Dodging the Bugs: Infection Control at Work

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Agenda

- Communicable disease prevention at work
  - Chain of Infection
  - Principles of exposure management
  - Workplace considerations

Agenda

- Diseases of interest
  - Influenza (including H5N1 Avian Flu)
  - Norwalk Virus (Norovirus)
  - Community-Associated Methicillin-Resistant *Staphylococcus aureus* (MRSA)
  - Bioterrorism resources

Agenda

- Information and resources
- Pace and questions
- Handout

Handout Sections

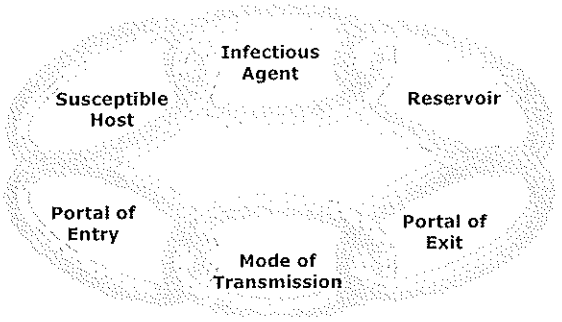
- Outline
- CDC Disease Precautions and Matrix
  - Definitions
  - CDC Disease Matrix
  - Hand-Hygiene Fact Sheet
  - NIOSH Latex Brochure
- Assorted Disease Fact Sheets and Information

The Perspective....

455 Oregon traffic fatalities in 2007 (NHTSA)

Source: http://www.nhtsa.dot.gov

Chain of Infection



Exposure Outcome Analogous to Chemical Exposure...

- Toxicity
- Dose
- Individual differences
- Infectivity of the bug
- Concentration of bug
- Duration of exposure
- Susceptibility

Exposure Management

- Precautions based on mode of transmission just as controls for chemicals are based on route of exposure
- Designed to reduce disease transmission from recognized and unrecognized sources of infection

Exposure Management

- Standard precautions
  - Similar to Universal Precautions, but more broad
  - Applies to everybody, sick or not:
    - All body fluids, except sweat
    - Non-intact skin
    - Mucous membranes
- *Protect yourself from exposure to all body fluids!*

Standard Precautions – Hand Hygiene

- Handwashing
  - Soap and water, friction!
  - Cuticles, wrists most often missed
  - 15 seconds – "Happy Birthday"
  - Keep hands in good condition
- On the web: http://www.cdc.gov/handhygiene/
  - Training resources
  - Fact sheet (included in your handout)
  - Promotional items (buttons, etc.)

Standard Precautions - Hand Hygiene

- Waterless hand-cleaner
  - Superior alternative if no visible debris
  - Hand-washing is still necessary
- Gloves
  - NIOSH Latex Alert: www.cdc.gov/niosh/latexalt.html
  - Avoid petroleum-based lotions if using latex

Standard Precautions - Cough Etiquette

- Source control measures such as:
  - Covering the individual's mouth/nose with a tissue when coughing
  - Prompt disposal of used tissues
  - Using surgical masks on the coughing person when tolerated and appropriate
- Hand hygiene after contact with respiratory secretions; and
- Spatial separation, ideally >3 feet
- Instructional video
  - http://www.coughsafe.com/media.html

Exposure Management: Transmission-Based Precautions

- Used in addition to Standard Precautions
  - Known or suspected diagnosis
  - Known or suspected mode of transmission
  - Highly transmissible diseases
  - When additional precautions beyond Standard Precautions are needed to interrupt transmission

Transmission-Based Precautions

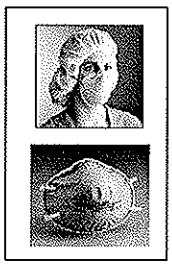
- Airborne
  - Pulmonary Tuberculosis, Measles, Chickenpox, Severe Acute Respiratory Syndrome (SARS), Avian Influenza*
- Droplet
  - SARS, Common cold, seasonal influenza, Avian Influenza* (eye protection needed), Norovirus (aerosolized body fluids)
- Contact
  - Chickenpox, C. difficile, Common cold, Avian Influenza*

*Guidance updated as recommendations change

Airborne Precautions

Small Particles Remain Suspended

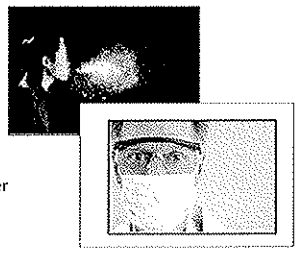
- NIOSH-approved respirator on caregiver
  - N-95 minimum
  - Fit-tested
  - FDA approval if for disease prevention or treatment
- Surgical mask on the sick person
- Negative-pressure room, closed door



