

Infection Control of Aerosol Transmissible Diseases

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Overview

- Transmission of communicable diseases
 - Aerosol transmissible diseases (ATDs)
- Principles of Infection Control
 - Application to ATDs
- Interactive exercises
 - Case study
 - Hand hygiene
- Packet:
 - Infection Control (IC) Resources
 - CDC recommendations for immunizations of HCWs

Transmission of Communicable Diseases

- Direct transmission
 - contact w/ infectious body fluids of human/animal
 - respiratory droplets (a special case)
 - Indirect transmission
 - Common vehicle (e.g., food, water, inanimate objects (fomites), biologic products)
 - Vector-borne (e.g., insect)
 - Airborne (i.e., inhalation route)
 - Some diseases transmitted by multiple routes
 - Malaria, West Nile virus- mosquito (vector; main), transfusions (vehicle; rare), transplacental (direct; rare)
- Control of Communicable Diseases Manual, 18th ed. American Public Health Association (2004)



Person-to Person Transmission by the Aerosol Route

Department of Medical Microbiology,
Edinburgh University

- Droplets land directly on mucosal lining of nose, mouth, eyes of nearby persons or can be inhaled. Highest exposures within 3-6 feet.
- Airborne: aerosols become smaller by evaporation, remain suspended for longer periods - inhaled deep in the lungs.
- Indirect (Contact route): aerosols contaminate nearby surfaces and if transferred to hands, can infect self or others.
- Relative contribution of three routes varies with organism.

Person-to Person Transmission via Infectious Respiratory Secretions

Some examples

- **Droplet:** meningococcal meningitis, rubella (German measles), pertussis (whooping cough), common cold
- **Airborne:** TB, measles, varicella (chickenpox) , disseminated herpes zoster (shingles),
- **Indirect (Contact):** respiratory syncytial virus (RSV)
- **Influenza:** traditionally classified as droplet; increasing evidence for airborne component. ? Role of contact?

See: CDC 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

Cal/OHSA ATD Std, Appendix A

Basic Principle of Standard Infection Control Precautions

- **Body fluids are potentially infectious (sweat excluded)**
- Designed to reduce risk of transmission of microorganisms from both recognized and unrecognized sources of infection when providing health care
- Protects yourself and other patients against reasonably anticipated contact with body fluids/ substances

Standard Precautions

Potentially infectious body fluids include:

- blood and blood-tinged fluids including open-wounds
- stool, urine, vomit, respiratory secretions, saliva, semen, vaginal secretions, breastmilk, other body fluids such as pericardial and synovial fluids

Standard Precautions for Infection Control in Healthcare Settings

- **Appropriate hand hygiene**
- **Barrier protective equipment:** gloves; mask or respirator; eye protection (face shield, goggles); gowns – if splash, splatter, or sprays can be reasonably anticipated
- **Proper use and handling** of patient care equipment
- **Proper environmental cleaning and disinfection**
- **Proper handling of linen**



<http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html>

Standard Precautions for Infection Control in Healthcare Settings (cont.)

- **Adherence to Bloodborne Pathogens Stds**
- **Proper patient placement** (where the potential for disease transmission is minimized)
- **Respiratory Hygiene/Cough Etiquette**
- **Safe injection practices**

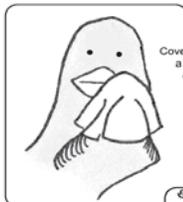
CDC: 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

<http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html>



Stop the spread of germs that make you and others sick!

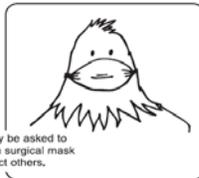
Cover your Cackle



Cover your beak with a tissue when you cough or sneeze or cough or sneeze into your upper wing, not your feathers.



Put your used tissue in the waste basket.



You may be asked to put on a surgical mask to protect others.

Clean
your
Feathers after cackling or chirping.

