Portal of Entry - The Missing Link?
Jim Gauthier, MLT, CIC, Providence Continuing Care Centre
A Webber Training Teleclass

Objectives
• Have some fun
• Look at the Chain of Transmission / Infection
• Discuss where we are failing
• Focus on a possible solution

What Are We Seeing?
• Increased rates of Methicillin Resistant Staphylococcus aureus (MRSA) in most areas
• Increased transmission of Vancomycin Resistant Enterococci (VRE)
• Increased transmission of Clostridium difficile (CDAD)
• Other antibiotic resistant organisms (ARO)

Where Do We Spend Our Time?
• Focus on
  – Reservoir
  – Mode of Transmission

Reservoir
• Patient Screening
  – Effective in many cases as patients are isolated if positive
  – Some hospitals do not screen with good success (Edmond, 2008)
• Isolation
  – Successful in many papers for some organisms
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<table>
<thead>
<tr>
<th>Reservoir</th>
<th>Admission Screening</th>
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| • Admission Screening  
  – Many American states are passing laws to do admission screening on all patients  
  – Targeted screening such as patients who have been in another healthcare facility in the previous 12 months (MOHLTC – Ontario)  
  – ?Isolate until screening is done? | • MRSA  
  – Nares, perianal or groin, wounds, exit sites  
• VRE  
  – Stool or rectal swab  
• CDAD  
  – No screening readily available  
• Other ARO’s  
  – Problems with culture media or standardization, what to look for? |

<table>
<thead>
<tr>
<th>Admission Screening Problems</th>
<th>Reservoir Problems</th>
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</table>
| • Cost  
  – PCR can be pricey but quick - $75  
• Turn Around Time (TAT)  
  – PCR is quick – same day  
  – Some culture techniques can take up to 5 or 7 days if mixed culture  
• Snap shot of that day, that site | • Unrecognized reservoirs could exist or develop  
  – Carbapenem resistant Enterobacteriaceae (Liedo 2009)  
  – Pan-resistant *Acinetobacter baumannii* (Furuno 2008)  
  – *Pseudomonas aeruginosa*  
• Family, visitors, and staff could be reservoirs |

<table>
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<tr>
<th>Contact Precautions</th>
<th>CONTACT PRECAUTIONS</th>
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| • Jim has problems with this! | • WE JUST FOUND OUT THAT THIS PATIENT HAS A BUG THAT COULD BE CARRIED TO THE NEXT PATIENT.  
• NOW WE **REALLY** MEAN YOU HAVE TO PERFORM HAND HYGIENE AND TRY NOT TO SOIL YOUR UNIFORM!  
• WE ARE NOT SURE ABOUT THE GUY NEXT DOOR, YET, SO DO WHATEVER YOU WANT! |

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Environment Reservoir Problems

- 87 surfaces cultured outside of patient rooms for CDAD
  - 20 (23%) were contaminated,
  - 9 of 29 (31%) in physician work areas,
  - 1 of 10 (10%) in nurse work areas,
  - 9 of 43 (21%) portable pieces of equipment,
    - pulse oximetry finger probe,
    - medication carts
    - bar code scanners on medication carts
  (Dumford 2008)

Mode of Transmission – Contact

- Hand hygiene
  - Alcohol hand rub
  - Soap and water
    - Variety of agents
- Equipment cleaning
  - Single patient use
  - Fomites such as toilets, tubs, etc.

Mode of Transmission – Droplet

- Febrile Respiratory Illness (PIDAC 2008)
  - Staff to use mask and eye protection
    - ANY coughing patient
    - Suctioning, CPAP, BiPAP
    - Chest Physio

Mode of Transmission - Contact

- Hand Hygiene focus
  - Education of Health Care Worker (Capretti 2008)
  - Patient empowerment (Julian 2008, McGuckin 2004)
    - Many patients are uncomfortable asking!

Mode of Transmission - Airborne

- Use of N95 Respirator or Powered Air Purifying Respirator (PAPR)
- Use of engineering controls
  - Negative pressure rooms
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**Infectious Agent**

- Bacteria
- Fungi
- Viruses
- Parasites
- Prions

**Susceptible Host**

- Age
- Immunosuppression
- Diabetes
- Burns
- Surgery
- Lines
- Immunizations

**Portal of Exit**

- Body Fluids (Blood, etc.)
- Skin
- Feces
- Mucous Membranes

  - Standard Precautions
  - Routine Practices

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This patient has:

- Skin!
- Feces!
- Mucous Membranes!

PERFORM HAND HYGIENE AFTER CONTACT WITH THIS PATIENT OR THEIR ENVIRONMENT!

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WARNING!!

Portal of Entry

• How do our bugs get into / onto our patients?
  – Equipment? (Barbolla 2008)

Portal of Entry - MRSA

• Common colonization site of nares
• HOW?
• Healthcare workers and noses?
• Patient and Nose?

