Emerging Infectious Diseases

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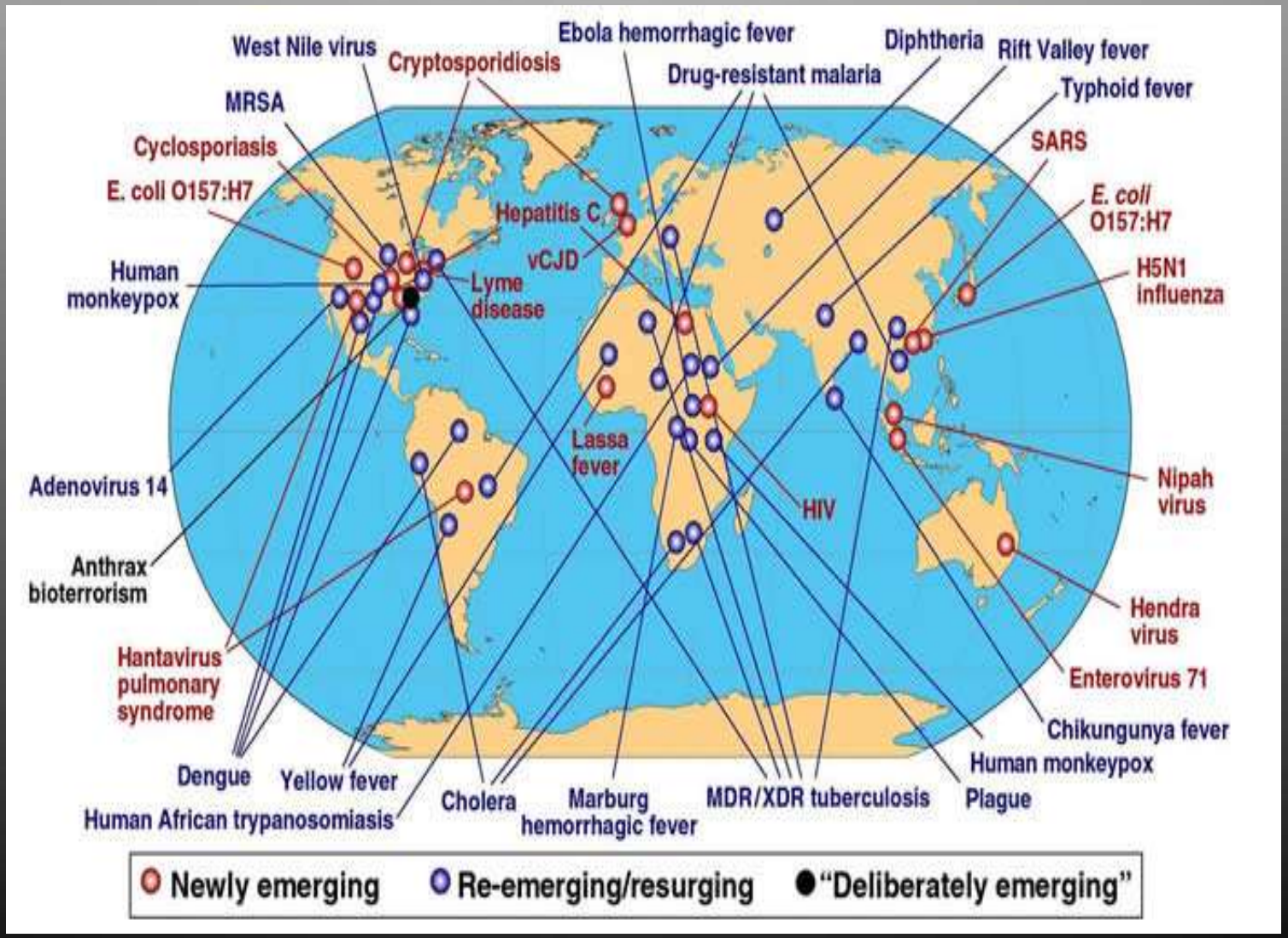
recent emerging diseases



Lancet

Emerging and re-emerging infectious diseases

- AIDS
- Avian Influenza
- Ebola
- Marburg
- Cholera
- Rift Valley Fever
- Typhoid
- Lassa Fever
- Tuberculosis
- Leptospirosis
- Malaria
- Japanese encephalitis
- Chikungunya
- Dengue
- Antimicrobial resistance
- MERS

Factors contributing to emergence

AGENT

- Evolution of pathogenic infectious agents (microbial adaptation & change)
    - ex: influenza
- Development of resistance to drugs
    - ex: MRSA, KPC
- Resistance of vectors to pesticides
    - ex: malaria

Factors contributing to emergence

HOST

- Human demographic change (inhabiting new areas)
- Human behaviour (sexual & drug use)
- Human susceptibility to infection (Immunosuppression)
- Poverty & social inequality

Factors contributing to emergence

ENVIRONMENT

- Climate & changing ecosystems
- Economic development & Land use (urbanization, deforestation)
- Technology & industry (food processing & handling)

Transmission of Infectious Agent from Animals to Humans

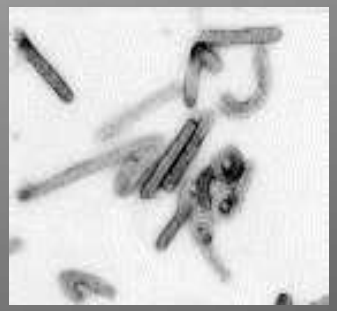
- Emerging Influenza infections in Humans associated with Geese, Chickens & Pigs
- Animal displacement in search of food after deforestation/ climate change (Lassa fever)
- Humans themselves penetrate/ modify unpopulated regions- come closer to animal reservoirs/ vectors (Yellow fever, Malaria)

Emerging Zoonoses: Human-animal interface

Avian influenza virus

Bats: Nipah virus

Ebola virus



Marburg virus

Borrelia burgdorferi: Lyme

Deer tick

Mostomys rodent: Lassa fever

Hantavirus Pulmonary Syndrome

How Ebola Outbreaks Start

- First human cases start with infection by an animal
  - Bats to chimpanzes, other animals and bush meat. How current outbreak started in unknown, but killing and preparing bush meat can spread other viral illnesses
- Infection from person-to-person creates an outbreak
  - Direct or indirect physical contact with body fluids of a **sick** infected person (blood, saliva, vomitus, urine, stool, semen)
- Well known locations where transmission occurs
  - Hospital:
    - Health care workers, other patients, unsafe injections
  - Houses and Communities:
    - Family, friends, contacts caring for ill, through funeral practices---ie contact with dead bodies

Critical Issues

- First large Ebola outbreak in West Africa
- Underlying weakness in health systems
  - Lack of preparedness and poor surveillance, health care, diagnostics, communications …
- **Health worker infections & inadequate infection control & prevention** The affected countries in West Africa have some of the worst physician–patient ratios in the world:
  - Liberia: more than 86 000 patients per physician
  - Sierra Leone: more than 45 000 patients per physician

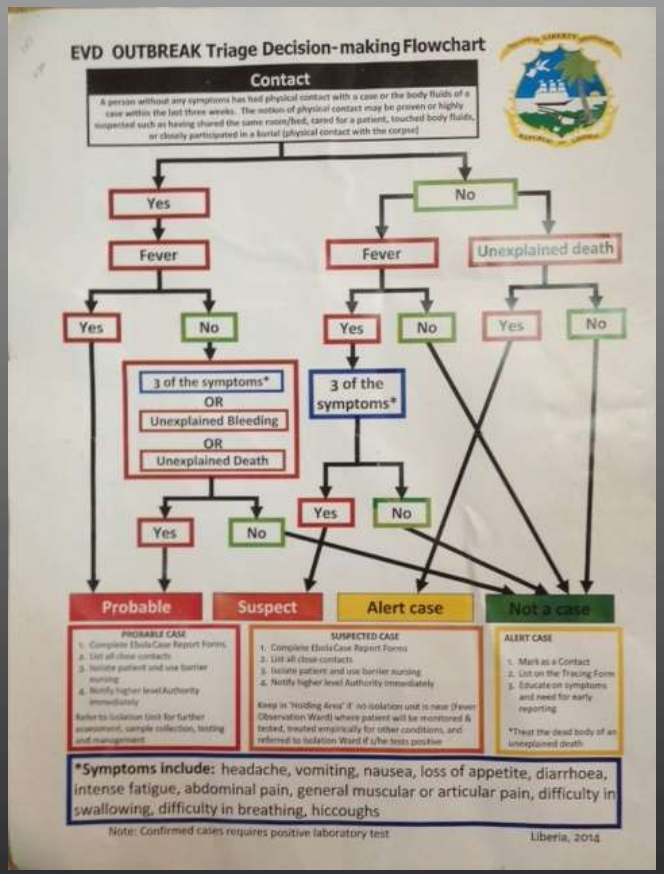
Effect of fear

- Strong community resistance in places ……..

Training …… screening

PPE, Bleach water (0.5% and 0.05%) Triage, Isolation, and No Touch Care!

Lab tech in the clinic



MOH Triage Flow Chart

USA PPE

US

- Contact Precautions
- Working knowledge of emerging diseases
- Know where your PPE is located
- Know who to call
- Don’t Panic

EMERGING INFECTIONS: STANDARD AND TRANSMISSION-BASED PRECAUTIONS FOR AMBULATORY HEALTHCARE SETTINGS

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Disclosures

Disclosure: Neither I nor members of my immediate family have any financial relationships with commercial entities that may be relevant to this presentation.

Visuals of products and devices are examples and are not an endorsement.

Objectives

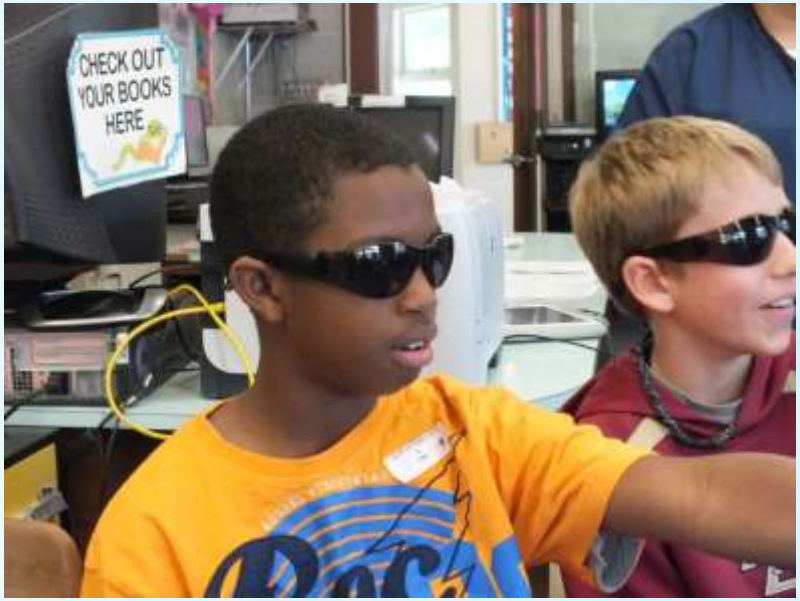
- Differentiate standard and transmission-based precaution measures
- Identify measures and resources clinicians may use to promote respiratory hygiene and setting-specific illness recognition.