Droplet Precautions

Heavy, large particles travel < 3 ft

- 3 ft rule
- Avoid sneeze and cough zone!
- FDA-approved surgical mask on you or them
- Research suggests a respirator may be a better choice for fine spray
- Good idea to protect the eyes



FDA vs. NIOSH

- FDA regulates as devices those respirators and other articles that are intended for use in preventing or treating infectious disease.
- Although NIOSH-certified non-medical respirators have met filtration efficiency requirements, they are not subject to the additional requirements of FDA-cleared surgical N95 respirators (i.e. fluid and flammability resistance) required for use in preventing or treating infectious disease.

FDA vs. NIOSH

- Non-medical respirators are available from many sources including hardware stores and online
- Non-medical respirators may look very similar to one another and to respirators that are regulated by FDA, but there are differences:
  - Among non-medical respirators
  - Between non-medical respirators and respirators that have been cleared by FDA as surgical N95 respirators

Types of masks and respirators commonly used in patient care

Surgical masks

- Include masks labeled as surgical, laser, isolation, dental, or medical procedure masks
- Help protect against microorganisms, body fluids, and ***larger*** particles in the air

Surgical N-95 respirators

- Are surgical masks that are *also respirators*
- Designed to protect against ***small*** droplets of respiratory fluids and other airborne particles in addition to all the protection of surgical masks

Types of masks and respirators used in patient care

Surgical masks

- Are designed to cover the mouth and nose loosely; not sized for individual fit
- Are made of soft materials and are comfortable to wear

Surgical N-95 respirators

- Fit closely to form a tight seal over the mouth and nose
- May be uncomfortable due to tight fit

Types of masks and respirators used in patient care

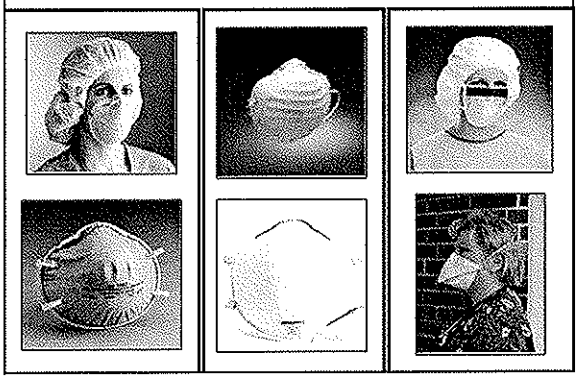
Surgical masks

- Help prevent exposure to the wearer's saliva and respiratory secretions
- Are usually packaged in boxes of single-use masks

Surgical N-95 respirators

- Require fit-testing and must be adjusted to your face to provide intended effectiveness
- Are usually packaged as single devices or in boxes of single-use devices

Mass confusion... wonder why?

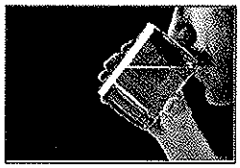


Powered Air Purifying Respirator

- Excellent option for certain procedures
  - More protective than filtering facepiece
  - Hooded model does not require fit-testing
  - Must be approved by FDA for use in preventing or treating infectious disease

Workplace Considerations

- Breakrooms
  - Microwaves
  - Multi-user cups
  - Refrigerators

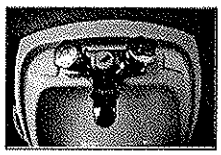


Workplace Considerations

- Food
  - 2-hour rule
  - Food-borne illness
    - Norovirus
    - Hepatitis A
    - Salmonella
  - Lettuce, peanut butter, spinach

Workplace Considerations

- Restrooms
  - Bar soap
  - Door handles
  - Faucets
  - Air blower vs. paper towels



Workplace Considerations

- In your work area
  - Flipping through paperwork
  - Telephones
  - Keyboards
  - Pens
  - Shaking hands
  - Coughing and sneezing

Applying the information....