Portal of Entry - MRSA

• Skin
  – Broken skin – opportunistic with own organism
    • Decolonization and SSI rates (Hacek 2008)
  – Perineum / perianal – GI tract?
    • Tubs
    • Linen
    • Patient hands

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Portal of Entry - VRE
- Two entrances
  - Rectal or oral
- Rectal
  - Scopes
  - tubs
  - fingers
  - gloves

Portal of Entry - VRE
- Oral
  - See Physics of Flying Feces
    - November 9, 2006
- Is it us?

Portal of Entry – CDAD
- Same as previous slides
  - Oral, rectal
  - Possible food based (Rodriguez-Palacios 2007)
    • Might explain some of the community related illness

Portal of Entry – CDAD
- Proton Pump Inhibitors
  - Possible problem
  - Conclusion: Clean patient’s hands! (Metz 2008)
- Rates lower with hand hygiene program for both staff and patients (Drudy 2007)

Portal of Entry – Our Patients
  • Could hospital patients’ hands constitute a missing link?
    - J Hosp Infect 2005;61:183–188

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Our Patients
They note:
• Not a lot of studies that look at patient hands
• Studies did find potentially pathogenic bacteria on patient’s hands
• Outbreak strains present
• Bed-ridden patients have higher numbers

Our Patients
• Lack of hand washing facilities
• Point of care issue
  – looking after yourself

Our Patients
• Our homes have organisms (Scott, 2008)
• Patient hand hygiene can lower risk of Group A Streptococci in long term care (Jordan 2007)
• Patients will buy in (Tomic 2008)
• Lowers risk of influenza transmission in homes (Cowling 2008)
• Must be part of program in LTC (Smith 2008)

Our Patients
• Alcohol hand rub on bedside table?
• Mandatory hand hygiene before meals
• Mandatory hand hygiene after use of bedpan or commode
• Mandatory hand hygiene before and after pet visitation (Lefebvre 2006)

Our Patients
• Use of volunteers?
• Family reminders?

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Our Patients

- Frequency of cleaning / disinfection?
- Frequency of linen changes?

Bad Press

- Hospitals bad places to be
- Hospitals dirty places
- Morbidity and mortality

Suggestions

- Clean your own hands thoroughly before eating.
- Do not touch your hands to your lips.
- Do not place your food or utensils on any surface except your plate.
- Ask family to bring wipes containing bleach to clean the items around your bed.
- When you leave the hospital, assume any belongings you bring home are contaminated.
  - McCaughey 2008

Suggestions

- Do not mix clothes from the hospital with the family wash; wash with bleach. Regular laundry detergents do not kill C. diff.
- If you are visiting someone in the hospital, be careful about eating in the cafeteria or a restaurant where the staff go in their scrubs or uniforms. These uniforms could be covered in invisible superbugs.
  – More than 20 percent of nurses’ uniforms had C. diff on them at the end of a workday, according to one study.

Summary

- We need more emphasis on patient hand hygiene
- Percent of patients who can’t perform hand hygiene?
- Staff reminders are plentiful…what about our patients?

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Figure 2: Breaking the Chain of Transmission
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Super Patient Hand Hygiener

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References

• Liedo W, et al. Guidance for control of infections with carbapenem-resistant or carbapenemase-producing Enterobacteriaceae in acute care facilities. MMWR;58(10):256-260

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- Tomic V, Ursic V, Semc K. Has the time come to recommend the use of alcohol-based hand rub to hospitalized patients? Infect Control Hosp Epidemiol 2008; 29:987-989

The Next Few Teleclasses

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<th>Speaker</th>
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<td>The Pregnant Health-Care Worker and Infection Risk</td>
<td>Prof. Sotiri Tsiodras, University of Athens Medical School</td>
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<tr>
<td>24 Jun 09</td>
<td>(South Pacific Teleclass) Tea Tree Oil and Staphylococcal Sepsis</td>
<td>Prof. Tom Riley, University of Western Australia</td>
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<td>16 Jul 09</td>
<td>(Free Teleclass) ProMED and the Use of Informal Information Sources for Emerging Disease Surveillance</td>
<td>Dr. Larry Madoff, ProMED Editor, Harvard Medical School</td>
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<td>(Free British Teleclass) Fitness for Purpose in Infection Control</td>
<td>Martin Kieran, Southport and Ormskirk NHS Trust View</td>
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<td>06 Aug 09</td>
<td>(Free Teleclass) How Professional Associations Can Best Contribute to Infection Prevention Globally</td>
<td>Dr. Cathryn Murphy, Bond University</td>
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<tr>
<td>13 Aug 09</td>
<td>(Free Teleclass) Safe Childbirth: What Can Infection Prevention Contribute?</td>
<td>Patricia Lynch, Chair, IFIC Safe Childbirth Special Interest Group</td>
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