What is an Infection Prevention and Control Program?

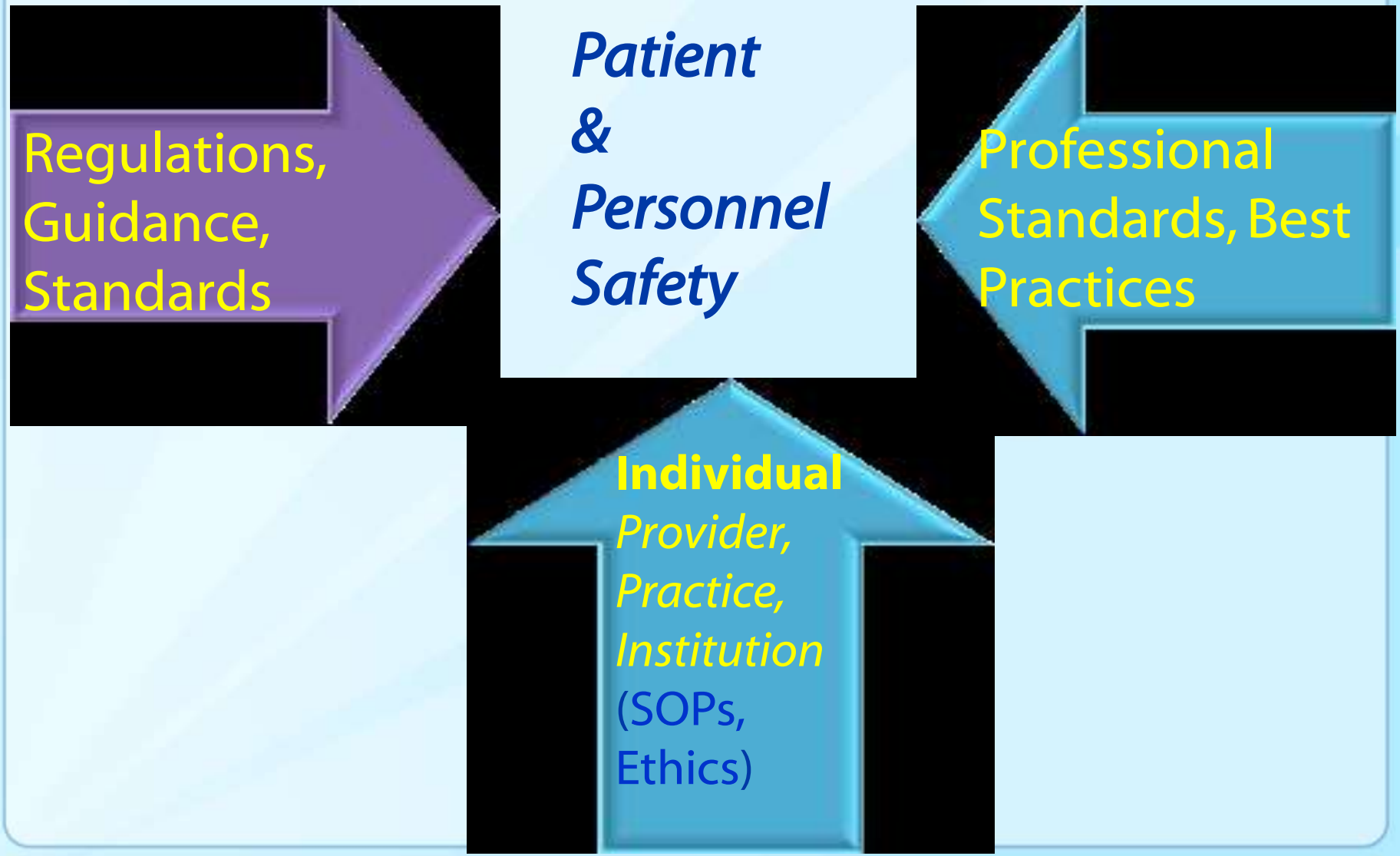
A system of policies, procedures and practices that when successfully implemented, will minimize the risk of transmission of pathogenic microorganisms. The goal is to prevent:

- healthcare-associated infections in patients
- injuries and illnesses in healthcare personnel

Public Trust & Expectations



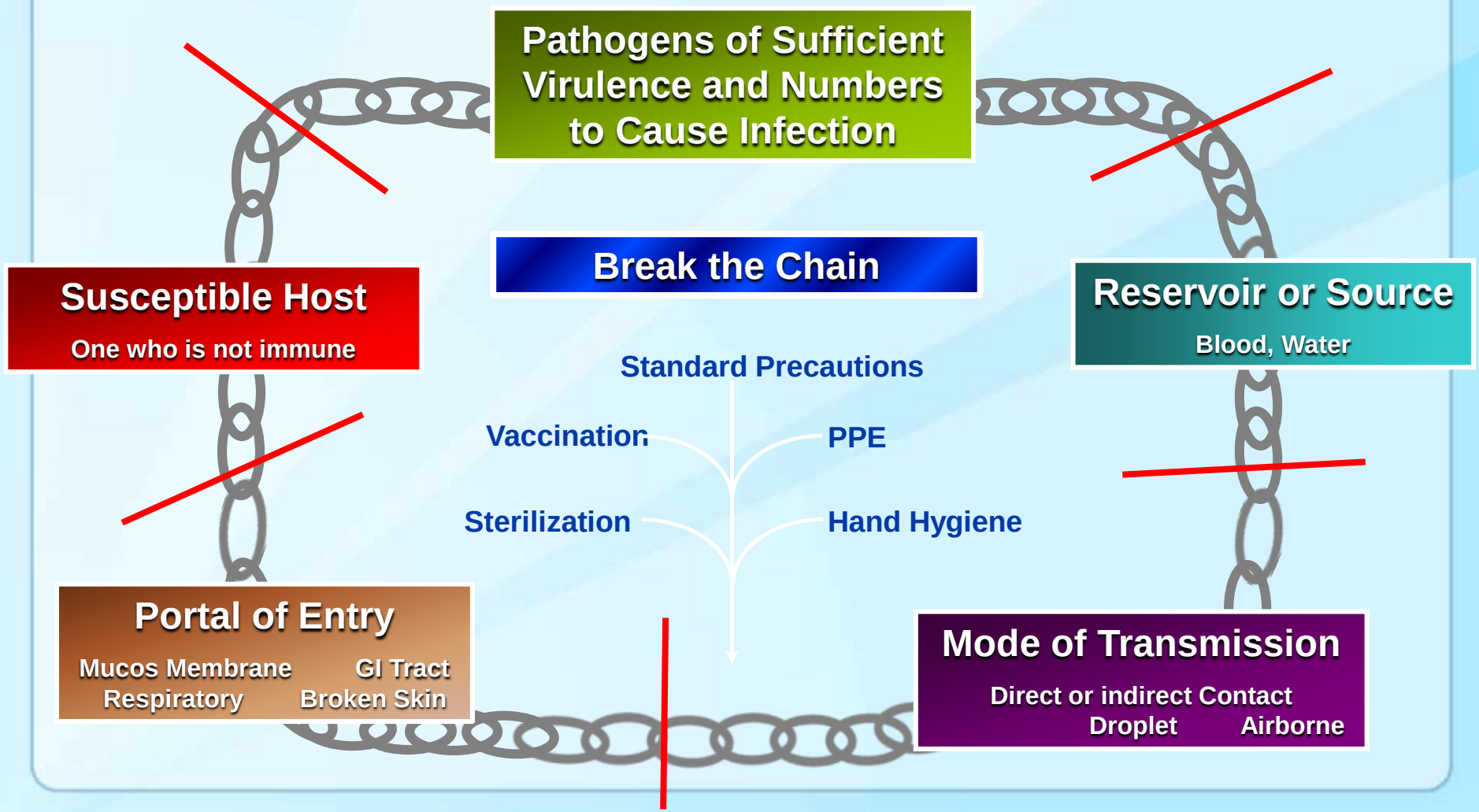
Infection Prevention and Control Program



Infection Control Policies and Procedures..

- Should be supported by an authoritative source

The Chain of Infection



Summary

- A variety of infectious agents can be transmitted in ambulatory healthcare settings through contact, droplet and airborne modes
- Standard precautions remain the major infection prevention strategy to prevent transmissions
- Hepatitis B and C virus transmission in healthcare remain preventable risks

Standard Precautions

- Synthesize major features of Universal Precautions
  - Applies to all patients regardless of diagnosis or infection status
  - Includes blood and all body fluids except sweat (includes saliva in all settings)
- May be supplemented by special isolation precautions for diseases transmitted by contact, droplet or airborne routes

Guideline for Isolation Precautions in Hospitals
Epidemiol 1996;17:53-80, and Am J Infect Control 1996;24:24-52.

Standard Precautions

- ***MUST*** be used in the care of all patients regardless of their infection status.
- Some patients require additional measures = '*transmission-based precautions*'
  - Interrupt potential spread of diseases via airborne, droplet, or contact transmission.
  - e.g. TB, influenza, and chickenpox
  - Spread via coughing, sneezing or contact with skin.

CDC 2007 Guideline for Isolation Precautions
http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf.

Transmission-Based Precautions

Pathogen and syndrome-**based precautions**, termed **transmission-based precautions**, for the care of patients who are infected or colonized with pathogens spread through airborne, droplet, or contact routes.

- Standard Precautions +…..

CDC 2007 Guideline for Isolation Precautions
http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf.
Guidelines for infection control in dental health-care settings—2003.
http://www.cdc.gov/mmwr/PDF/rr/rr5217.pdf

Standard Precautions +

TRANSMISSION-BASED PRECAUTIONS

- **Transmission-based precautions** are designed for patients documented or suspected to be infected or colonized with pathogens that require additional **precautions** beyond the standard **precautions** necessary to interrupt **transmission**.
- These **precautions** apply to airborne, droplet, and contact **transmissions**. The **precautions** may be combined for diseases that have multiple routes of **transmission**.
- Whether singly or in combination, they are always to be used in addition to **standard precautions**.

