

# Vanquishing VRE – Confronting a Mighty Microbe

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# Objectives

- Look at this bug
- Look at the mode of transmission
- Discuss issues around the mode
- Tie in the cleaning and disinfecting aspect of the day!

# Enterococci

- Gram positive cocci, predominately found in the gut
- Not very pathogenic, perhaps 3<sup>rd</sup> leading cause of urinary tract infections
- Can make up half the flora of feces

# Vancomycin

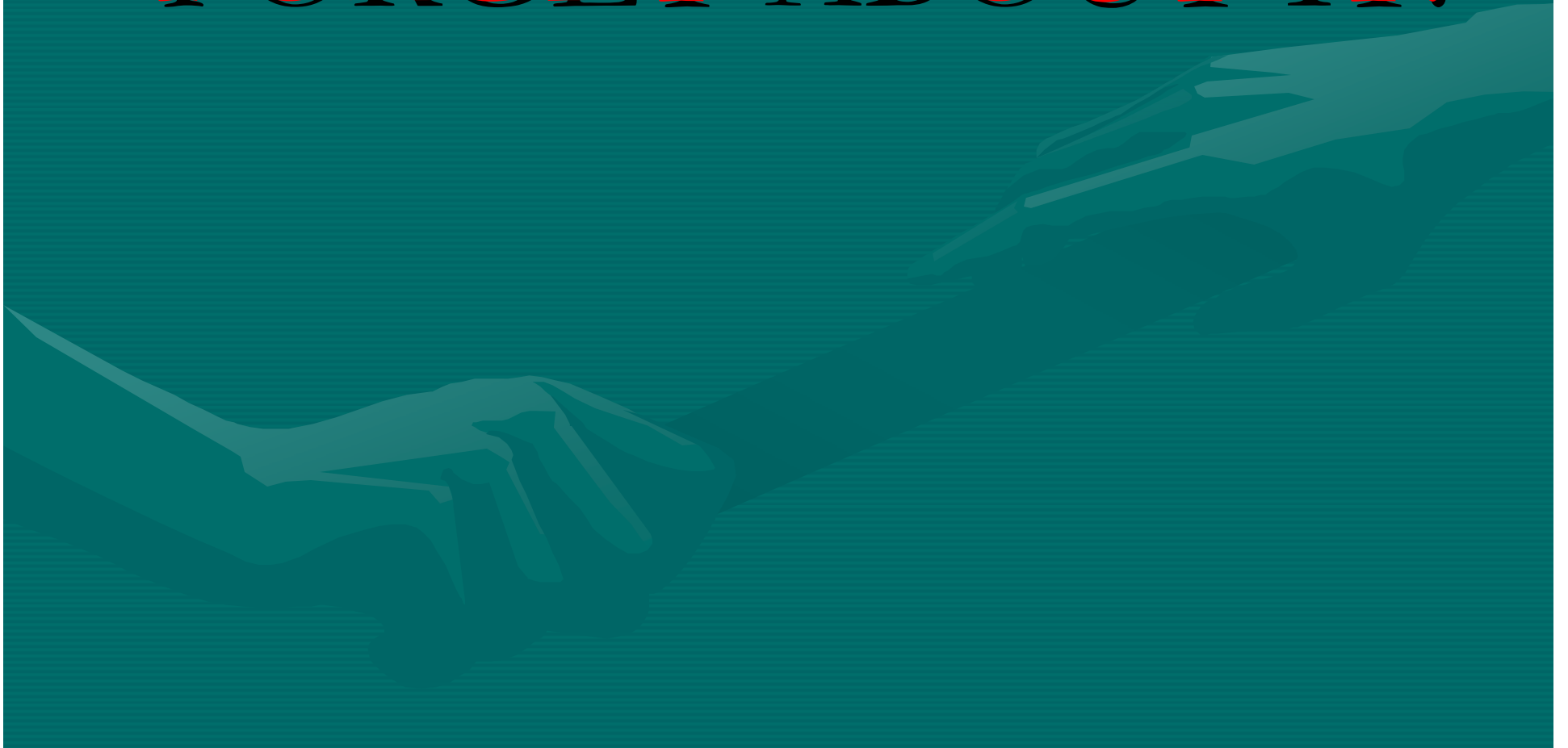
- Good antibiotic against Gram positive cocci
- Very expensive
- Used way too much for *Clostridium difficile*
- Used for febrile neutropenics