CDC Matrix - Excerpt

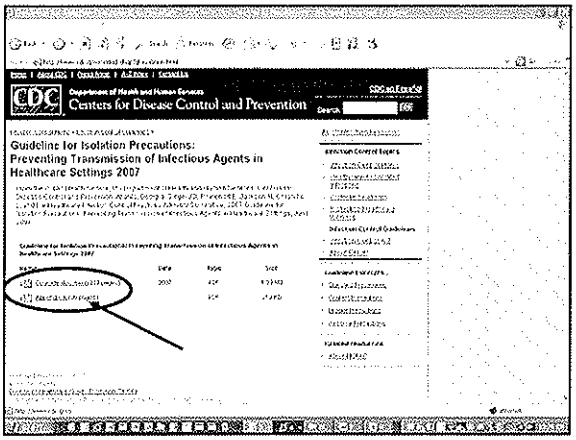
• Tuberculosis	
• Pulmonary, confirmed or suspected disease	A
• Skin-test positive, with no evidence of current pulmonary disease	S
• Varicella (chickenpox)	A,C

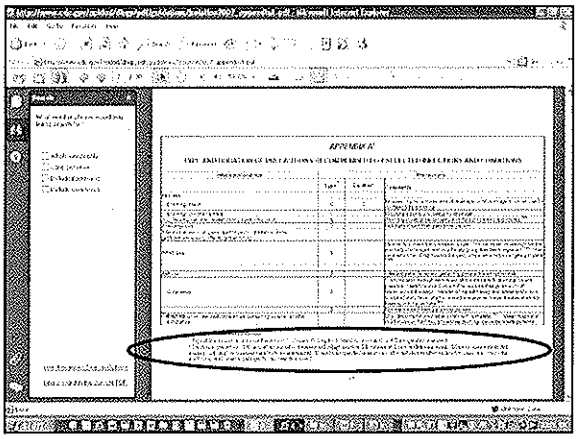
Disease Characteristics
The "MSDS" for Infectious Disease

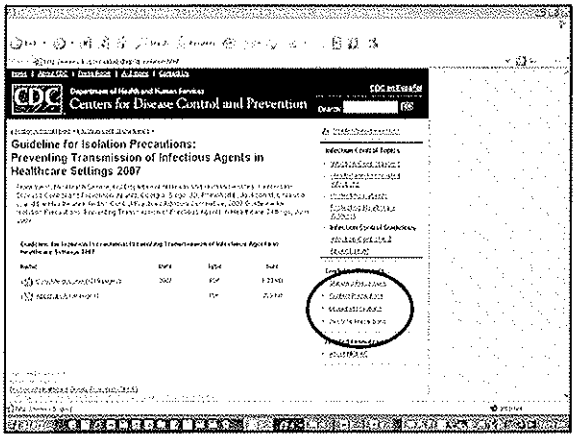
- Isolation precautions have been revised and now apply to all health care settings. Link:

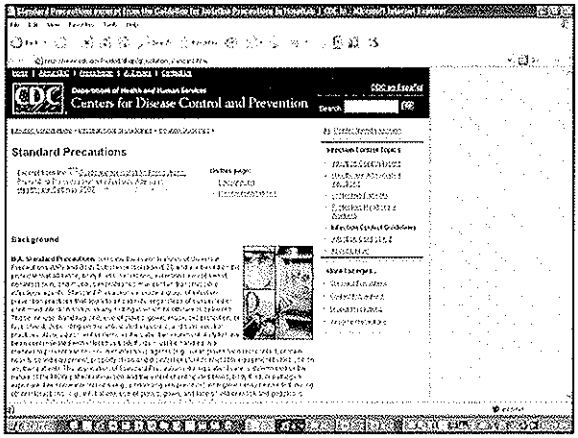
  http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Isolation2007.pdf

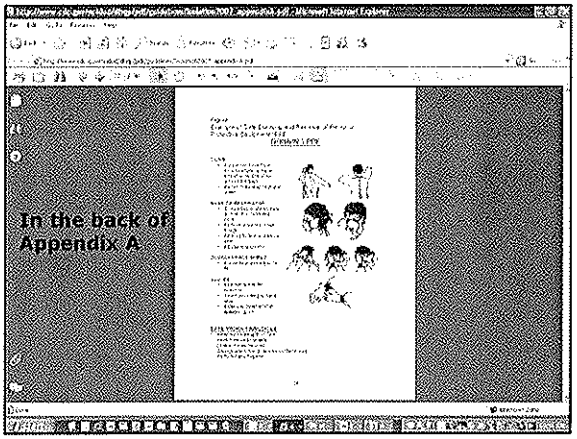
- Transmission-based precautions defined at links found at bottom right corner of page: http://www.cdc.gov/ncidod/dhqp/gl_isolation.html
- Matrix of infectious diseases/precautions on CDC website: http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Isolation2007_appendixA.pdf