Transmission-Based Precautions

- Might include:
  - Patient placement (e.g., isolation)
  - Adequate room ventilation
  - Respiratory protection (e.g., N-95 masks) for dental health-care personnel (DHCP)
  - Postponement of nonemergency dental procedures.
- More than 1 transmission category may apply
- Always used IN ADDITION to Standard Precautions

CDC 2007 Guideline for Isolation Precautions
http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf.
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Contact Precautions

*Contact **transmission***, the most important and frequent mode of **transmission** of heahcare-associated infections, is divided into two subgroups:

- direct-contact **transmission**
- indirect-contact **transmission**

Example: MRSA

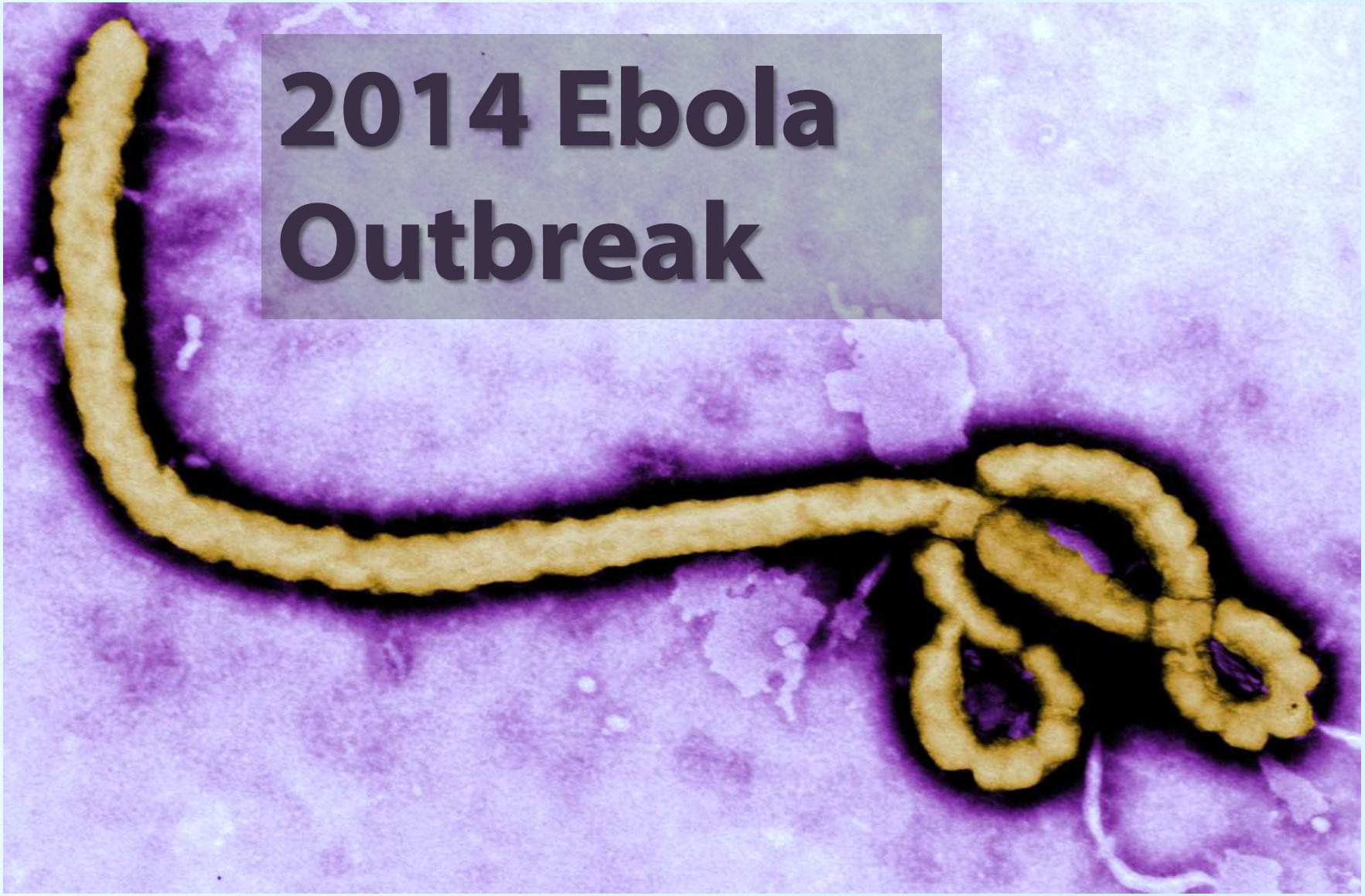
Contact: Droplet Precautions

- *Droplet **transmission***, theoretically, is a form of contact **transmission**. However, the mechanism of transfer of the pathogen to the host is quite distinct from either direct- or indirect-contact **transmission**. Therefore, droplet **transmission** is considered a separate route of **transmission**
- Examples:
  - Influenza
  - Chickenpox

Airborne Precautions

- *Airborne **transmission*** occurs by dissemination of either airborne droplet nuclei (small-particle residue [5 µm or smaller] of evaporated droplets containing microorganisms that remain suspended in the air for long periods) or dust particles containing the infectious agent.
- Tuberculosis (TB)

2014 Ebola Outbreak



- Ebola Response 2014

Healthcare Providers in the United States

- CDC encourages all U.S. healthcare providers to:
  - Ask patients about their travel histories to determine if they have traveled to West Africa within the last three weeks
  - Know the signs and symptoms of Ebola – fever (greater than 100.4°F or 38°C), severe headache, muscle pain, vomiting, diarrhea, abdominal (stomach) pain, or unexplained hemorrhage (bleeding or bruising)
  - Know what to do if they have a patient with Ebola symptoms:
    - First, properly isolate the patient
    - Then, follow infection control precautions to prevent the spread of Ebola.
    - Avoid contact with blood and body fluids of infected people

Infection Control Principles

- Early recognition
  - Early recognition is critical for infection control
- Patient Placement
  - Patients should be placed in a single patient room containing a private bathroom with the door closed
- Protecting healthcare providers
  - IDENTIFY-ISOLATE-INFORM
  - Guidance for hospitals available at: http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html
  - Guidance for emergency departments available at: http://www.cdc.gov/vhf/ebola/hcp/ed-management-patients-possible-ebola.html
  - Guidance for ambulatory care settings in development

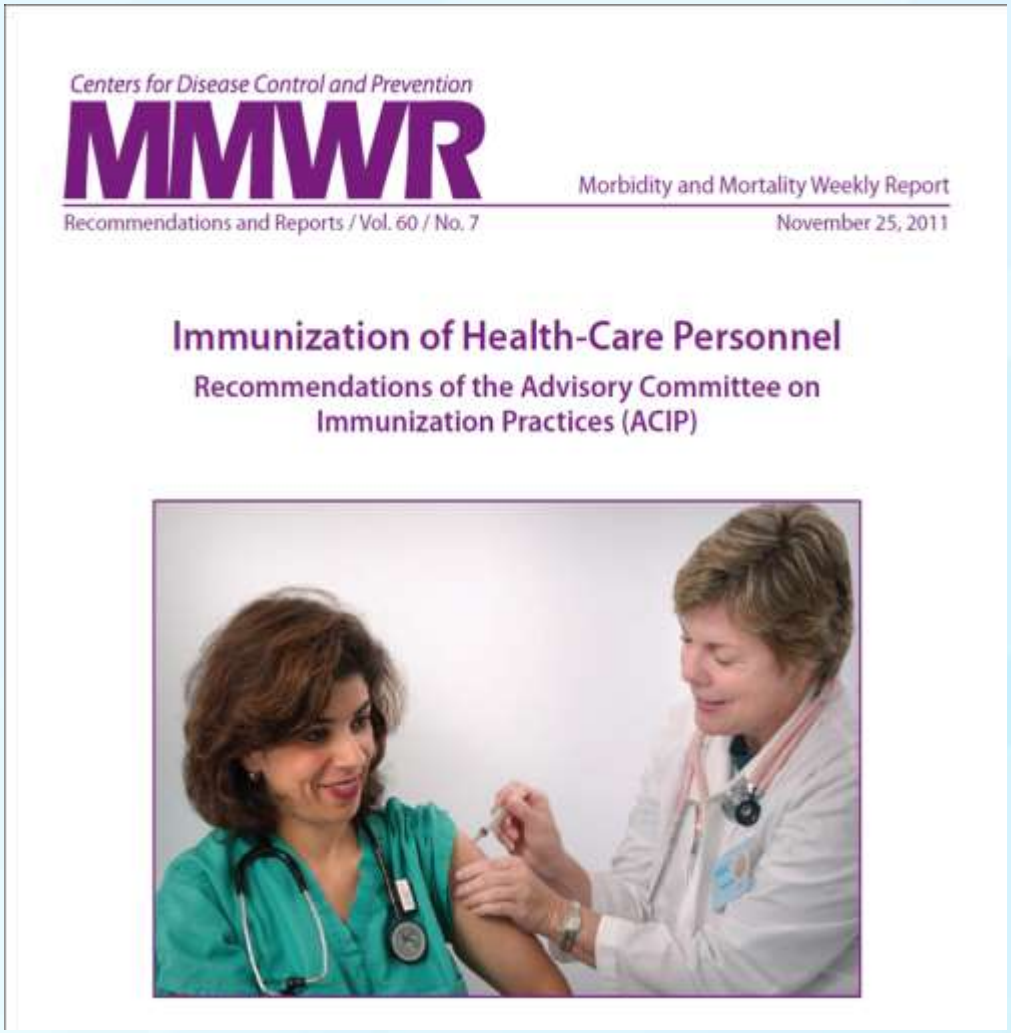
CDC 24/7
Saving Lives. Protecting People.™

Elements of Standard Precautions

- Handwashing
- Personal protective equipment
- Sterilization of instruments and devices
- Cleaning/disinfecting environmental surfaces
- Engineering/work practice controls
- Respiratory hygiene/cough etiquette
- Safe injection practices

CDC 2007 Guideline for Isolation Precautions
http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf.

