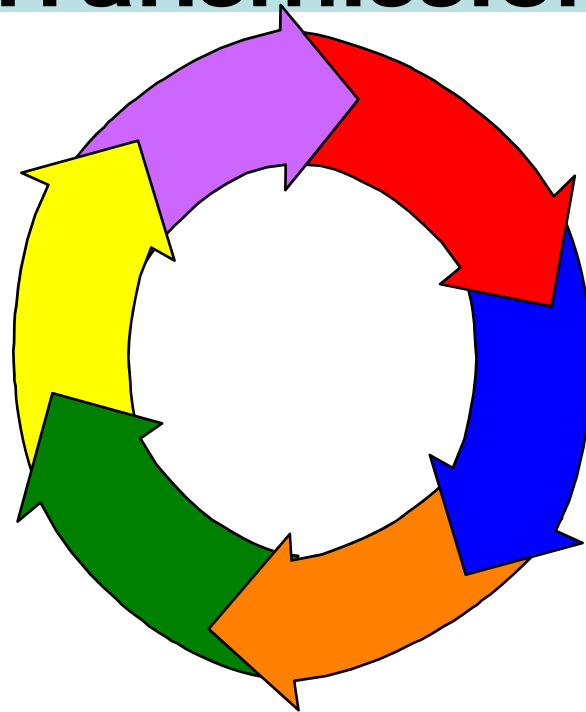


# Targeted Infection Prevention Program Study: The Infectious Disease Process & Chain of Cross Transmission



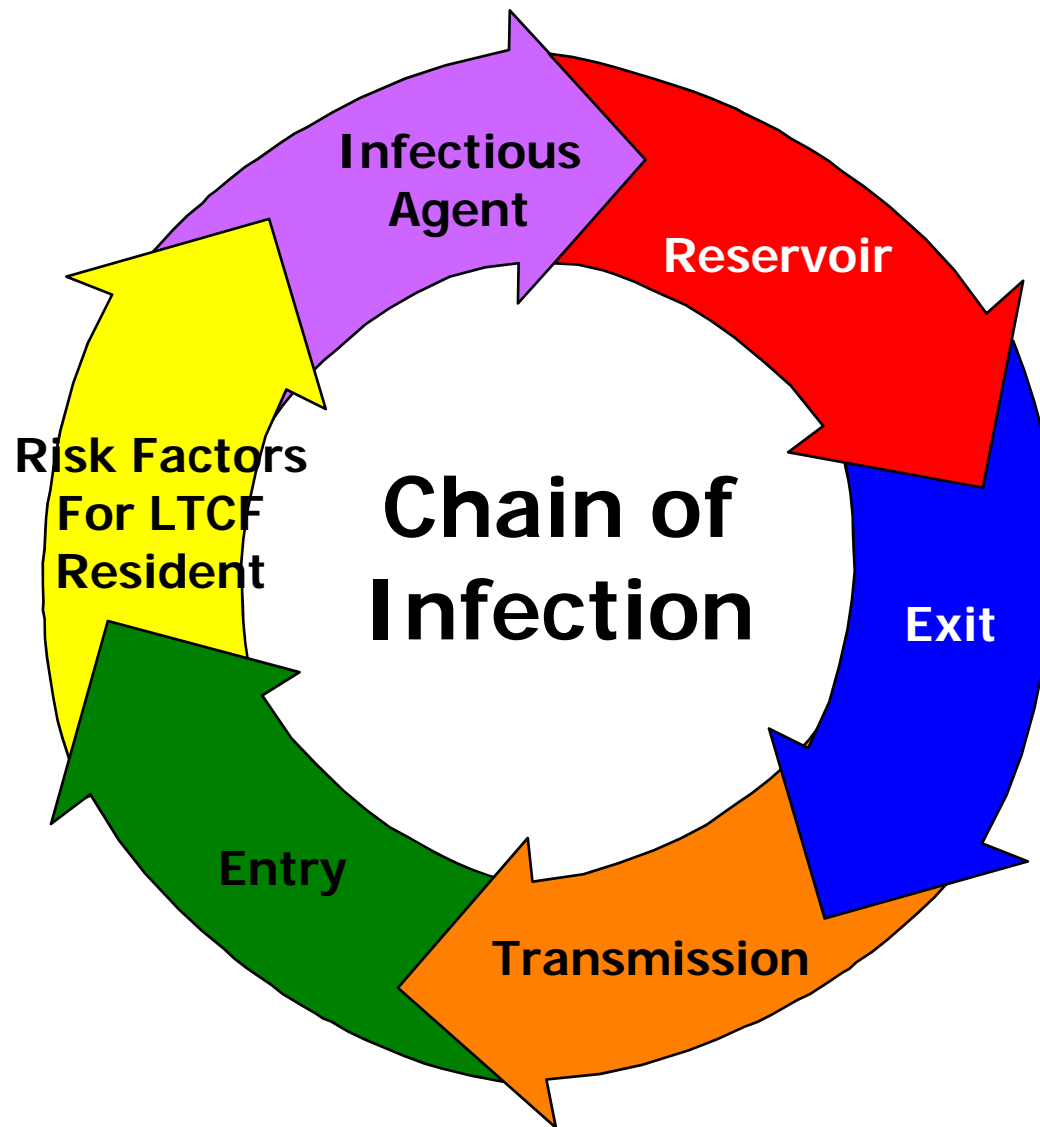
## Module # 2

Ruth Anne Rye, RN, BS, CIC;

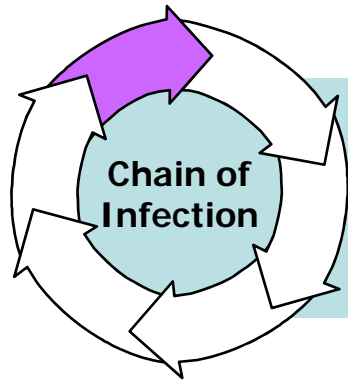
Russ Olmsted, MPH, CIC

The Infectious  
Disease Model  
On Cross  
Transmission  
Of Microbes  
[Germs]  
Or...

How  
Microbes  
Move  
around



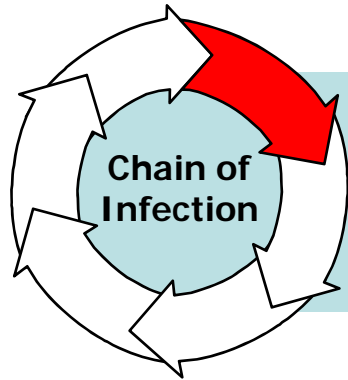
LTCF = long term care facility



# Infectious Agent or Microbe

- **Exogenous flora:**  
from outside the body
  - Example: bacteria = methicillin-resistant Staph. aureus [MRSA] is carried to the resident via hands of healthcare worker (HCW)
- **Endogenous flora:**  
from inside or on the body

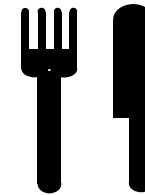
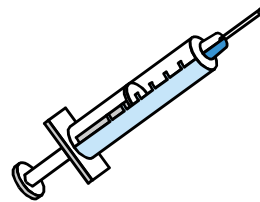
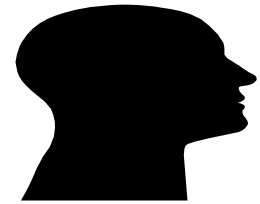
- **Bacteria**
  - Bacilli
  - Cocci
  - Spirochetes
- **Virus**
- **Fungi**
- Rickettsia
- Protozoa