Basic Infection Control Principles 24/7 include:

Respiratory Hygiene/ Cough Etiquette

- Cover your cough- use tissues/ dispose of properly

Hand Hygiene

Expanded Isolation Precautions Based on Modes of Transmission

- Contact
- Droplet
- Airborne

Transmission-Based Precautions: Contact

- Prevent spread of infectious agents by direct or indirect contact with patient & environment
- Examples – MRSA, *C difficile*, Norovirus, other GI pathogens, RSV
- Personal Protective Equipment
 - Gown & Gloves



(in addition to Standard Precautions)

Transmission-Based Precautions: Droplet

- No special air handling or ventilation required
- **HCWs wear surgical or procedure mask within 6 ft of patient**
- Single room preferred; consult IC/PH if cohort
- Mask patient if transport necessary (if tolerated), follow respiratory hygiene/cough etiquette
- Eye protection (face shield/goggles) if splashing, spraying anticipated

(in addition to Standard Precautions)

Transmission-Based Precautions: Airborne

- Airborne Infection Isolation Room (AIIR) if available (for H1N1-AIIR not necessary)
- N95 respirator should be donned prior to entry into room, discarded (or stored in paper bag) after exit
- Higher level respirators for aerosol-gen procedure (effective Sept 2010)
- Careful attention to proper putting on & taking off (don/doff) respirator, including seal check and hand hygiene before & after don/ doff
- Patient wears a face mask during transport, if tolerated
- Alert others if need to transfer

(in addition to Standard Precautions)

Sequence for Donning PPE

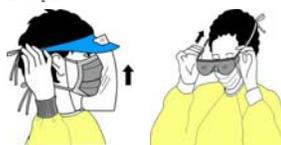
1. Gown



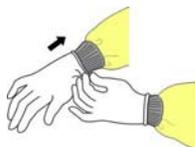
2. Mask or Respiratory



3. Goggles/Face Shield



4. Gloves

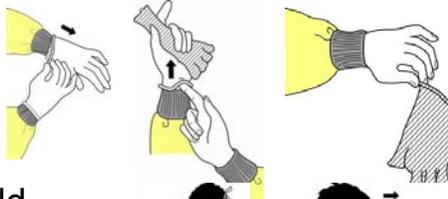


PPE in healthcare settings

www.cdc.gov/ncidod/dhqp/ppe.html

Sequence for Removal of PPE

1. Gloves



2. Goggles/Face Shield



3. Gown



4. Mask or Respiratory



www.cdc.gov/ncidod/dhqp/ppe.html

What you should do when you hear Ah-choo!

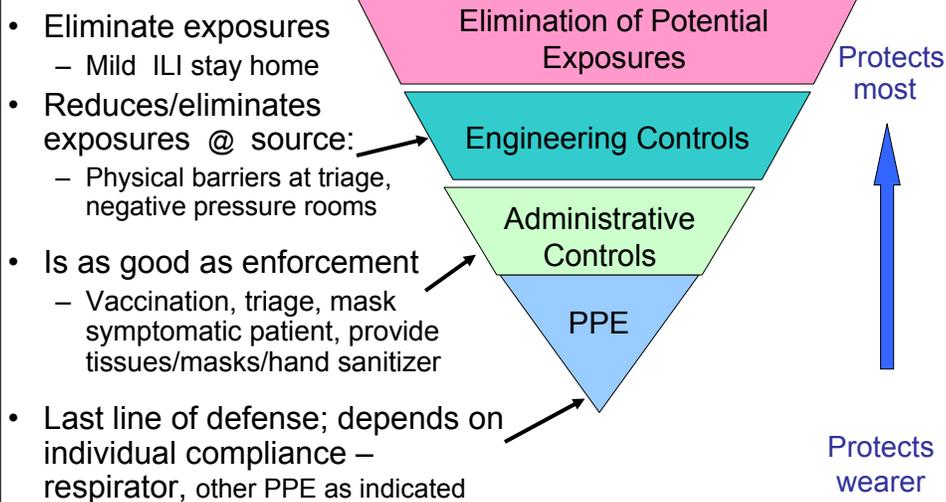


- Likely communicable?
 - Droplet versus Airborne?
- Choose appropriate source control and PPE
- Reportable Diseases? Contact local health department.