Immunization of Health-Care Personnel

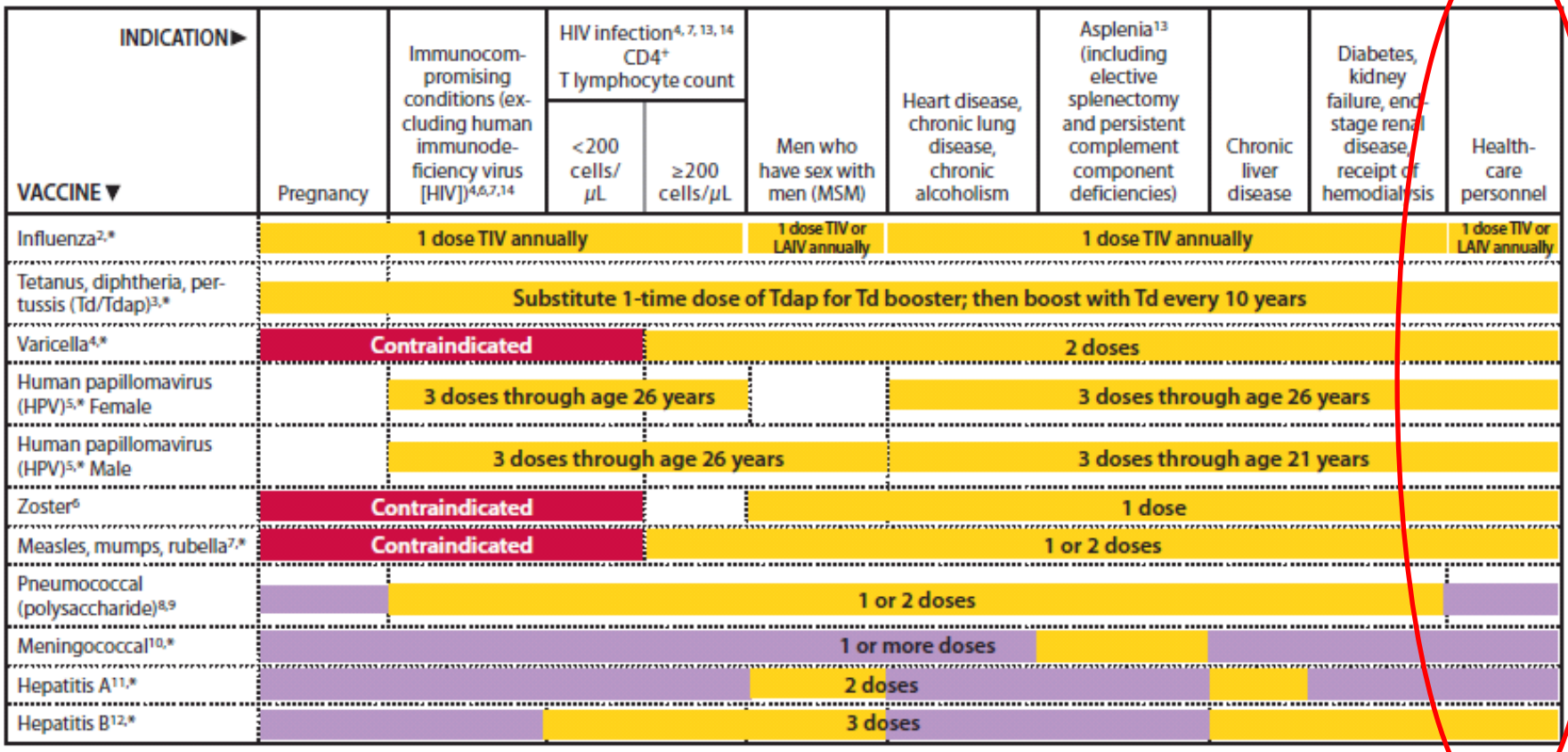


Acknowledge:
CAPT Raymond A. Strikas, MD, MPH, FACP, FIDSA
Sarah Schillie, MD, MPH, MBA

www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm?s_cid=rr6007a1_e

2012 ACIP Adult Immunization Schedule, Medical, Occupational and Behavior-Based Recommendations

FIGURE 2. Vaccines that might be indicated for adults, based on medical and other indications[1] — United States, 2012



* Covered by the Vaccine Injury Compensation Program

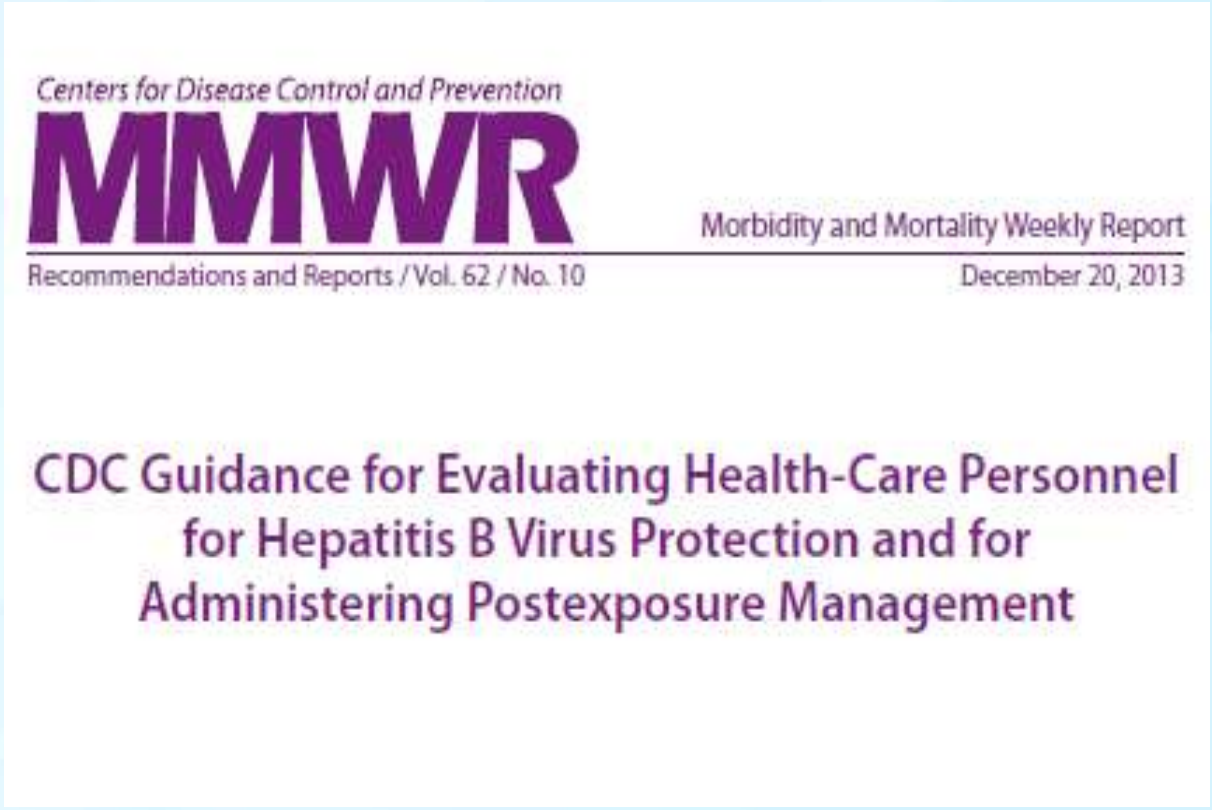
- For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection
- Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)
- Contraindicated
- No recommendation

Recommended Vaccines for HCP Based on Risk of Healthcare Setting Transmission*

Hepatitis B	**Give 3-dose series. Give IM. Obtain anti-HBs serologic testing 1-2 months after dose #3**
Influenza	**Give 1 dose of TIV or LAIV annually. Give TIV intramuscularly or LAIV intranasally. *Follow 2013 recommendations from CDC***
MMR	**HCP born in 1957 or later without evidence of immunity or prior vaccination, give 2 doses MMR, 4 weeks apart. Give SC. If born before 1957, 1 dose. Two doses for all HCP during mumps outbreak.**
Varicella	**HCP with no serologic proof of immunity, prior vaccination, or history of varicella disease, give 2 doses of varicella vaccine, 4 weeks apart. Give SC.**
Tetanus/diph-theria/pertussis	**All HCP need Td every 10 years after completing a primary series. Give 1 dose of Tdap IM, if direct patient contact, prioritize HCP in contact with pts. <12 mos.**

***MMWR November 25, 2011 / 60(RR07);1-45**

CDC Recommendations for Hepatitis B Protection among HCP (2013)



www.cdc.gov/mmwr/preview/mmwrhtml/rr6210a1.htm?s_cid=rr6210a1_w

HCP with Hepatitis B Vaccination in the Remote Past

- **Increasing proportion of HCP entering training and workforce have received HepB vaccination as infants or in the remote past**
  - Anti-HBs testing not recommended after routine infant HepB vaccination
- **Anti-HBs after vaccination wanes over time, although protection believed to persist**

HCP with Hepatitis B Vaccination in the Remote Past

(with Documentation of Complete, ≥3-dose HepB vaccine series)

- **May undergo anti-HBs testing upon hire or matriculation**
  - Anti-HBs ≥10 mIU/mL: Considered immune
  - Anti-HBs <10 mIU/mL: 1 additional dose of HepB vaccine, followed by anti-HBs testing 1-2 months later
    - HCP whose anti-HBs remains <10 mIU/mL should receive 2 additional doses (usually 6 doses total), followed by repeat anti-HBs testing 1-2 months after last dose

Pre-exposure anti-HBs Testing HCP Vaccinated in the Remote Past

- **~72% of institutions measure anti-HBs upon hire/matriculation for remotely vaccinated HCP**
- **Advantages**
  - Results in fewer cases of occupational Hepatitis B transmission
  - Provides greatest protection for HCP (including protection against unrecognized/unreported exposures)
  - More cost-effective over time

- 2013 MMWR

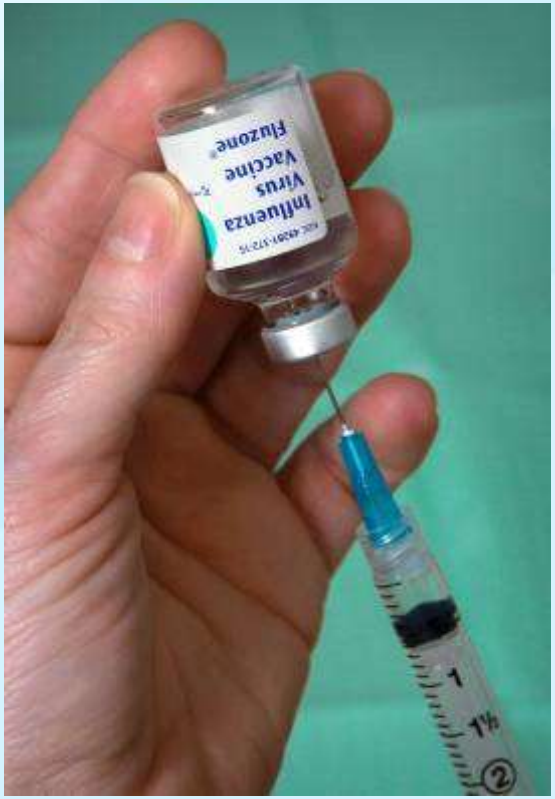
INFLUENZA VACCINE

Tools for the Prevention of Influenza

- **Influenza vaccine**
- **Antiviral medications**
  - Can be used for treatment or prevention (prophylaxis)
- **Hand hygiene**
- **Masks**
- **Respirators**
- **Environmental controls**
  - E.g. ensuring appropriate ventilation, air exchange, physical barriers, etc.

