Your Health Connection

simcoe muskoka
DISTRICT HEALTH UNIT

Antibiotic Resistant Organisms (ARO's)
How You Can Prevent and Control the Spread

Objective

- Learn about Antibiotic Resistance
- Learn about different Antibiotic Resistant Organisms (AROs) and how they are spread
- Discuss how we can stop the spread of ARO's by using Routine Practices

simcoe muskoka
DISTRICT HEALTH UNIT

Resistance to Antibiotics

1. Miscoded genetic information: errors create mutations

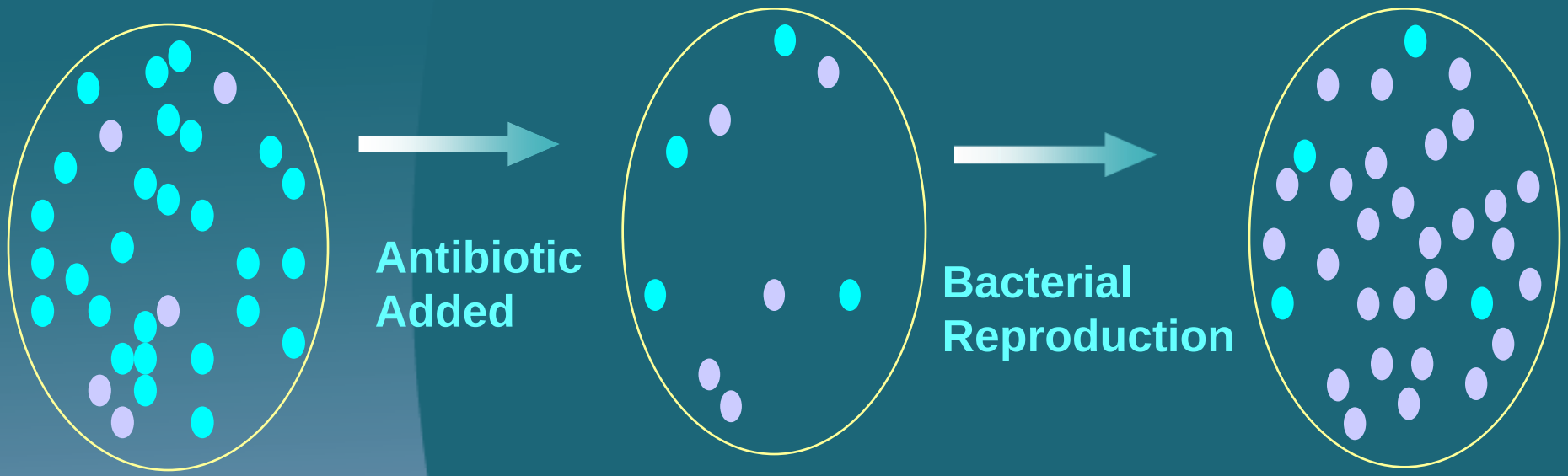
2. Natural defensive mechanism: passed down

- Transfer antibiotic resistant genes to the next bacteria via plasmid transfer (bridge between two bacteria)
- Pick up DNA released into environment from dying bacteria (same species)
- Insertion of (gene with code) into DNA