Some require immediate action or ≤ 24 hrs

- Title 17 reporting requirement
- http://www.cdph.ca.gov/HealthInfo/Documents/Reportable_Diseases_Conditions.pdf

Hierarchy of Infection Prevention and Control Measures: H1N1 Exposure



Face Masks vs. N95 Respirators



- Loose fitting, not designed to filter out small aerosols
 - Place on coughing patient (source control)
 - HCW should wear mask to
 - protect pt during certain procedures
 - protect HCW
 - droplet precautions
 - for anticipated spray/splash
- Tight fitting respirator
 - Protects the wearer
 - Filters air that you breathe
 - HCW should wear when concerned about transmission by “airborne” route



<http://www.cdc.gov/Features/MasksRespirators/>

Vaccination of HCWs

- Protect patients, protect yourself and other HCWs
- CDC recommends
 - Measles, mumps, rubella (MMR): vaccination unless documentation of immunity or vaccination
 - Varicella: vaccination unless documentation of immunity or vaccination
 - Tdap (pertussis = whooping cough)
 - Seasonal influenza vaccine yearly
 - Hepatitis B vaccine documentation or vaccinate
 - List: <http://www.immunize.org/catg.d/p2017.pdf>
- Cal/OHSA
 - requires employer to offer MMR and varicella vaccination to those who are not vaccinated or immune, offer Tdap and seasonal influenza vaccination (ATD standard) and to offer hepatitis B vaccination to those who are not vaccinated or immune (Bloodborne Pathogen standard)
 - records of immunity, vaccine, or declinations on file



Tuberculosis Screening for Health Care Workers

- Title 22 : Tb screening at hire and then annually for all licensed healthcare facilities in CA (e.g., acute care hospitals, skilled nursing facilities, primary care clinics)

Aerosol Transmissible Diseases

Stop the spread of germs that make you and others sick!



Respiratory hygiene/cough etiquette

Mask symptomatic patient. Separate or isolate.



hand hygiene saves lives
Hand hygiene

HCW Protection

- Vaccinate
- Droplet – Mask
- Airborne- N95 respirator





References:

CDC Healthcare Infection Control Practices Advisory Committee (HICPAC)

- 2007 Guideline for Isolation Precautions:
Preventing Transmission of Infectious
Agents in Healthcare Settings
- <http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html>
- Guideline for Hand Hygiene in Health-Care Settings
 - *MMWR* 2002; vol. 51, no. RR-16
 - <http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf>

What Type of PPE Would You Wear?

- Giving a bed bath?
 - Generally none
- Suctioning oral secretions?
 - Gloves and mask/goggles or a face shield – sometimes gown
- Transporting a patient in a wheel chair?
 - Generally none required
- Responding to an emergency where blood is spurting?
 - Gloves, fluid-resistant gown, mask/goggles

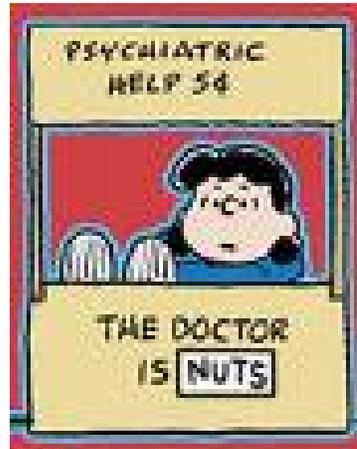
PPE in healthcare settings
www.cdc.gov/ncidod/dhqp/ppe.html

What Type of PPE Would You Wear?

- Taking vital signs
 - Generally none
- Drawing blood from a vein?
 - Gloves
- Cleaning an incontinent patient with diarrhea?
 - Gown, gloves
- Taking vitals on a patient with suspect Tb ?
 - N95 respirator

PPE in healthcare settings
www.cdc.gov/ncidod/dhqp/ppe.html

Questions?



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