Influenza Vaccine

- Primary means for preventing influenza
- Recommended annually for all people 6 months of age and older
  - Including pregnant women
  - Including healthcare personnel
- "Insurance" against infection
- Benefit to those vaccinated plus decreases risk of spreading influenza to others
  - Not 100% effective
  - Need to use other tools in addition to vaccination



Influenza and Vaccination

- **Four types of influenza vaccines available:**
  - Traditional inactivated ("killed") influenza vaccine injected in muscle
    - anyone 6 months of age or older
  - Nasal spray vaccine (LAIV): healthy individual
    - ages 2-49 years
    - HCP not working with patients in a protected environment
  - High-dose inactivated injectable vaccine
    - 65 years and older
  - Intradermal inactivated vaccine: uses very small needle
    - 18-64 years old

Influenza and Mask or Respirator Use

- **Relatively few clinical studies done to assess reduction in influenza illness in clinical setting for masks or respirators**

- **Household transmission studies and one study of college students found**
  - Limited reductions with mask +/- hand hygiene when
    - High levels of compliance with mask use
    - Early initiation of mask use
  - No reductions in influenza with increase in hand hygiene alone

- **Study of 2009 H1N1 in hospital workers**
  - Masks likely helpful
  - Emergency Department workers more likely to become ill with influenza than other types of workers
    - May have been related to lack of wearing mask with first encounter with patient

Apisarnthanarak CID 2012; Vanhems Archives Intern Med 2011; Aiello JID 2010; Cowling Epi Infect 2010; Aiello AJPH 2008

Influenza vaccination coverage of health care personnel by occupation, mid-November 2011

Group	Already vaccinated
Overall	63.4
Occupation:	
Physician/dentist	77.6
Nurse practitioner/physician assistant	76.8
Nurse	75.7
Other†	58.7

† "Other" includes allied health professionals, technicians/assistants and aides, and administrative and non-clinical support staff.

http://www.cdc.gov/flu/professionals/vaccination/health-care-personnel.htm

Conclusions for Influenza

- **Many tools for influenza prevention, but vaccination is the primary means to prevent influenza**
  - Best insurance against influenza infection and transmission to HCP family, friends, coworkers and patients
- **Vaccination should be used in conjunction with other influenza prevention tools to most effectively decrease the spread of influenza**

Common Reasons HCP and Adult Patients Might Give for Not Getting Vaccinated

10. Vaccine preventable diseases are a thing of the past.
9. Vaccines don't work.
8. I am great at washing my hands.
7. I always put on a mask before I am near patients that may have [INSERT DISEASE HERE].
6. I never come to work sick.
5. Vaccines will make me sick.
4. It is easier to deal with the rare case than to vaccinate routinely.
3. My patients are already vaccinated so I don't need to be.
2. The healthcare facility where I work doesn't require vaccines.
1. My doctor didn't recommend any vaccines for me.

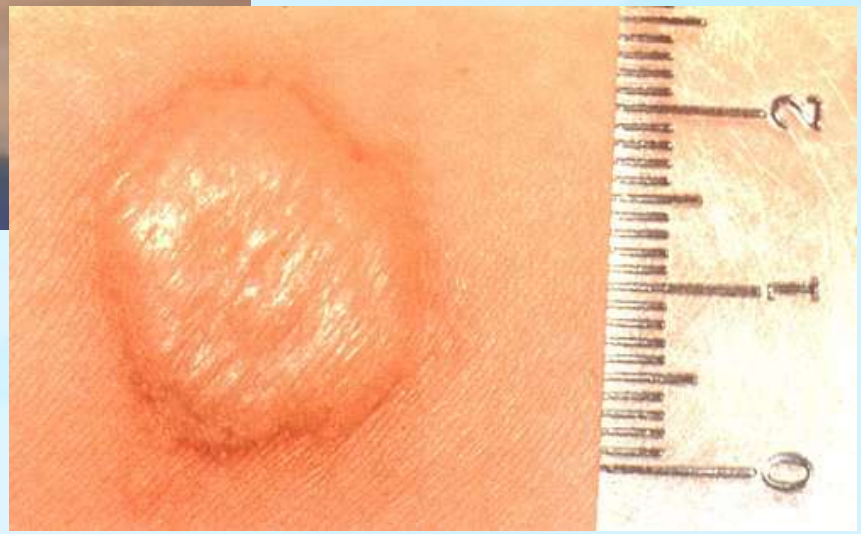
Summary

- **Outbreaks of vaccine preventable diseases continue to occur**
  - Result in health risks to patients and HCP and their families
  - Very disruptive and expensive to investigate and manage
  - Can be difficult to recognize early and before many people have been exposed
  - Exposures and illnesses can result in substantial lost work time as early awareness and implementation of control measures challenging

Conclusions

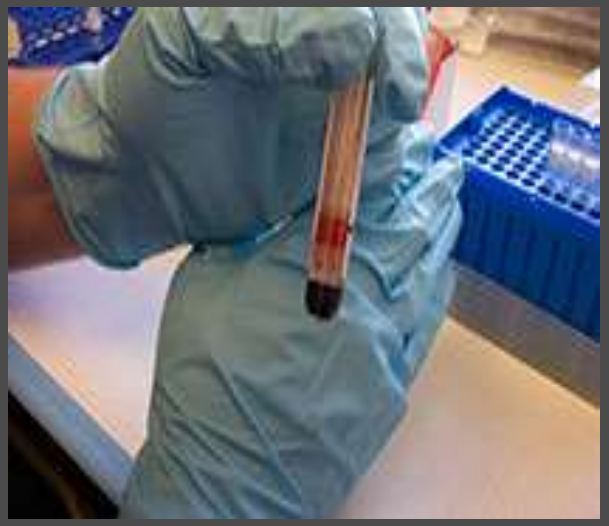
- **Vaccines have been highly successful in reducing the burden of many diseases**
- **Vaccination are a critical component of infection control to protect HCP and their patients, coworkers and families**
- **DHCP should be**
  - Assessed for vaccination and immunity status at the time of hire and at least annually to ensure they are up to date with recommended vaccines.
  - Provided with information about risks and benefits of the vaccines

Tuberculin Skin Test

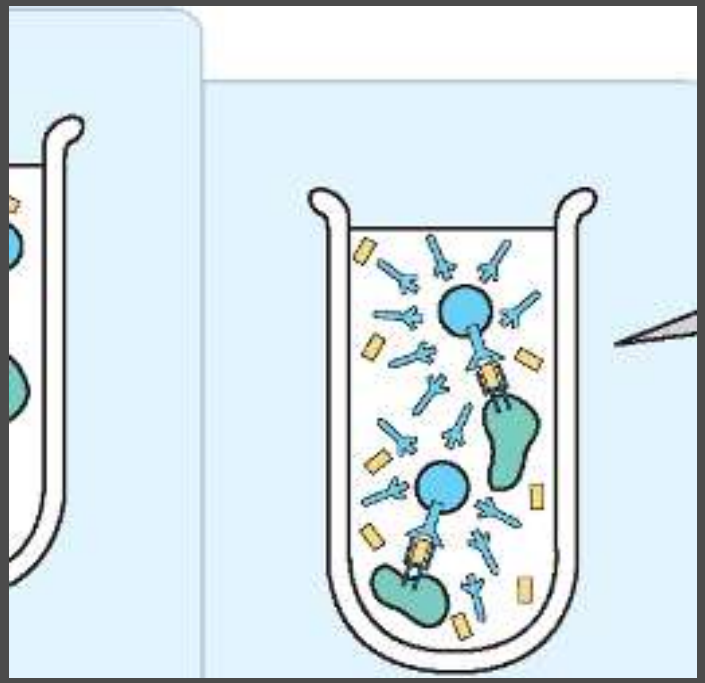


TB Blood Test

Identifies if a person was exposed to MTB



Primed peptide TH1 cells create interferons



TB Testing Frequency

Risk category	***Frequency***
Low	Baseline on hire; further testing not needed unless exposure occurs
Medium	Baseline, then annually
Potential ongoing transmission	Baseline, then every 8–10 wks until evidence of transmission has ceased

Program Evaluation: Immunization of HCP

- Program Element
  - Appropriate immunization of health-care personnel (HCP).
    - Develop and implement a program that promotes immunity of health-care personnel according to current CDC ACIP recommendations for health-care personnel.
      - HBV Vaccine: OSHA Bloodborne Pathogens Standard Regulate Employer provide Education and Training, access to HBV vaccine during normal working hours, and pay for the vaccine. If employee refuses, the OSHA Declination form must be signed, but employee can change his/her mind.
      - Other CDC recommended vaccines……
- Evaluation Activity
  - Conduct an annual review of personnel records to ensure up-to-date immunizations.
    - Keep updated immunization records of personnel.
    - Refer non-immune personnel to a qualified health-care provider for evaluation and indicated vaccinations/immunizations.

Work Restrictions of HCP

Medical Conditions, Work-Related Illness, and Work Restrictions

- HCP are responsible for monitoring their own health status. HCP who have acute or chronic medical conditions that render them susceptible to opportunistic infection should discuss with their personal physicians or other qualified authority whether the condition might affect their ability to safely perform their duties.
- Under certain circumstances, health-care facility managers might need to exclude HCP from work or patient contact to prevent further transmission of infection (e.g., conjunctivitis, influenza, etc.)

Medical Conditions, Work-Related Illness, and Work Restrictions

- Under certain circumstances, health-care facility managers might need to exclude HCP from work or patient contact to prevent further transmission of infection (e.g., conjunctivitis, influenza, etc.)
- Managers may exclude HCP from patient contact to prevent transmission
  - Work restrictions based on mode of transmission and period of infectivity
  - Written policies should define who can exclude HCP (e.g., personal physicians) and be clearly communicated

Medical Conditions, Work-Related Illness, and Work Restrictions

Decisions concerning work restrictions are based on the mode of transmission and the period of infectivity of the disease.