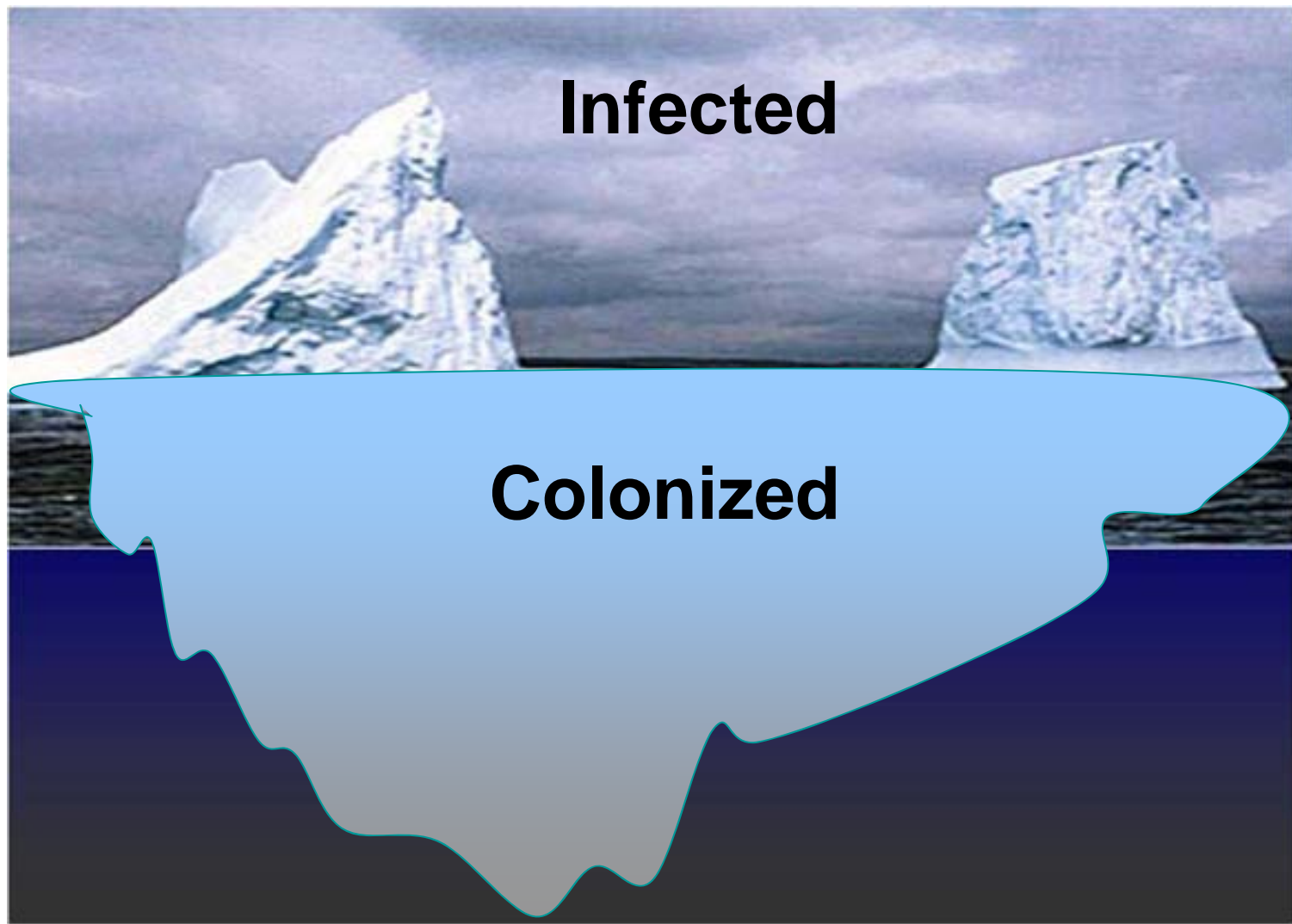
# Reservoir

→ **Place where microbe (germ) grows and reproduces**

- **Humans:** Resident's own microbial flora – transient (temporary) or resident (more permanent)  
other sources = healthcare workers, family, visitors
- **Animals;** pet therapy program
- **Environment:** (food, beverages, soil, healthcare equipment)
  - Contaminated
  - Handling
  - Storage



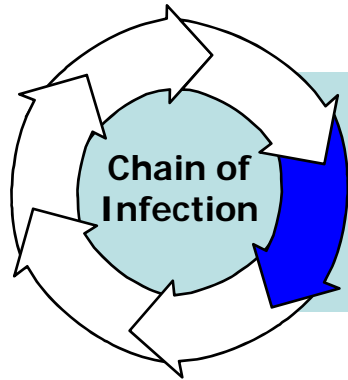
# The Iceberg Effect: Much larger proportion of microbes are present but not causing infection



# Colonized or Infected: What is the Difference?

- **Colonization**: bacteria is present without evidence of infection (e.g. fever, increased white blood cell count)
- **Infection**: active process where the bacteria is causing damage to cells or tissue;
  - example purulent drainage from an open wound on the resident's skin.
  - UTI: resident has new fever and complains of burning pain when urinating plus frequency and urgency
- If an infection develops, it is usually from bacteria that colonize patients, e.g. their endogenous microbial flora, but can also exogenous source, e.g. transmitted by hands of HCW

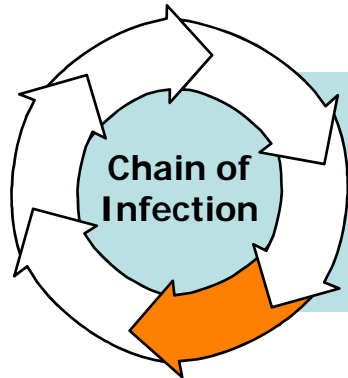
**~ Bacteria can be transmitted even if the resident does not have active infection ~**



