spp.
- **Carbapenems**: A class of antibiotic that includes meropenem and ertapenem
- **Carbapenemase**: An enzyme capable of inactivating carbapenem antibiotics
  - Examples include NDM-1, OXA-48, KPC
- **CPE**: *Enterobacteriaceae* that have acquired transmissible resistance to carbapenems

CPE (2/2)

- Serious infections have been associated with >50% mortality
- Significant clinical and public health concern
  - Can spread rapidly in healthcare settings
- Main reservoir is colonized patients/residents/clients
- Prolonged colonization
  - 16.5% develop infections

Tischendorf J, de Avita RA, Safdar N. Risk of infection following colonization with carbapenem-resistant Enterobactericeae: a systematic review. Am J Infect Control. 2016;44(5):539-43. Available from: https://doi.org/10.1016/j.ajic.2015.12.005

CPE Case Scenario (1/2)

CPE in Acute Care

- A 68-year-old dialysis patient was admitted to the hospital with high fever, chills, and confusion.
- They had recent hospitalizations for a complicated urinary tract infection and received multiple courses of antibiotics
- Physical examination reveals signs of sepsis, including rapid heart rate and low blood pressure. There is no localized infection site.
- Blood cultures were positive for CPE, indicating a CPE bloodstream infection.

CPE Case Scenario (2/2)

What Infection Prevention and Control (IPAC) Measures Should be Implemented for a CPE Positive Patient?

1. Initiate Contact Precautions for the patient
2. Place the patient in a private room
3. Cohort with other CPE positive patients
4. Dedicate equipment or adequate cleaning and disinfection of shared equipment

Candida auris (*C. auris*)

C. auris

- Emerging fungal pathogen
- First detected in Japan in 2009
  - Canada: 43 cases between 2012 to 2023; 19 of whom were identified in the last 3 years (June 2023)
  - Ontario: 21 cases through to June 2024
  - Reported in at least 50 countries on six continents
- Common sites of colonization:
  - Skin
  - Mucosal surfaces of the gastrointestinal tract and genitourinary tract
  - Respiratory tract
  - Ear

C. auris Concerns

- May be highly resistant to antifungals typically used to treat infections caused by *Candida* spp.
  - ~ 4% pan-resistant isolates have **no** treatment options
- ~10% of colonizations will develop invasive infections
  - Mortality rate ~40%
- Can cause extended outbreaks in healthcare facilities
  - *C. auris* is able to withstand many common hospital disinfectants and remains viable on surfaces for prolonged periods of time.
- Difficult to identify in the lab

IPAC Best Practices for AROs

Screening for AROs (1/2)

- A questionnaire should be completed for all patients/residents to determine who is at risk for being colonized with AROs:
  - Prior history of colonization/infection with an ARO
  - Health care facility (HCF) exposure (admitted, or spent >12 hours) in past 12 months
  - Transfers between HCF
  - Exposure to an outbreak
  - Exposure to a known case of an ARO
  - High risk medical conditions
- Risk factors may also be identified during admission (e.g., roommate of a case)

Screening for AROs (2/2)

- Specimens should be collected for testing from those at risk
- Sites to swab:
  - MRSA: nares, perineal, skin, wounds
  - VRE, CPE and ESBL: stool preferred or rectal swab
  - *C. auris*: combined bilateral axilla and groin, nares
- A point prevalence may be indicated during outbreaks
- PHO has recently published an updated screening tool for AROs
  - Access the resource: Antibiotic Resistant Organism (ARO) Risk Factor-Based Screening Guidance for All Health Care Settings

ARO Transmission

Through contact transmission, for example:

- Hands of health care workers
- From contact with a patient/resident/client with an ARO
- After touching contaminated surfaces/equipment
- AROs can live on hands and objects in the environment

Prevention of ARO Transmission

- Routine Practices
- Additional Precautions
  - Acute care
    - Private room
    - Contact Precautions for entry into room
  - LTCH/Retirement Home/Home Care
    - Contact Precautions for direct care

Routine Practices

- Risk Assessment
  - Done prior to every interaction between a healthcare worker and a patient/resident/client
- Hand Hygiene
  - Your 4 moments
- Environmental Controls
  - Cleaning healthcare environment, cleaning equipment, etc.
- Administrative Controls
  - Policies and procedures, staff education, audits, etc.
- Personal Protective Equipment
  - Sufficient supply, easily accessible

Hand Hygiene

- Hand hygiene is one of the most effective measures to prevent the spread of infections.
- Use alcohol-based hand rub (ABHR) when hands are not visibly soiled
- Use dedicated hand washing sink to clean hands with soap and water when visibly soiled

Environmental Cleaning, Laundry and Waste

- Environmental Cleaning
  - AROs can survive on environmental surfaces easily for long periods of time
    - MRSA and ESBL require routine cleaning and disinfection only
    - VRE, CPE and *C. auris* have unique cleaning recommendations and considerations
  - Access the Resource: FAQ: Significant Organisms in Environmental Cleaning
- Laundry
  - Routine practices for handling and laundering are sufficient regardless of the source
- Waste
  - No special disposal of garbage required

Additional Precautions

- Always used in addition to Routine Practices
- Includes:
  - Accommodation – risk assessment may be required
  - Signage
  - Gloves/gown (for direct care in LTCH)
  - Dedicated equipment
  - Additional cleaning

How Can We Improve Adherence to Contact Precautions?