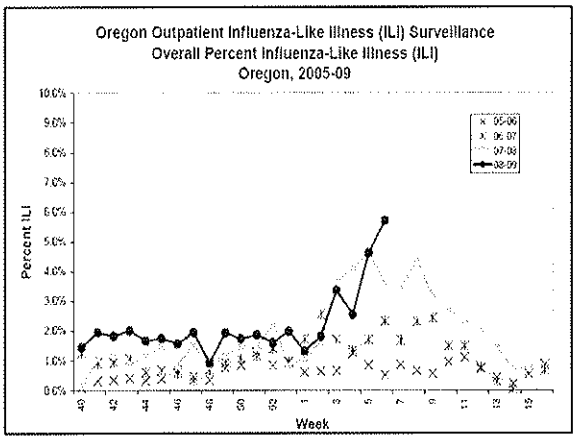
Disease Characteristics

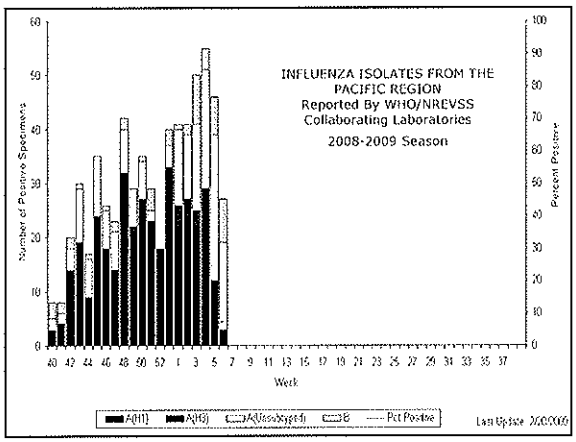
- Other disease precautions can be found by navigating to the CDC link (http://www.cdc.gov/) and clicking on the A-Z Index. Scroll down to select the pathogen of interest, and look for the infection control section

Diseases of Interest

Seasonal Influenza

- Seasonal (or common) flu
  - Respiratory illness that can be transmitted person to person
  - Most people have some immunity
  - Vaccine is available seasonally





Seasonal Influenza Resources

- Oregon Health Division Influenza Information

  http://www.oregon.gov/DHS/ph/acd/flu/influenza.shtml
- CDC Seasonal Influenza Information

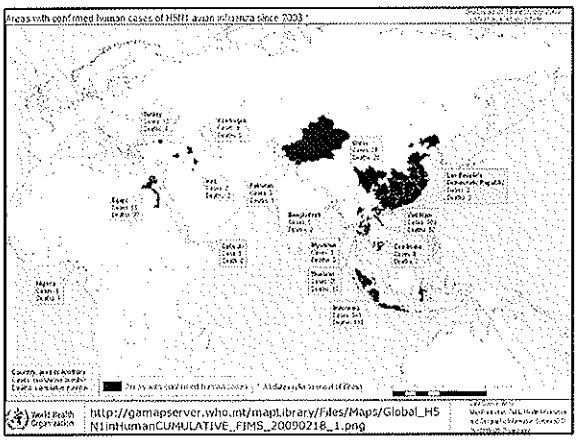
  http://www.cdc.gov/flu/

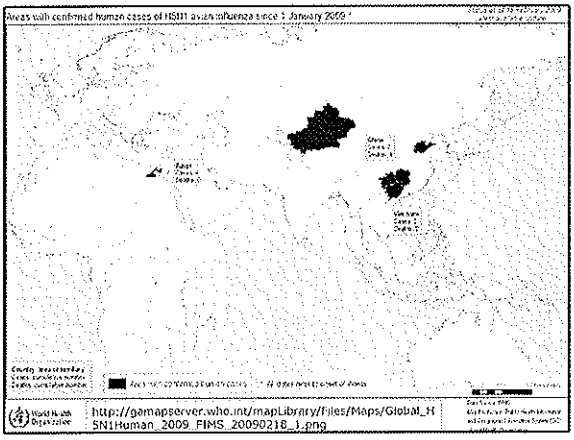
Avian (H5N1) Influenza (AI)

- Caused by influenza viruses that occur naturally among wild birds
- Low pathogenic AI is common in birds and causes few problems
- H5N1 is highly pathogenic, deadly to domestic fowl, and can be transmitted from birds to humans
- No human immunity and no vaccine is available

Avian (H5N1) Influenza (AI)

- Not yet in US
- ~ 60% fatality rate
- So far, beginning to spread more easily from bird to human, but still rare human to human spread