# Mode of Exit

## → **Microbe** leaves the Reservoir

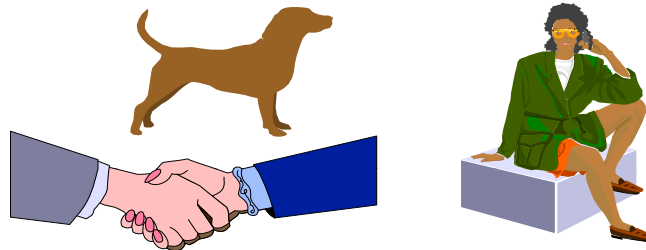
- Respiratory tract
  - Cough, sneeze, talking
- Gastrointestinal tract
  - vomitus, feces
- Skin, mucous membranes
- Genitourinary tract
  - Urine, semen, vaginal secretions
- Blood: from a cut through the skin or contaminated needle
- Artificial openings, e.g. tracheostomy or feeding tube inserted through the skin



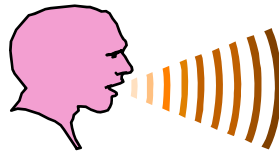
# Mode of Transmission

- Contact

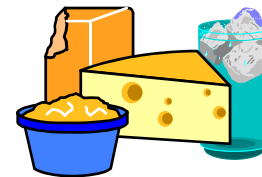
- Direct
- Indirect



- Droplet



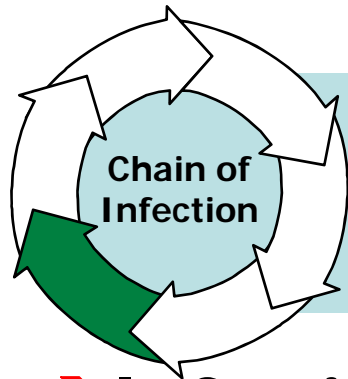
- Airborne



- Other sources of infection

- Example: food-borne from contaminated food



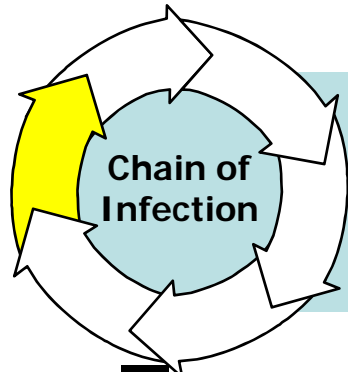


# Mode of Entry

➔ **Infectious agent enters the new host (resident or patient)**

- Respiratory tract
  - Breathing contaminated air droplets
- Gastrointestinal tract
  - Eating, drinking, hand-to-mouth (fecal-oral route)
- Skin, mucous membranes
  - Non-intact skin
  - Hand-to-eye and nose
- Genitourinary tract
  - Urinary catheter is present; bacteria move up catheter into the bladder
- Blood
  - Contaminated lancet used for blood glucose





# Resident Risk Factors : Increase risk for infection

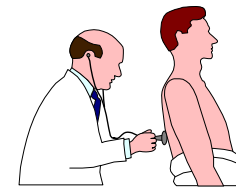
■ **Functionally dependent:** resident needs lots of help with activities of daily living



■ **Immune system,** e.g. does not work as well as one gets older

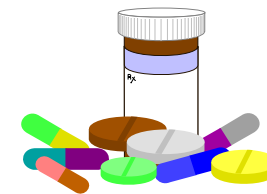
■ **Barrier** compromised,

- fragile skin: tear, burn injury, chronic wound
- Device use: indwelling urinary catheter (Foley); feeding tube