- Ensure staff receive comprehensive training on ARO transmission.
- Emphasize the importance of hand hygiene and proper use of Contact Precautions.
- Provide clear and accessible education to patients/residents/clients and their visitors about ARO transmission and importance of Contact Precautions.
- Use written materials, verbal instructions, and demonstrations to reinforce IPAC best practices.

Resources to Support ARO Best Practices

Foundational Resources (1/2)

MRSA, VRE, CPE and ESBL

- Antibiotic Resistant Organism (ARO) Risk Factor-based Screening Guidance for all Health Care Settings (July 2024)
- Management of a Single New Case of Candida auris (C. auris), (2024)
- Evidence Review and Revised Recommendations for the Control of Vancomycin-Resistant Enterococci in All Ontario Health Care Facilities (2019)
- Methicillin Resistant Staphylococcus aureus (MRSA) | Public Health Ontario
- Vancomycin Resistant Enterococci (VRE) | Public Health Ontario
- Carbapenemase-producing Enterobacteriaceae | Public Health Ontario

Foundational Resources (2/2)

C. auris

- PIDAC Interim Guide for Infection Prevention and Control of *Candida auris* (January 2019)
- PHO Focus On: *Candida auris* (June 2023)
- *Candida auris* | Public Health Ontario

Practical Tools (1/4)

MRSA, VRE, CPE and ESBL

- Personal Protective Equipment (PPE) Auditing | Public Health Ontario
- How to: Put On and Take Off Personal Protective Equipment (PPE) (publichealthontario.ca)
- Best Practices for Infection Prevention and Control Programs in Ontario, 3rd Edition (2012)
- Routine Practices and Additional Precautions in All Health Care Settings (2012)
- Best Practices for Environmental Cleaning for Prevention and Control of Infections in All Health Care Settings (2018)
- FAQ-Significant Organisms in Environmental Cleaning (publichealthontario.ca)
- Best Practices for Surveillance of Health Care-associated Infections: Patient and Resident Populations (2014)
- Best Practices for Hand Hygiene in All Health Care Settings, 4th edition April 2014

Practical Tools (2/4)

MRSA, VRE, CPE and ESBL

- Survey Results Released: Antimicrobial Resistance in Common Hospital Pathogens in Ontario (2022)
- Antimicrobial Resistance in Common Hospital Pathogens in Ontario: Annual Laboratory and Hospital Survey Report 2019 (publichealthontario.ca)
- IPAC Canada, AROs resources

Practical Tools (3/4)

CPE

- Management of Carbapenem-resistant Enterobacteriaceae (CRE) in All Health Care Settings: Questions and Answers (2012)
- Carbapenemase Producing Enterobacteriaceae (CPE) | Public Health Ontario
  - PHO Webinar: New Carbapenemase-Producing Enterobacteriaceae (CPE) Resources for Long-Term Care Homes (LTCHs)
  - Frequently Asked Questions: Information about CPE for Long-Term Care Homes Residents, Family and Visitors. November 2023
  - At a Glance: CPE Transmission Risk Factors in Long-Term Care Homes. November 2023
- Checklist: Resident Admission, Discharge, and Transfer Considerations for Carbapenemase-Producing Enterobacteriaceae (CPE). November 2023

Practical Tools (4/4)

C. auris

- Antibiotic Resistant Organism (ARO) Risk Factor-Based Screening Guidance for All Health Care Settings
- Management of a Single New Case of *Candida auris* (*C. auris*)

Key Highlights

- Controlling the spread of AROs in healthcare settings is essential.
  - You can identify patients/residents/clients at risk for colonization/infection with an ARO by screening for risk factors on admission.
  - When you identify AROs early on, you can reduce the negative impacts on patient/resident/client outcomes, and reduce healthcare costs

- Check out the resources discussed in this presentation that can help to support you in identifying and safely managing patients/residents/clients with AROs!

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1. Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee (PIDAC). Routine practices and additional precautions in all health care settings. 3rd ed. Toronto, ON: Queen's Printer for Ontario; 2012. Available from: https://www.publichealthontario.ca/-/media/Documents/B/2012/bp-rpap-healthcare-settings.pdf?rev=97a9a0d61f7848e3bc721a119a0f8f63&sc_lang=en

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