AI Infection Control Recommendations

- Standard Precautions (meticulous hand hygiene and cough etiquette)
- Contact Precautions
  - Use gloves and gown for all contact
- Airborne Precautions
  - N-95 respirator (minimum)
- Eye protection when within 3 feet

AI Resources

- CDC Avian Flu web page: http://www.cdc.gov/flu/avian/gen-info/facts.htm
- Oregon Health Services Avian flu information: http://oregon.gov/DHS/ph/acd/flu/zooflu.shtml

Pandemic Influenza

- Virulent human flu that causes a global outbreak, or pandemic, of serious illness
- Because there is little natural immunity, the disease can spread easily from person to person

Currently, there is no pandemic flu

Personal Pandemic Flu Preparedness

- Social disruption may be widespread
- Going to work may be difficult or impossible
- Schools may be closed for extended period
- Transportation services may be disrupted
- People will need advice and help at work and home

Be prepared

Personal Pandemic Flu Preparedness

- Social distancing
- 2 week supply of medications, food
- Teach children about hand-washing
- Business and personal preparedness checklists available at http://www.pandemicflu.gov/

Pandemic Preparedness Resources

- Pandemic Flu Preparedness Website http://www.pandemicflu.gov/
- OSHA Guidance: http://www.osha.gov/Publications/influenza_pandemic.html

Norwalk Virus

- Agent: Norovirus
- History: Named after an outbreak in Norwalk, OH 30 years ago…
- Mid-2002, many folks infected on five cruise ships (the first one had two outbreaks on two separate cruises), then in WA, NH and NY
- Becoming an increasing problem, especially in institutional settings

Norwalk Virus

- CDC website: http://www.cdc.gov/ncidod/dvrd/revb/gastro/norovirus.htm
- OHD CD Summary: http://www.oregon.gov/DHS/ph/cdsummary/2009/ohd5802.pdf
- Guidance to control the spread to residents and staff in nursing homes and similar settings: http://www.oregon.gov/DHS/ph/acd/outbreak/control.pdf

Norwalk Symptoms

- 30% of those infected have no symptoms
- Acute onset
  - Nausea, vomiting
  - Watery, non-bloody diarrhea
  - Abdominal cramps

Norwalk Symptoms

- Incubation 24-48 hrs. – can become ill as soon as 12 hrs.
- Dehydration is a risk for elderly and frail
- 24-60 hours in duration, recovery usually complete

Norwalk Virus - Transmission

- VERY contagious!
- Fecal-oral; as few as 10 - 100 particles needed
- Transmission occurs through contact with feces (and contaminated surfaces, food) and as a result of aerosolization of vomitus

Norwalk Virus - Transmission

- Infectious from symptom onset until 72 hrs after recovery (maybe longer – virus sheds for 2 weeks)
- Susceptibility is at least partially genetic; with those with Type "O" blood at highest risk of severe illness if infected
- Note: this virus can live in > 10 ppm chlorine and can survive freezing

Norwalk Virus CDC Recommendations

- Good hand-hygiene – Standard Precautions
  - Do *NOT* use waterless hand cleaners
- Safe food handling
- Disinfect with 1:50 solution if using bleach

Community-Associated Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA)

- *Staphylococcus aureus*
  - Bacteria commonly carried on the skin or in the nose of healthy people
  - 25% to 30% of the population is colonized (when bacteria are present, but not causing an infection) in the nose with staph
  - One of the most common causes of skin infections in the United States; usually minor (such as pimples and boils)
  - Sometimes cause serious infections (such as surgical wound infections, bloodstream infections, and pneumonia)

Community-Associated Methicillin-Resistant *Staphylococcus aureus* (CA-MRSA)

- **Methicillin-resistant *Staphylococcus aureus*)**
  - Staph bacteria become resistant to a specific type of antibiotic that includes methicillin, oxacillin, penicillin and amoxicillin
  - Approximately 1% of population is colonized with MRSA
  - Difficult to treat
  - Standard Precautions essential

Who Gets It?