Medical Conditions, Work-Related Illness and Work Restrictions

- Exclusion policies should
  - 1) be written,
  - 2) include a statement of authority that defines who can exclude DHCP (e.g., personal physicians), and
  - 3) be clearly communicated through education and training. Policies should also encourage DHCP to report illnesses or exposures without jeopardizing wages, benefits, or job status.

Medical Conditions, Work-Related Illness and Work Restrictions

Policies should encourage DHCP to report illnesses or exposures without jeopardizing wages, benefits, or job status.

Work Restrictions: Influenza

- Self-assess daily for symptoms of febrile respiratory illness (fever plus one or more of the following:
  - nasal congestion/runny nose,
  - sore throat
  - cough.
- Personnel who develop fever and respiratory symptoms should promptly notify their supervisor and should not report to work.

Work Restrictions - Influenza

Personnel should remain at home until at least 24 hours after they are free of fever (100°F/37.8°C), or signs of a fever, without the use of fever-reducing medications.

Resource: Preventing Transmission of Influenza in Healthcare Settings

- http://www.cdc.gov/flu/pdf/infectioncontrol_seasonalflu_ICU2010.pdf
- On July 29, 2010, CDC issued Recommendations for the Prevention and Control of Influenza
- http://www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm
- http://www.cdc.gov/flu/professionals/infectioncontrol/

Diseases for Which Vaccines Routinely Recommended for HCP and Work Implications if Exposed* or Infected

	Measles	Mumps	Rubella	Varicella	Pertussis
if exposed and not immune	5 days after exposure through 21 days	12 days after exposure through 25 days	7 days after exposure through 23 days	8 days after exposure through 21/28 days**	Monitor for cough for 21 days; consider antibiotics
if ill	For 4 days after rash first appears	For 5 days after onset parotitis	For 7 days after rash first appears	Until all lesions dry and crust or no new lesions >24 hours	3 weeks after cough onset or 5 days antibiotics
Vaccine Doses***	2 SQ MMR doses	2 SQ MMR doses	1 SQ MMR dose	2 SQ	One Tdap as adult

*Exposures are from first exposure through date of last exposure. **Longer if receive immune globulin; ***for MMR and Varicella is no accepted evidence of immunity.

CDC. Immunization of Health-care Personnel: Recommendations of the Advisory Committee on Immunization Practices. MMWR 2011;60:RR1-47.

Program Evaluation: Immunization of DHCP

- Program Element
  - Appropriate immunization of dental health-care personnel (DHCP).
    - Develop and implement a program that promotes immunity of health-care personnel according to current CDC ACIP recommendations for health-care personnel.
      - HBV Vaccine: OSHA Bloodborne Pathogens Standard Regulate Employer provide Education and Training, access to HBV vaccine during normal working hours, and pay for the vaccine. If employee refuses, the OSHA Declination form must be signed, but employee can change his/her mind.
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- Evaluation Activity
  - Conduct an annual review of personnel records to ensure up-to-date immunizations.
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    - Refer non-immune personnel to a qualified health-care provider for evaluation and indicated vaccinations/immunizations.

Hand Hygiene/Antisepsis for Routine Dental Procedures

	Soap & Water	Anti-microbial Soap & Water	Alcohol-based Hand Rub Alone
If hands are visibly soiled with blood, body fluids, or proteinaceous material	YES	YES	NO
If hands are **not** visibly soiled	YES	YES	YES


Softsoap

In the News…

- **FDA issues proposed rule to determine safety and effectiveness of over the counter antibacterial soaps**
  - http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm378542.htm
  - proposed rule to require manufacturers of antibacterial hand soaps and body washes to demonstrate that their products are safe for long-term daily use and more effective than plain soap and water in preventing illness and the spread of certain infections.
  - Under the proposal, if companies do not demonstrate such safety and effectiveness, these products would need to be reformulated or relabeled to remain on the market.

Hand Hygiene/Antisepsis
Surgical Procedures

	Soap & Water Alone	Antiseptic Handwash* & Water	Antiseptic Handwash & Water Followed by Alcohol-based Hand Rub*
Surgical hand antisepsis prior to gloving	NO	YES	YES

*Antiseptic handwash agent and alcohol-based hand rubs should have a persistent effect and broad spectrum of activity, and be fast-acting.

PPE

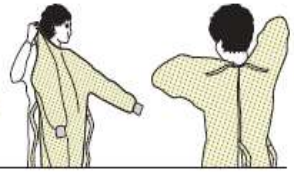
- Wear long-sleeved disposable or reusable gowns, lab coats, or uniforms that cover skin and personal clothing likely to be soiled with blood, saliva or infectious material
- Change if visible soiled, or as soon as possible
- Remove all barriers before leaving patient care or laboratory areas

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist

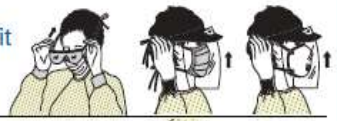


2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

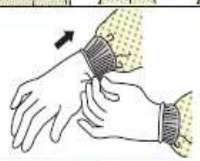
3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit



4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

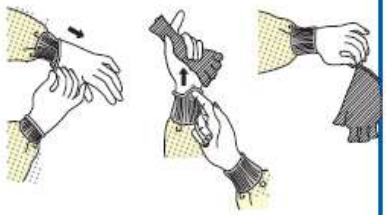
- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

SEQUENCE FOR REMOVING PERSONAL PROTECTIVE EQUIPMENT (PPE)

Except for respirator, remove PPE at doorway or in anteroom. Remove respirator after leaving patient room and closing door.

1. GLOVES

- Outside of gloves is contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist
- Peel glove off over first glovet
- Discard gloves in waste container



2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield is contaminated!
- To remove, handle by head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container

3. GOWN

- Gown front and sleeves are contaminated!
- Unfasten ties
- Pull away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard

4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- Grasp bottom, then top ties or elastics and remove
- Discard in waste container

PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE

http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf

New Elements to Standard Precautions (2007)

- 'Infection control problems that are identified in the course of outbreak investigations often indicate the need for new recommendations or reinforcement of existing infection control recommendations to protect patients.'
- Two areas of practice relevant to dentistry added:
  - Respiratory Hygiene/Cough Etiquette
  - Safe Injection Practices

CDC 2007 Guideline for Isolation Precautions
http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf.

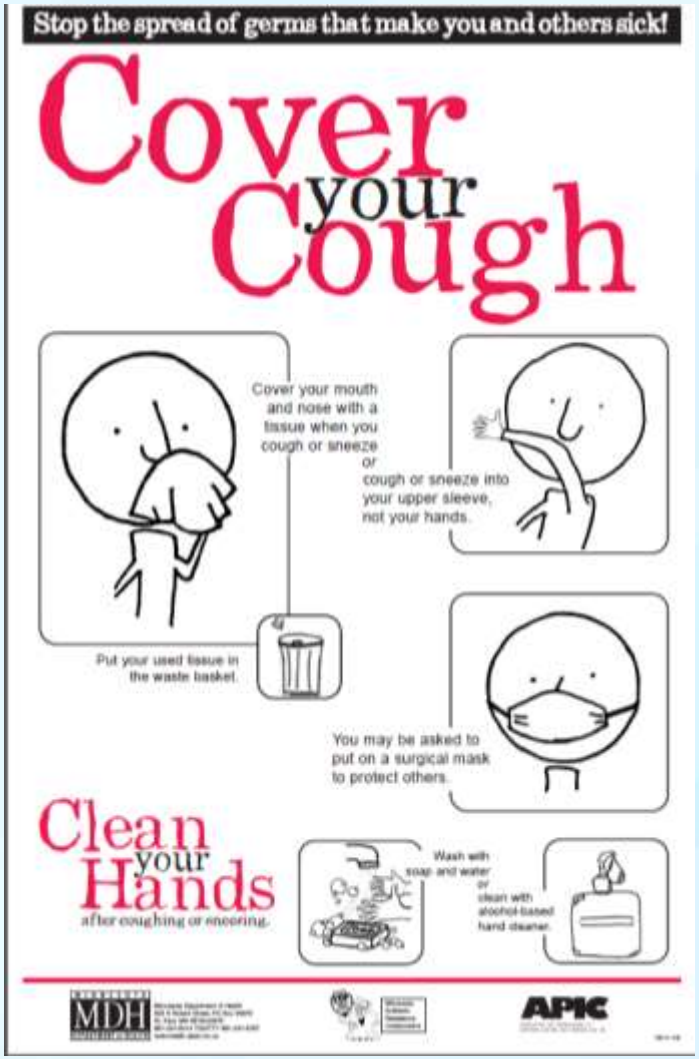
Respiratory Hygiene/Cough Etiquette

- Grew out of observations during severe acute respiratory syndrome (SARS) outbreaks where failures to implement simple source control measures with patients, visitors, and health-care personnel with respiratory symptoms may have contributed to SARS-coronavirus (SARS-CoV) transmission.

Safe Injection Practices

- Conclusions of the investigations of transmissions that could have been prevented by adherence to basic principals of aseptic technique for the preparation and administration of parenteral medications

Respiratory Hygiene/Cough Etiquette



- Cover your mouth and nose with a tissue when coughing or sneezing;
- Use in the nearest waste receptacle to dispose of the tissue after use;
- Perform hand hygiene after having contact with respiratory secretions and contaminated objects/materials.