# Vancomycin Resistant Enterococci

- a.k.a VRE
- Colonizes 98% of patients
- Can cause urinary tract infections, wound infections, sepsis
- Reasonably hardy in the environment
  - 5 to 7 days no problem
- Susceptible to hospital-grade disinfectants

Now...

- **FORGET ABOUT IT!**



# Basics

- We are buggy people
- Bacteria
  - What can I say?
  - Can you pronounce “Ubiquitous”?
  - Do you understand “everywhere”?



# Jim's New Routine Practice Sign

You saw it here first...

# **WARNING!!**

**This patient has:**

- Skin!**
- Feces!**
- Mucous Membranes!**

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

# Susceptible Host

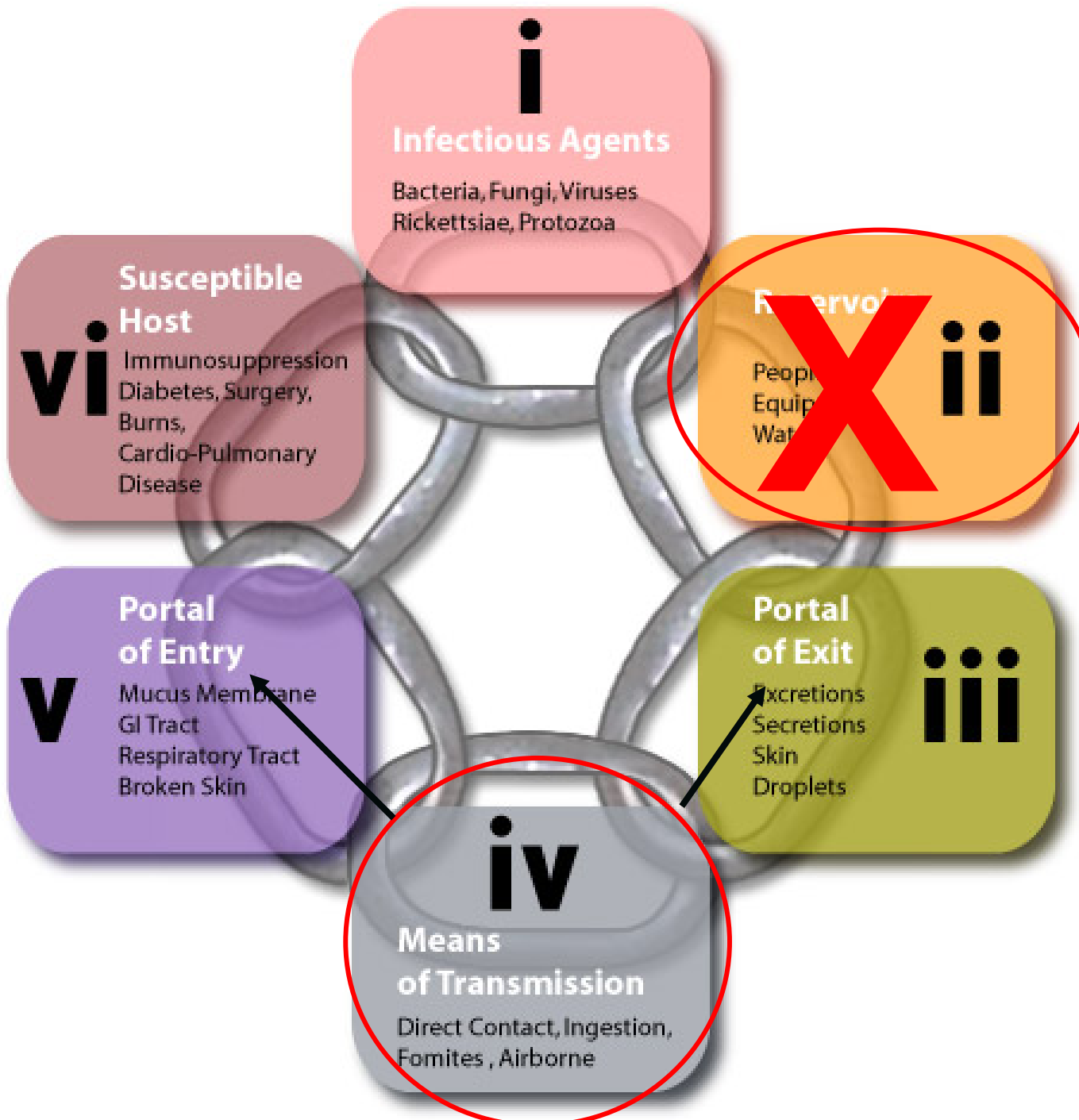
- Age
- Portals of Entry
- Immunization



# Mode of Transmission

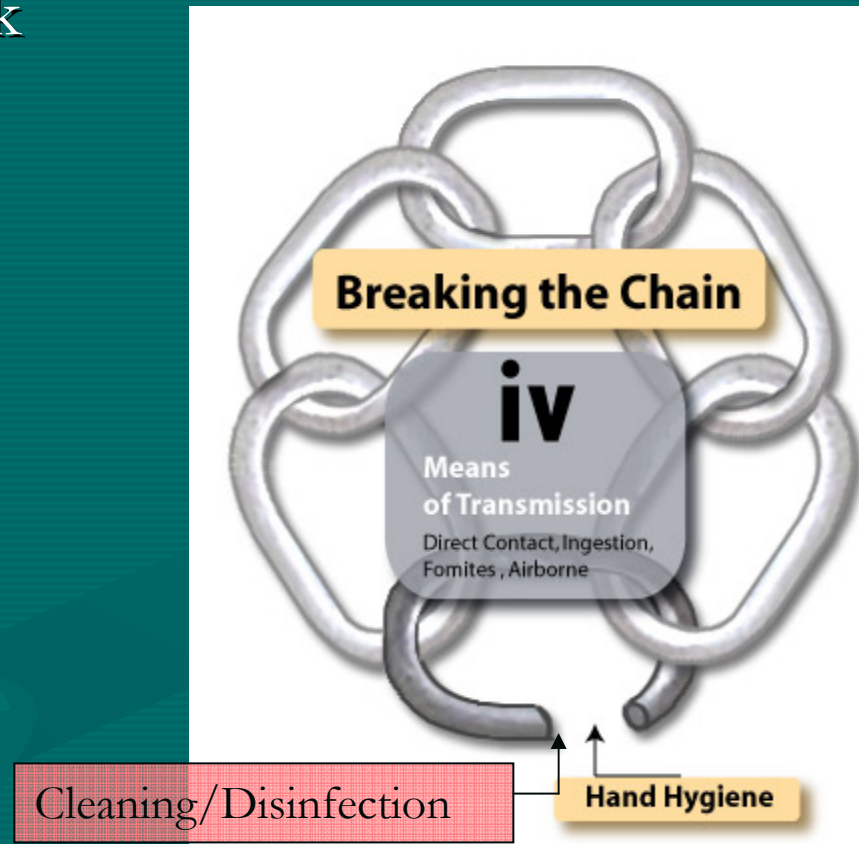
- Must be able to move the bug from a reservoir through a portal of exit to a portal of entry into a susceptible host (whew!)