3. Antibiotic use

simcoe muskoka
DISTRICT HEALTH UNIT

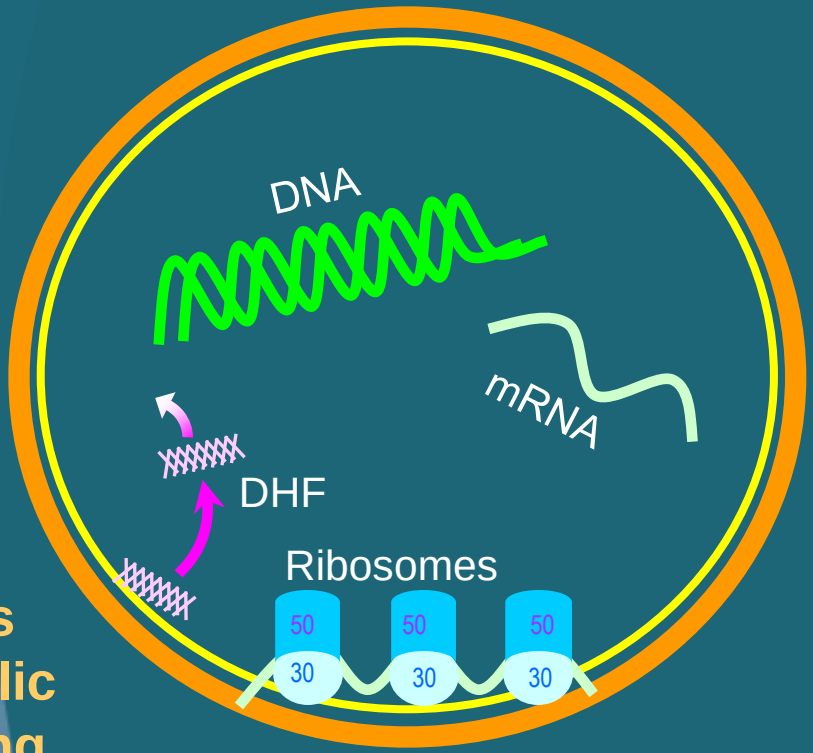
Creating Resistance



simcoe muskoka
DISTRICT HEALTH UNIT

Resistance to Antibiotics

① The antibiotic is inactivated before reaching the cell



② Cell becomes impermeable so the target cannot be reached

③ The cell acquires the ability to pump back out the antibiotic

④ The target is altered, no longer recognizable by the antibiotic

⑤ The cell acquires alternative metabolic pathway, by-passing the antibiotic's site of action

simcoe muskoka
DISTRICT HEALTH UNIT

Some Definitions

Colonization

- Bacteria is in or on our body without causing injury to tissue or cells.

Infection

- Bacteria entry and multiply in the body and cause infections.

Decolonization

- Use of antimicrobial ointments/body wash and oral antibiotics to remove colonization of resistant bacteria.

Who should be decolonized?

- During outbreaks with the same strain that has caused the outbreak
- Staff who are linked and colonized with an outbreak strain.
- PIDAC: Routine decolonization is not currently recommended

simcoe muskoka
DISTRICT HEALTH UNIT

Resistant Staphylococcus aureus (MRSA)

- 60 % of us are colonized with Staphylococcus aureus (NOSE, SKIN)
- Infections of skin (iGAS), and lungs (pneumonia)
- Some Staph carry resistance to Beta-lactum classes: Penicillin and Cephalosporin's
- Spread via colonized hands of people who come in direct contact with infected patients or contaminated equipment/surfaces
- Hand hygiene and environmental surface cleaning

simcoe muskoka
DISTRICT HEALTH UNIT

Resistant Enterococci (VRE)

- Enterococcus faecium or Enterococcus faecalis
- Naturally live in the gastrointestinal track
- Resistant to Vancomycin
- Infections of wounds, ulcers and medical devices
- Spread via colonized hands of people from colonized or infected patients or after handling equipment
- Hand hygiene and environmental cleaning

simcoe muskoka
DISTRICT HEALTH UNIT

Extended-Spectrum Beta Lactamase (ESBL)

- Enterobacteriaceae Escherichia coli (E.coli) and Klebsiella pneumoniae
- Found in the gastrointestinal tract
- Causes infections in the urinary tract (UTI) and blood (bacteraemia)
- Produce enzymes (beta-lactamase) that break down the antibiotic (i.e. penicillin, cephalosporin, carbapenem)
- Spread via hands
- Hand hygiene

simcoe muskoka
DISTRICT HEALTH UNIT

Carbapenemase-producing Enterobacteriaceae (CPE)

- Escherichia coli (E.coli) and Klebsiella pneumoniae
- Found in the lower gastrointestinal tract
- Produce carbapenemase enzymes hydrolyzing the antibiotic. (also all first, second and third generation penicillin's)
- Spread via direct and indirect contact
- Hand hygiene

simcoe muskoka
DISTRICT HEALTH UNIT

Clostridium difficile (CDI)

- Ingestion of C. difficile spores
- In the environment and colonizes up to 3-5% of adults without causing symptoms.
- Risk = loss of normal flora (antibiotics, GI surgery, proton pumps, drugs that suppress the anti toxin antibody)
- Spores become living bacteria and toxins are released that damage colon and cause watery diarrhea.
- Appropriate and adequate treatment - reoccurrence will occur.
- Hand hygiene after glove use and environmental cleaning using a sporicidal disinfectant

simcoe muskoka
DISTRICT HEALTH UNIT

Who is at Risk of getting ARO's

- Residents of LTC facilities
- Clients with a history of long/frequent hospital stays
- Babies admitted to the nursery from other hospitals will be screened for MRSA, VRE and Serratia.
- Patients previously identified as positive for ARO's or exposed from previous admissions are flagged electronically.
- Health Care Workers
- Prior use of antibiotics
- People with existing surgical wounds, or devices

simcoe muskoka
DISTRICT HEALTH UNIT

Routine Practices and Additional Precautions for ARO's

Hand Washing

Hand hygiene to be conducted:

- Before entering a patient's environment and after (ground, vehicle, house, back of ambulance)
- Before direct contact with the patient and after (skin, fluids, devices)
- before and after glove/PPE
- ✓ Have ABHR at Point of Care

PPE

- Gloves and gowns at Point of Care-symptomatic
- Taken off when care is complete, immediately discard and hand hygene conducted

Laundry

- Regular wash/dry cycles are sufficient to destroy ARO's
- Soiled linens must be bagged wearing gloves

simcoe muskoka
DISTRICT HEALTH UNIT

Routine Practices and Additional Precautions

Equipment

- Disposable items/dedicated equipment
- Response bags cleaned/disinfected after each use or sent to laundry if heavily soiled or contaminated with blood/body fluids
- CLEAN items with soap and water and then DISINFECTED with an approved disinfectant. (Pressure cuffs, Stethoscopes, stretchers, mattress and belts, clip boards)

Environment

- All high touched and horizontal surfaces: routine cleaning with a board spectrum bactericide (follow contact time)
- Handle garbage as per routine – use gloves
- For CDI and norovirus the back of the vehicle is cleaned twice
- VRE no double dipping of cloth
- Ensure a “cleaning” checklist is used to adequately clean and disinfect the vehicle after each and every client transport
- All items (cloths, mops) laundered or discarded

simcoe muskoka
DISTRICT HEALTH UNIT

Citations

- Public Health Agency of Canada Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare Settings 2012
- Ontario Public Health PIDAC Annex A: Screening, Testing and Surveillance for Antibiotic-Resistant Organisms (AROs) In all Health Care Settings 2013
- Ontario Public Health PIDAC Best Practices for Environmental Cleaning For Prevention and Control of In all Health Care Settings 2012
- Public Health Agency of Canada (March 2001). Material Safety Data Sheet – Infectious Diseases: *Staphylococcus aureus*. Retrieved on 2007-05-23 from the world wide web at: http://www.phac-aspc.gc.ca/msds-ftss/msds143e.html
- Madigan, M.T.; Martinko, J.M. & Parker, J. (2003) Brock Biology of Microorganisms, (10th ed). New Jersey: Pearson Education, Inc.
- Alcamo, I.E. (2001) Fundamentals of Microbiology, (6th ed). London: Jones & Bartlett Publishers International.
- Jensen, M.M.; Wright, D.N. & Robison, R.A. (1997) Microbiology for the Health Sciences, (4th ed). New Jersey: Prentice Hall.
- Mims, D.; Dockrell, H.M.; Goering, R.V.; Roitt, I.; Wakelin, D. & Zuckerman, M. (2004) Medical Microbiology, (3rd ed). Edinburgh: Mosby.
- Alberts, B; Johnson, A.; Lewis, J; Raff, M.; Roberts, K. & Walter, P. (2002) Molecular Biology of the Cell, (4th ed). London: Taylor & Francis Group. p. 1261.

simcoe muskoka
DISTRICT HEALTH UNIT

Public Health Ontario

- Crown corporation dedicated to protecting and promoting the health of all Ontarians and reducing inequities in health

- They provide expert scientific and technical advice and support relating to:

  infectious diseases, infection prevention and control, surveillance and epidemiology, health promotion, chronic disease and injury prevention as well as environmental and occupational health, emergency preparedness and incident response

- They operate the public health labs

- Main clients are local public health units, government and health care providers and institutions.

simcoe muskoka
DISTRICT HEALTH UNIT

Public Health Ontario

- http://www.publichealthontario.ca

Important Topics

- Hand Hygiene: Just clean your hands program
- PIDAC: Best Practice Documents
- Regional Infection Control Networks – Located in Orillia
- IPAC Core Competencies Online Learning Course
- Ontario Health Profiles –using data to describe the health status of Ontarians

simcoe muskoka
DISTRICT HEALTH UNIT