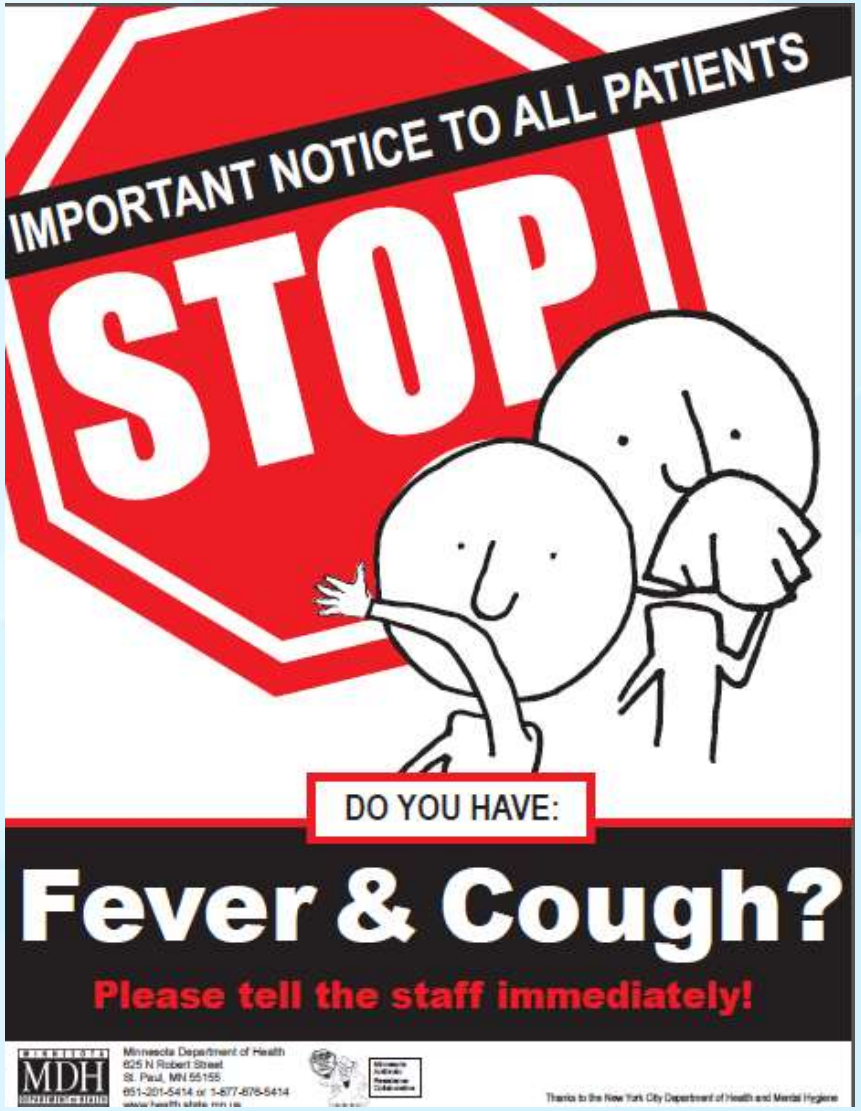
http:///www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm

Supplies for Patient Areas

- Kleenex
- Hand sanitizer
- Masks – specifications and proper use

- **Identify patients with signs and symptoms of fever and cough.**

- **Place symptomatic patients in separate room.**
  - **Give patient surgical face mask**
  - **Contact providers should wear at least surgical face mask.**



http://www.health.state.mn.us/divs/idepc/dtopics/infectioncontrol/cover/hcp/notice.pdf

Safe Injection Practices

- Safe Injection Practices are a set of recommendations within Standard Precautions, which are the foundation for preventing transmission of infections during patient care in all healthcare settings

Note: In dentistry, generally applies to administration of parenteral medications not related to local anesthesia.

http://www.cdc.gov/injectionsafety/IP07_standardPrecaution.html

Risk of Infection after Needlestick

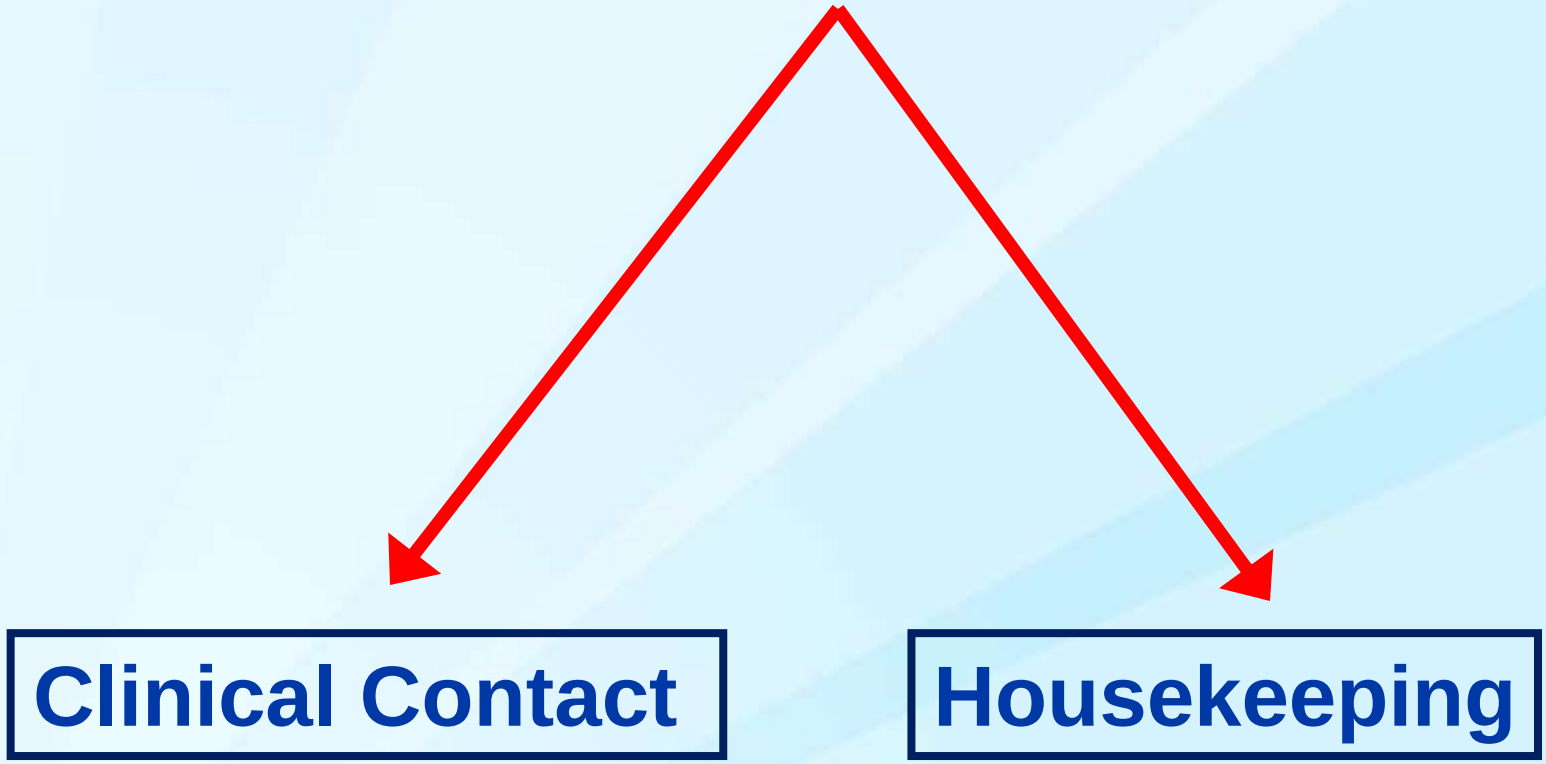
Source	Risk	
HBV	6.0-30.0%	1/3
HBeAg+	22.0-30.0%	
HBeAg-	1.0-6.0%	
HCV	1.8%	1/30
HIV	0.3%	1/300

Safe Injection Practices = Aseptic Technique for Parenteral Medications

- Do not administer medications from a syringe to multiple patients, even if the needle on the syringe is changed (IA) (378).
- Use single-dose vials for parenteral medications when possible (II) (376,377).
- Do not combine the leftover contents of single-use vials for later use (IA) (376,377).
- Use fluid infusion and administration sets (i.e., IV bags, tubing and connections) for one patient only and dispose of appropriately (IB) (378).

CDC 2007 Guideline for Isolation Precautions
http://www.cdc.gov/ncidod/dhqp/pdf/isolation2007.pdf.
Guidelines for infection control in dental health-care settings—2003.
http://www.cdc.gov/mmwr/PDF/rr/rr5217.pdf

Environmental Surfaces



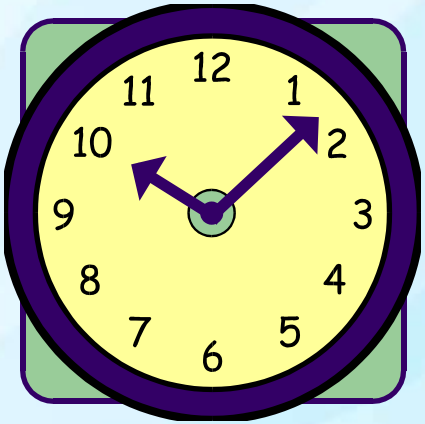
Environmental Stability

- HBV can survive in dried blood on environmental surfaces for at least one week.
- In vitro studies have shown the HCV can remain infective on dry surfaces for up to 6 weeks.
- HBV and HCV transmission via contact with environmental surfaces has been demonstrated in investigations of outbreaks among patients and staff of hemodialysis units.

Bond WW et al, Lancet 1981
Kamili S et al, Infect Control Hosp Epidemiol 2007
Paintsil E, J Infect Dis 2014.

Barriers VS. Cleaning and Disinfection

- Remove
- Replace



- Spray
- Clean/wipe
- Spray

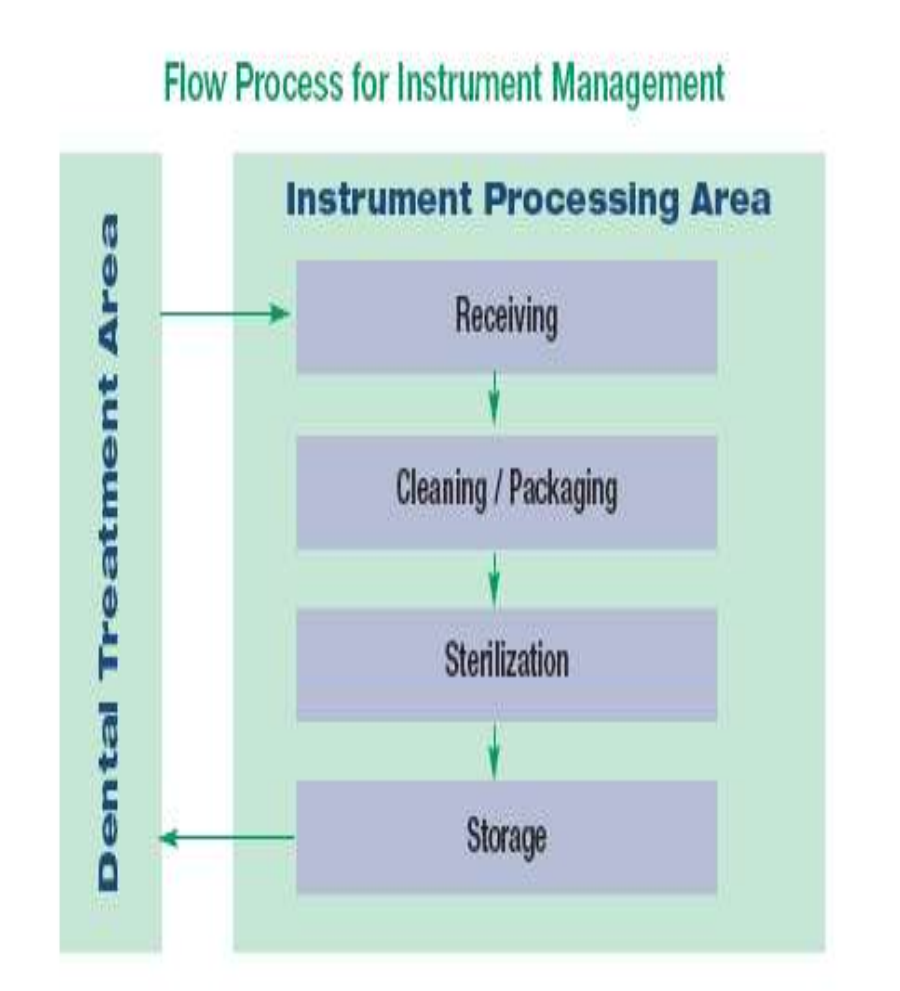
Clean and disinfect using an EPA registered **low**- (HIV/HBV claim) to **intermediat**e- (tuberculocidal claim) level hospital disinfectant

Premoistened Disinfectant Wipes

- Wipe (clean)
- Wipe (disinfect)
- Wait (manufacturer's claim)
- Follow specific Product Manufacturer's Instructions for use.