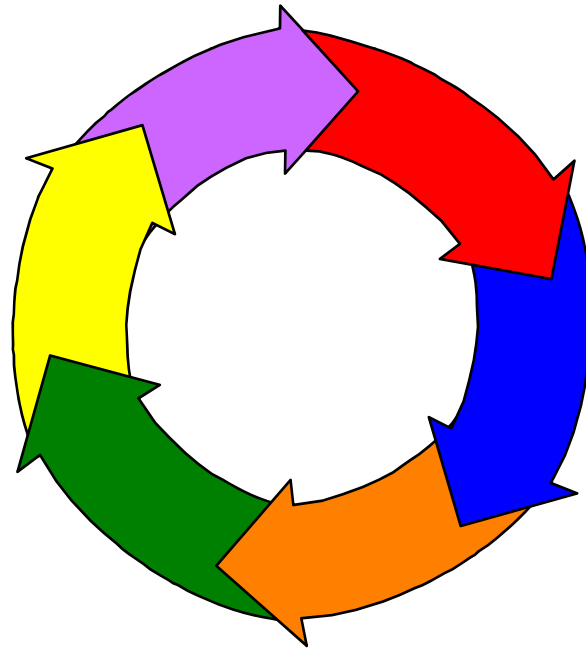


■ **Additional factors:**

- Admission to acute care hospital
- Antibiotic use



# Breaking the Chain

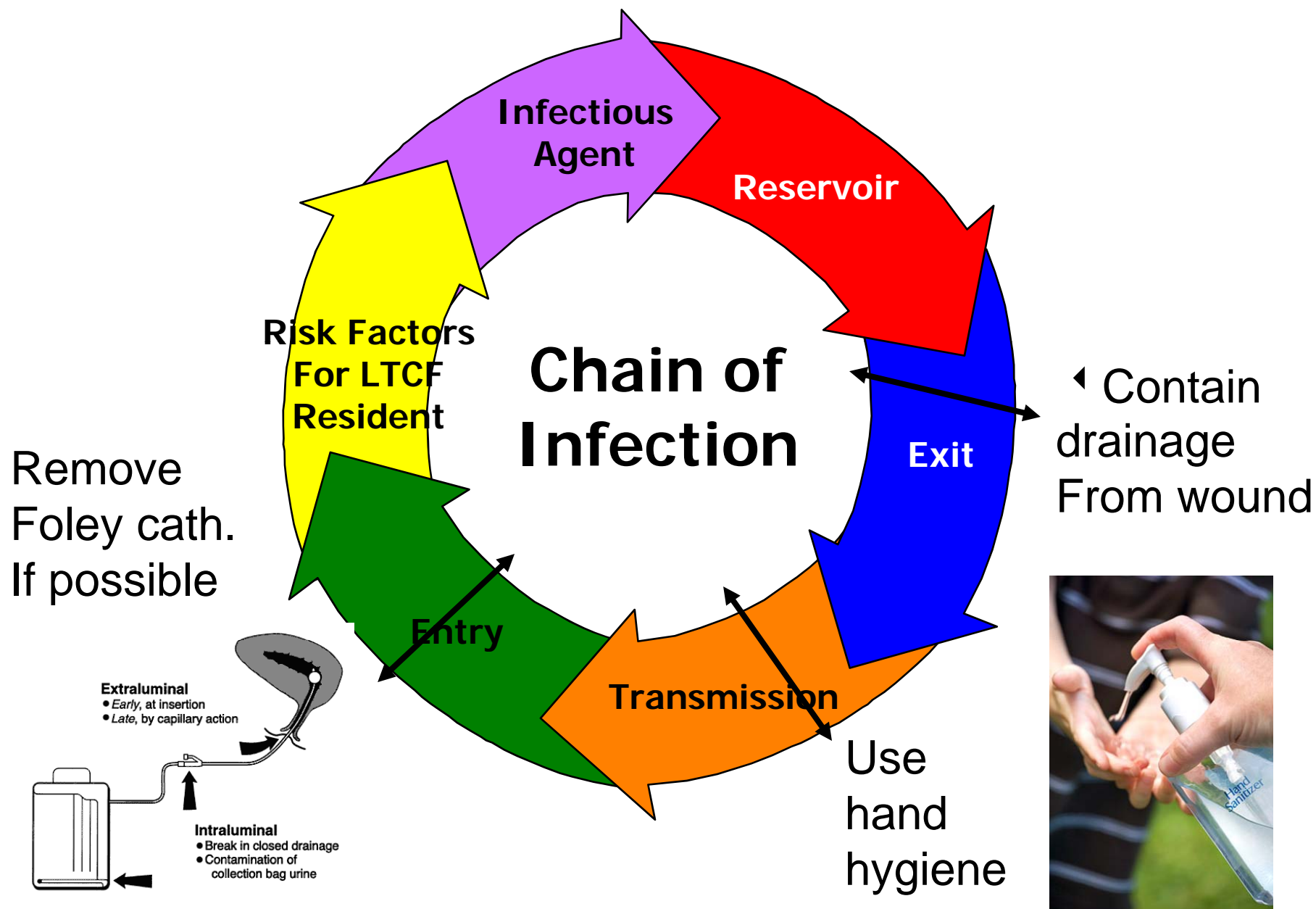


Preventing Cross Transmission & Infection

# Example: A Completed Chain of Cross Transmission & Infection

- Infectious agent – methicillin-resistant Staphylococcus aureus (MRSA)
- Reservoir - skin
- Exit – open, draining wound on Resident A
- Transmission – HCW picks up MRSA on hands & does not use hand hygiene before contact with Resident B
- Entry – HCW contaminates indwelling urinary catheter tubing during manipulation of catheter... MRSA ascends to meatus and then into the bladder
- Resident risk factor: indwelling urinary catheter
- Infection: UTI develops in Resident B

Chain is complete – how can we break this chain?



# **Coming Attractions: Standard Precautions & Hand Hygiene Next Module**

**Any Questions?**