# Mode of Transmission

- Always think of this link



# Feces\*

- fe<sup>ks</sup> ces   fi siz/ [fee-seez]
- –noun (used with a plural verb )
  - 1. Waste matter discharged from the intestines through the anus; excrement.
  - 2. Also, especially British, faeces.
    - Origin 1425-75; late middle English from Latin faecēs – grounds, dregs, sediment

\*[www.dictionary.com](http://www.dictionary.com)

- Dictionary.com unabridged V1.0.1

# Some Stuff You Don't Really Want to Know!

- The average person passes 100 – 250 gm of feces per day
- Defecation may occur from once every two or three days to several times per day



Wikipedia.org

# More Stuff!

- 70-75% of what we pass per rectum is water
- 30% of solid remaining is bacteria ( $1 \times 10^{12}$  per gram, dry weight)

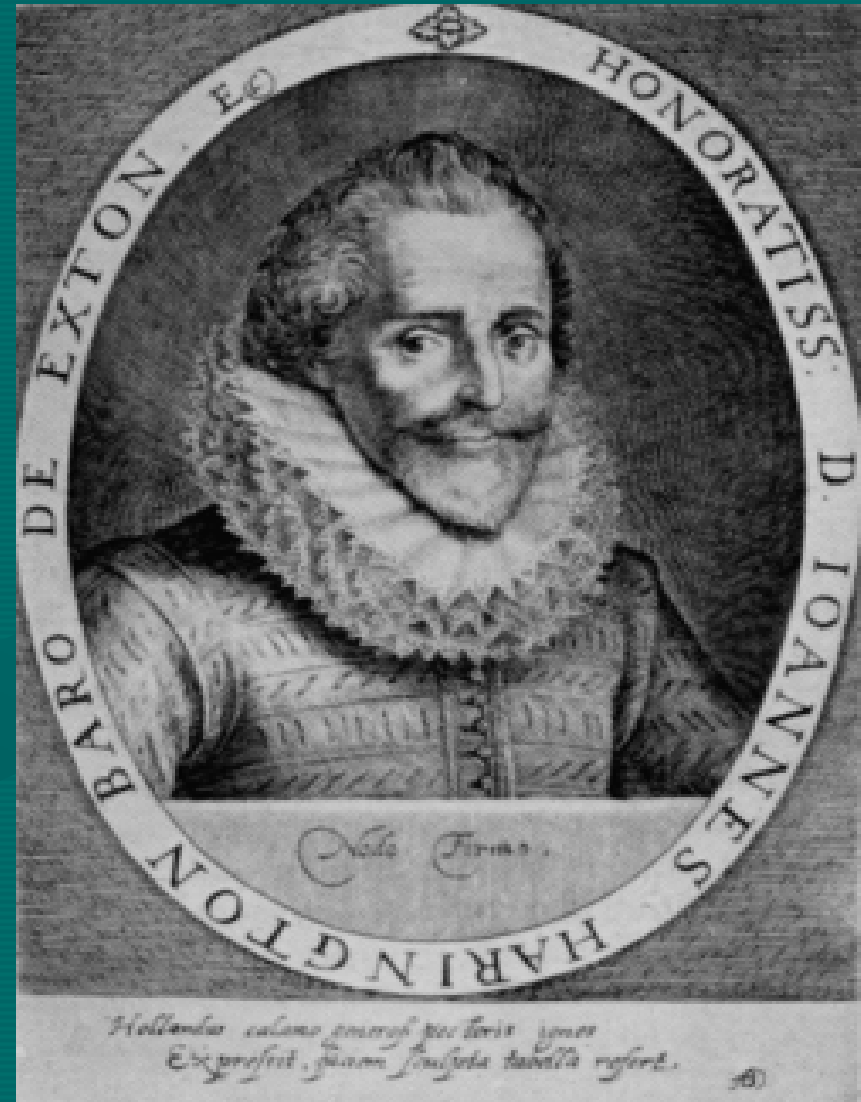
(Kelly 1994, [www.heptune.com/poop.html](http://www.heptune.com/poop.html))



[www.my.opera.com](http://www.my.opera.com)

# What Do We Do With It?

- Sir John Harington
- Credited in 1596 with our basic design today
  - Flush valve
  - Wash down design



[www.wikipedia.com](http://www.wikipedia.com)

# Modern Waste Disposal



- Modifications through the 1700's
- Albert Giblin obtained a patent in 1819 for the "Silent Valveless Water Waste Preventer"

# Toilet Trivia

- Thomas Crapper did not “invent” the toilet
- Phrase “crap” was in use long before Tom came along!