- Most frequently associated with healthcare such as hospitals, nursing homes, and dialysis centers, especially in those with weakened immune systems (pneumonia, wound infections, etc.)
- Sometimes acquired by persons who **have not** been recently (within the past year) hospitalized or had a medical procedure
- CA-MRSA infections are usually manifested as skin infections (pimples, boils, etc.) in otherwise healthy people
- Clusters among athletes, military recruits, children, Pacific Islanders, Alaskan Natives, Native Americans, men who have sex with men, and prisoners

Risk Factors

- Close skin-to-skin contact
- Openings in the skin such as cuts or abrasions
- Contaminated items and surfaces
- Crowded living conditions
- Poor hygiene

Prevention – Standard Precautions with a Twist

- **Cover your wound.** Drainage can spread the bacteria.
- **Clean your hands.** Frequent hand cleansing, especially after changing the bandage or touching the infected wound
- **Do not share personal items.** Avoid sharing personal items, such as towels, washcloths, razors, clothing, or uniforms, that may have had contact with the infected wound or bandage. Wash soiled sheets, towels, and clothes promptly, dry thoroughly
- **Communicate.** Tell any healthcare providers who treat you that you have or had a staph or MRSA skin infection

Health Clubs and Gyms

- Environment has insignificant role in MRSA transmission; transmitted most frequently by direct skin-to-skin contact
- Good hygiene
  - Keep your hands clean
  - Shower after working out
  - Cover any open skin area such as abrasions or cuts with a clean dry bandage
  - Avoid sharing of personal items such as towels or razors
  - Use a barrier (e.g., clothing or a towel) between your skin and shared equipment
  - Wipe surfaces of equipment before and after use

Invasive MRSA

- Predominantly related to exposures in healthcare delivery
- About 85% of all invasive MRSA infections were associated with healthcare
  - About two-thirds occurred outside of the hospital
  - About one third occurred during hospitalization
- About 14% of these serious infections occurred in persons without obvious exposures to healthcare
- Overall rates of disease were consistently highest among older persons (age >65), Blacks, and males

Treatment Challenges

- Most are treatable with antibiotics – important to complete the entire course as prescribed, even if you feel better
- Draining the abscess or boil may be enough (should only be done by a healthcare provider)
- If you don't see improvement in a few days after either treatment, contact provider again
- Recurrence is not unusual; follow the prevention steps carefully

Community Associated MRSA

- Campaign to Reduce Anti-microbial Resistance in Healthcare. Four-pronged approach:
  - Prevention of infection
  - Accurate and timely diagnosis and treatment
  - Prudent antibiotic use
  - Prevention of transmission
- Educational materials: http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca_posters.html

MRSA Resources

- CDC document on Multi-Drug Resistant Organisms published in late 2006:

  http://www.cdc.gov/ncidod/dhqp/pdf/ar/mdroGuideline2006.pdf
- CDC MRSA info:

  http://www.cdc.gov/NCIDOD/DHQP/ar_mrsa_ca.html
- Oregon Health Division MRSA info:

  http://oregon.gov/DHS/ph/acd/diseases/mrsa/mrsa.shtml

Bloodborne Pathogens

- Hepatitis B 30-40%
- Hepatitis C 1.8%
- HIV 0.3%
- Booklet in your handout

References for Bioterrorism

- Department of Homeland Security:

  http://www.dhs.gov/index.shtm
- Public Emergency Readiness

  http://www.ready.gov/
- CDC Emergency Management (and Bioterrorism) Web Site:

  http://www.bt.cdc.gov/
- Oregon Health Division Bioterrorism Resources

  http://www.oregon.gov/DHS/ph/acd/bioterrorism/agents.shtml

References for Infectious Disease

- Oregon Health Services Communicable Diseases Website:

  http://oregon.gov/DHS/ph/odpe/
- CD Summary Index – a GREAT resource!

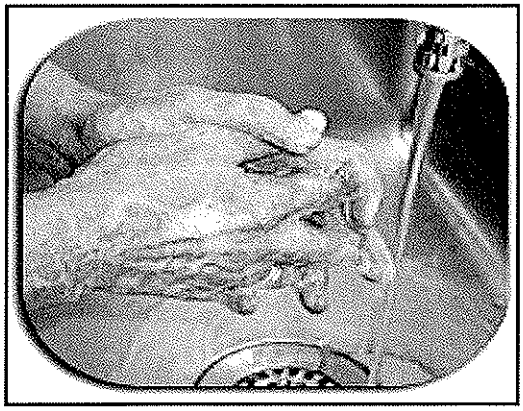
  http://oregon.gov/DHS/ph/cdsummary/cdsum.shtml
- Centers for Disease Control and Prevention Infectious Disease Resource:

  http://www.cdc.gov/DiseasesConditions/
- APHA Control of Communicable Diseases Manual
  - To order: 1-202-777-2531

  http://www.apha.org/publications/bookstore/

Summary

- Chain of Infection
- Transmission-based Precautions and Disease Matrix (MSDS Analogy)
- Diseases of Interest
- Bioterrorism



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