Principle 4
Make Reusable Patient Care Items Safe for Use

- Clean, heat sterilize or disinfect reusable patient care items that ….
- Monitor processes….
- Contain and dispose of single use items
- Considerations for on-site vs. centralized processing of re-usable patient care items.

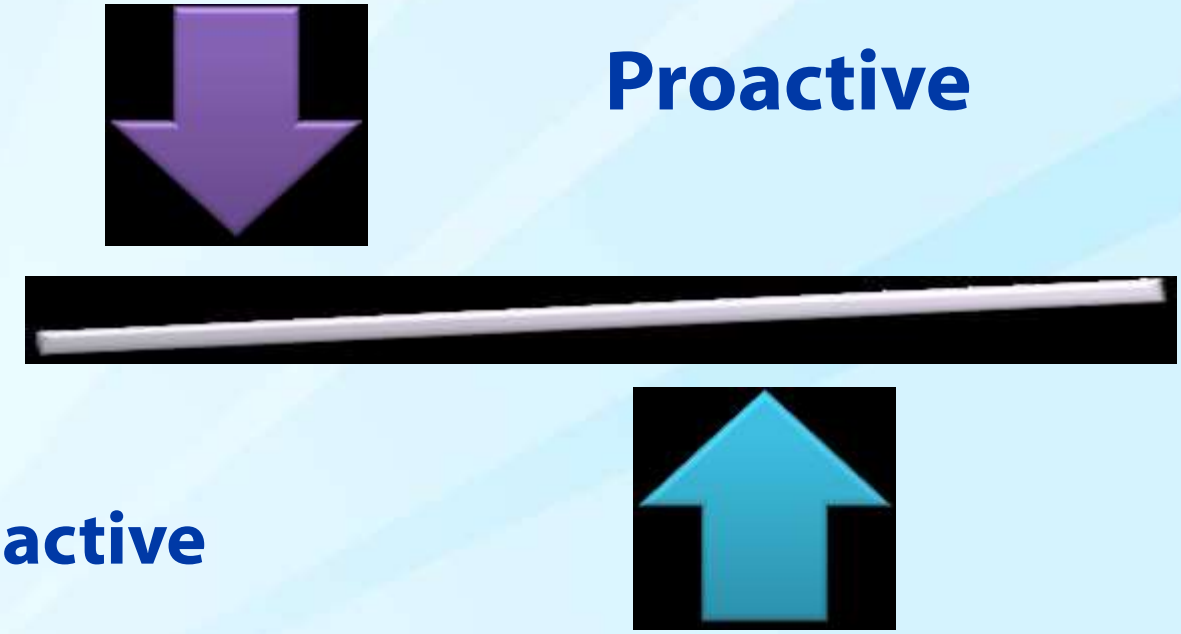


Proper Work Flow Prevents Errors

"Program evaluation provides an opportunity to identify and change inappropriate practices, thereby improving the effectiveness of your infection control program."

- Centers for Disease Control (CDC) "Guidelines for Infection Control in Dental Health-Care Settings – 2003"

Implementing Change

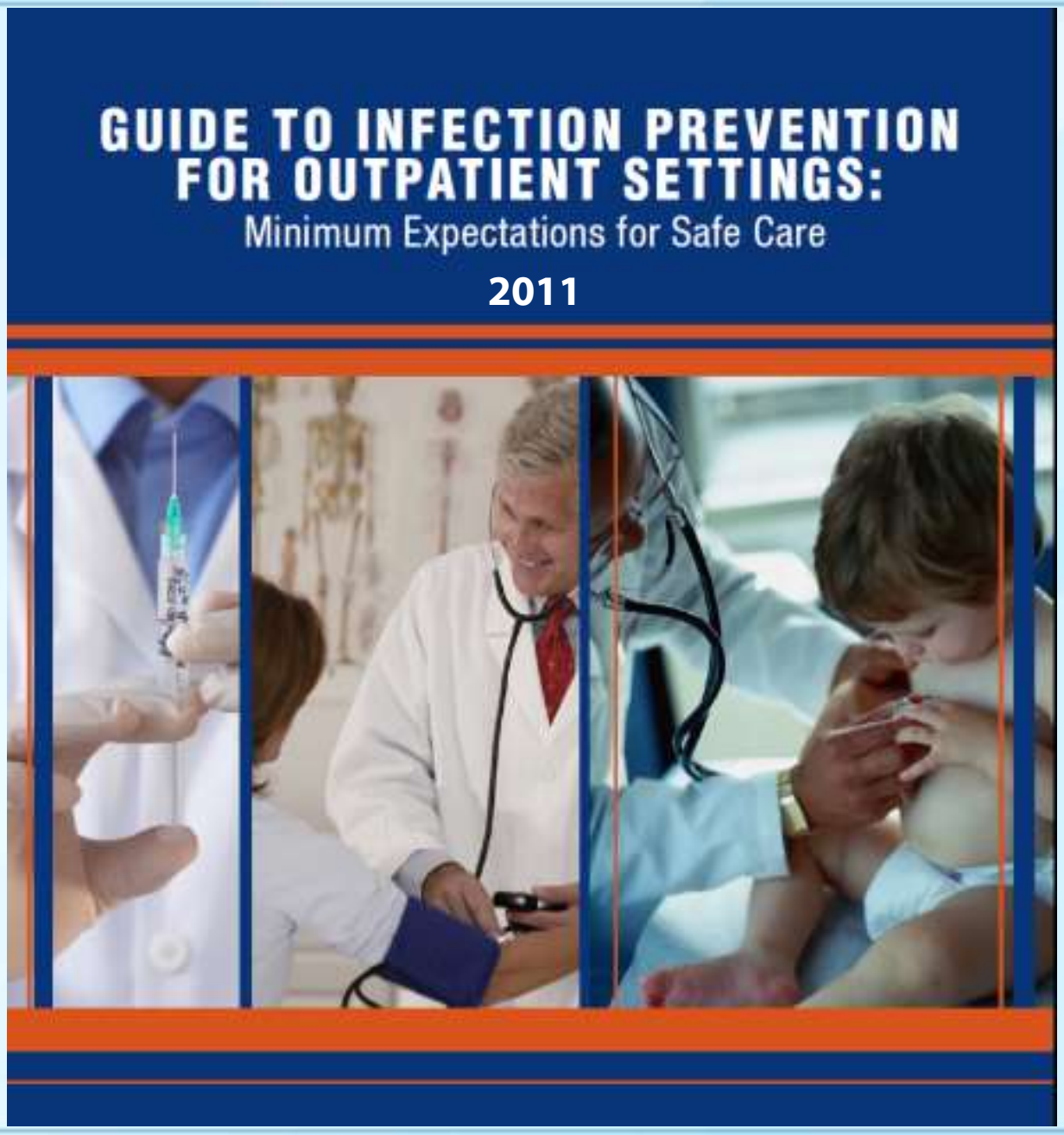


Program Evaluation

- **Strategies and Tools**
  - **Periodic observational assessments**
  - **Checklists to document procedures**
  - **Routine review of occupational exposures to bloodborne pathogens**

Checklists for Repeatable Processes

- Remind individuals of critical steps to complete each time
- Provide verification that the steps have been completed
- Create a history that can be reconstructed if there is an adverse event


GUIDE TO INFECTION PREVENTION
FOR OUTPATIENT SETTINGS:
Minimum Expectations for Safe Care
2011

Guide and Checklist for Outpatient Settings

In Outpatient Settings

The transition of healthcare delivery from acute care hospitals to ambulatory care settings, along with ongoing outbreaks and patient notification events, have demonstrated the need for greater understanding and implementation of basic infection prevention guidance. Guide to Infection Prevention in Outpatient Settings: Minimum Expectations for Safe Care distills existing infection prevention guidance from the Centers for Disease Control and Prevention (CDC) and its Healthcare Infection Control Practices Advisory Committee (HICPAC).

Infection Prevention Guide

Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care

This summary guide of infection prevention recommendations for outpatient (ambulatory care) settings.

Infection Prevention Checklist

The Infection Prevention Checklist for Outpatient Settings: Minimum Expectations for Safe Care is a companion to the *Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care*. The checklist should be used for two purposes:

http://www.cdc.gov/HAI/settings/outpatient/outpatient-settings.html

2011 Guide Summary

- **Basic infection prevention recommendations for outpatient settings**
  - Administrative measures
    - Education and training of all HCP
    - Report process and outcome measures
- **Standard Precautions**
  - Hand hygiene
  - Injection safety
  - Medical equipment
  - PPE
  - Environmental cleanin
  - Resp hygiene/cough e
- **Resources**
  - Disinfection and sterilization
  - FDA device information
  - Transmission based precautions

Checklist for Infection Prevention for Outpatient Settings

Infection Prevention Checklist
Section I. Administrative Policies and Facility Practices

1. Facility Policies	Practice Performed	If answer is No, document plan for remediation
• Written infection prevention policies and procedures are available, current, and based on evidence-based guidelines (e.g., CDC/HICPAC), regulations, or standards *(Note: Policies and procedures should be appropriate for the services provided by the facility and should extend beyond OSHA bloodborne pathogen training)*	Yes No	
• Infection prevention policies and procedures are re-assessed at least annually or according to state or federal requirements	Yes No	
• At least one individual trained in infection prevention is employed by or regularly available to the facility	Yes No	
• Supplies necessary for adherence to Standard Precautions are readily available *(Note: This includes hand hygiene products, personal protective equipment, and injection equipment.)*	Yes No	

Thank You