# So, What is the Problem?



# Handling of Feces

- Patients have a few choices
  - Use the toilet in the room
    - May be shared
  - Use a commode
    - Kept at bedside
    - May be shared
  - Use Bedpan
    - Kept in a variety of places
    - Not always single use



# Handling of Feces



- Choices
  - Use Incontinent products
    - Briefs
  - Use bed
    - May have an absorbent pad under them
    - Vented, unconscious ICU patients

# Sluice Rooms

[www.stanbridge.co.uk/care/planning.html](http://www.stanbridge.co.uk/care/planning.html)

- “Sluice”
  - either a slop hopper or a utensil washer/disinfector.
  - The slop hopper is a cross between a sink and a conventional toilet.
  - It functions in a similar way to a cistern type toilet and it is not an ideal way of dealing with human waste disposal.
  - It should be considered only as a back up to the automatic equipment.

# Rim Flushing Sink



# Hoppers

- Plenty of good evidence that there is dispersal of bacteria around these sinks (Moorefield 1998, Frederick 1997)
- Household studies showed aerosol can persist hours after a flush (Gerba 1975)



# Bed Pan Washing

- Pipe or wand on back of toilet
- Still in general use
- Huge risk of splashing
- Only rinses pan, no disinfection



# What Are We Seeing?

- Transmission of VRE
- After routine cleaning, 2 of 10 rooms still had detectable VRE
  - Light switch, toilet flusher, telephone, bathroom faucet
- I can see nurse enter room with gloves and gown on
  - Turn on dirty light switch, and offer care!

(Martinez 2003)

# What Are We Seeing?

- Patient and environmental contamination in Rehabilitation facility
  - 15% of surfaces sampled had VRE, usually related to patient colonization

(Trick 2002)

# What Are We Seeing?



- Structured physical exam of VRE positive patients
  - auscultation of heart and lungs
  - palpation of back, abdomen, and lower extremities
- Bugs were present –  
Where?

(Zachary 2001)

# Patient Examination

- 67% of the time VRE could be found
  - Gowns 37%
  - Gloves 63%
  - Stethoscopes 31%
  - All 3 were contaminated in 24% of cases
- Iliostomy or colostomy were linked
- Alcohol wipe removed VRE

# Is it Just the Patients?

- NO
- Transfer to healthcare workers and their families

(Baran 2002)



# Is it Just Incontinent Patients?

- 14 colonized VRE patients, continent – Mock exam rooms
- Chair cultures positive
  - 36% outpatient, 58% hemodialysis
- Couch Cultures positive
  - 48% outpatient, 42% radiology, 45% hemodialysis

(Grabsch 2006)

# Environment

- Gowns positive
  - 20% outpatient consultation, 4% radiology, 30% hemodialysis sessions
- Infection control measures should focus on
  - effective HCW and patient hand hygiene
  - chair and couch cleaning

# How Might This Be Possible

- Contamination of patient's clothing?
- Poor patient hand hygiene?



# Let's Be Politically Incorrect!

- These patients have been exposed to feces – not colonized!
- I still feel most nosocomial cases of VRE and CDAD indicates that:
  - the patient has ingested feces!

(Cartmill 1994)

# INTRODUCING:

- SPIFĒ
  - Society for the Prevention of Ingestion of Feces Everywhere!
- SPISEĒ
  - Society for the prevention of ingestion of spores everywhere



<http://barfblog.foodsafety.ksu.edu/donteatpoop.jpg>

# Cleaning and Disinfecting

- We need to clean better
    - Microfibre
    - Single Dip Methods
    - Remove dirt, organisms, spores
  - We need to clean effectively
    - Well trained
    - Check the work (glo-germ / glitterbug concept)
- (Dettenkofer 2004, Carling 2006, Buntrock 2005)

# Cleaning and Disinfecting

- Disinfecting is not as important as effective cleaning  
(Dettenkofer 2004)
- Housekeeping has been cut too far in many institutions
  - Or lowest bidder!
  - Florence Nightingale recognized that cleaning was vital in 1850's

(Dancer 1999)

# The Soiling of the Environment

- How do we change incontinent patient's briefs?
- How do we change beds?
  - Number of glove changes?
- How do we handle bed pans?
  - Bedpan with red paint all over it...
- Commode Chairs?

# The Environment

- I do recognize that we live in a buggy world
  - I only want clean equipment
  - I only want clean hands
  - I only want to limit the movement of those who soil my environment!

# Suggestions

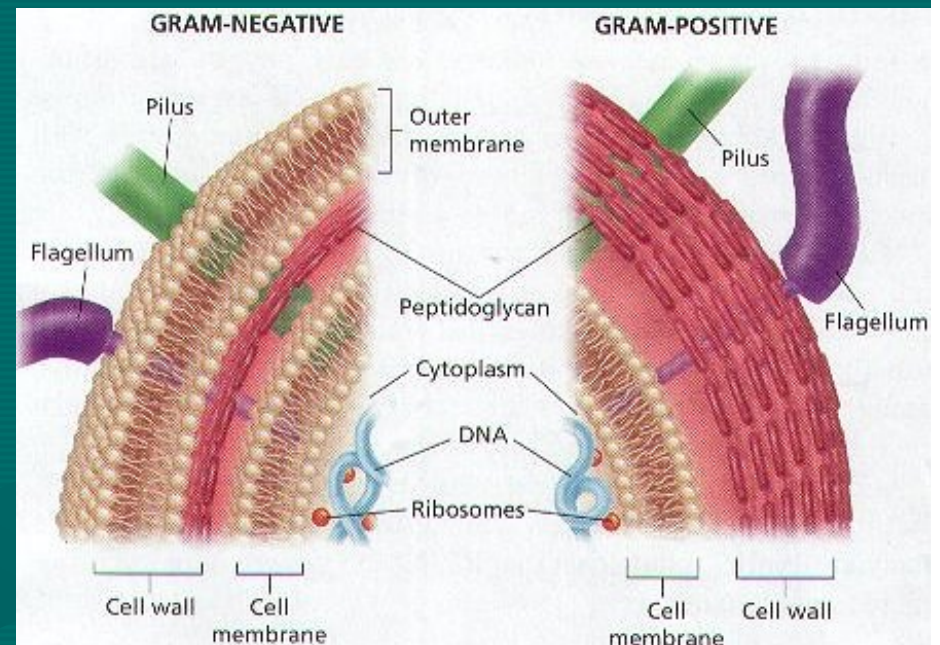
- Any new hospital construction or renovation
  - Single rooms
  - Thermal flusher/disinfector
  - Macerators
- Incontinent Rooms
- Multi-use washrooms
  - For continent and incontinent

# Suggestions

- Staff and visitor hands
- Patient hands
- Further look at the food link
  - Speculated in 1991 (Zaleznik 1991)
  - Investigated for Gram neg in 1971 (Shooter 1971)
  - CD found in sausages, ground beef, veal, turkey  
(<http://www.cbc.ca/cp/health/061015/x101520.html>)

# Other Fecal Fellows

- Gram negative bacteria
  - E. coli
  - Klebsiella pneumonia
  - Enterobacter species
  - Citrobacter species
  - Proteus species
  - Providencia species
  - Serratia species



# Other Poop Pathogens

- Salmonella species
- Shigella species
- Yersinia species
- E. coli O157:H7
- Campylobacter species
- Aeromonas / Vibrio species
- Hepatitis A

Easy?



# Summary

- We must clean better
- We must handle feces better
- We must stop worrying about the acronym (see above!)

# Questions? Don't be Afraid!



# References

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