

## Infection Control Is Not Optional: Dental Practitioners Need to Be Involved

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## Disclosure

- Dr. DePaola is a consultant for the following:
  - Colgate Palmolive
  - GC America
- The content of this was developed and controlled by Dr. DePaola.

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## Why Is Infection Control Important in Dentistry?

- Both patients and dental health care personnel can be exposed to pathogens
- Routine contact with:
  - Blood
  - Oral and respiratory secretions
  - Contaminated equipment

Proper procedures can prevent transmission of infections among patients and DHCP



## Much of Infection Control is Common Sense

- It is not rocket science
- Or black magic
  - It's just separating the clinician/patient/staff from the microorganisms in the daily practice of dentistry

## Infection Control Timeline

### The 19th Century:

- The Germ Theory of Disease
- Putting Infection Control into Practice

### The 20th Century:

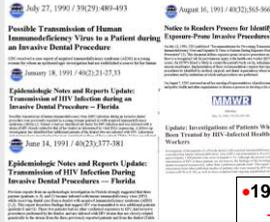
- The antibiotic era
- Vaccines conquer disease

## Infection Control Timeline

- **1986: CDC**
  - Recommended Infection Control Practices for Dentistry
    - *MMWR* April 18, 1986/35(15)237-42



## Infection Control Timeline

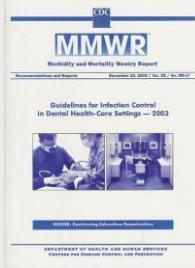


- **1990**
  - Florida Dental HIV transmission case

- **1991: OSHA**
  - Bloodborne Pathogens Standard
- **1993: CDC**
  - Recommended Infection Control Practices for Dentistry, 1993

## Infection Control Timeline

- **2003: CDC**
- *MMWR* December 19, 2003 Vol. 52/No. RR-17
  - Guidelines for Infection Control in Dental Health-Care Settings, 2003



**Patient-to-Patient Transmission of Hepatitis B Virus Associated With Oral Surgery**

May 2007

Is this an isolated event or the tip of the iceberg???

## Patient-to-Patient Transmission of Hepatitis B Virus Associated With Oral Surgery

- Molecular epidemiologic techniques document pt-to-pt transmission of HBV between 2 outpatient oral surgery patients operated on 161 minutes apart.
  - Index case a 60 year old woman with no traditional risk factors for HBV.
    - Investigation lead to oral surgery procedure
    - Linked to previous patient who was HBeAg positive
    - OS office following recommended infection control protocols
- Mechanism of transmission unknown
  - Suspect cross-contamination

Redd J, et al. *JID* 2007;195:1311-14.

## CDC Confirms Hepatitis C Transmission In Oklahoma Dental Office

As you may be aware, there is top-tier news coverage (Associated Press (AP), ABCNews.com and CNN.com) about one confirmed case of patient-to-patient hepatitis C transmission linked to improper infection control practices in an Oklahoma oral surgeon's office. The transmission is described as "patient to patient" because improper infection control procedures caused the virus to be passed from one patient to another.

Yesterday, the Oklahoma State Department of Health and Tulsa Health Department published an interim status report of findings related to their ongoing investigation of this oral surgeon's infection control practices. The report included confirmation of the first documented patient-to-patient transmission of hepatitis C virus associated with a dental setting in the United States. These findings were also independently confirmed by the Centers for Disease Control and Prevention (CDC) through genetic-based testing of patient specimens

American Dental Association-Press Release 09/19/13

### West Virginia Dental Clinic at Center of Hepatitis B Scare

June 7th, 2010

- West Virginia hepatitis B transmission outbreak involves about 2,000 people, most of whom were low income patients,
  - Outbreak could possibly extent to five states (WV, VA, MD, PA, NC, & DC).
- Approximately 2,000 patients and volunteers were urged to received hepatitis B testing after receiving or rendering treatment at a free dental clinic in West Virginia after 5 patients (3 patients and 2 volunteers) developed acute hepatitis B sometime in November, 2009.
- All 5 individuals participated in the Mission of Mercy Dental Clinic in Berkeley County in June 2009.
- Although the origin of the disease remains unclear, testing confirms four people were likely infected by the same source, according to the AP.
  - The investigation is continuing.

### Risk of Viral Transmission With Sharps Injury From Infected Source

Source	Risk
• HBV:	
* HBsAg positive	
* Unvaccinated/Non-responder HCW*	
- Source HBeAg +:	37 to 62 %
- Source HBeAg -:	23 to 37%
• HCV:	1.8%
• HIV:	0.3%
* anti-HBs <10 mIU/mL	

Barratt J. 2002. Medical Management of HIV Infection; MMWR 2001; 50: RR-11

### Infectious Disease Control Objectives

- **Reduce** the number of pathogens in the environment
- **Break** the chain of infection and eliminate cross contamination
- **Treat** every patient/instrument as though infectious
  - The same way;
  - Every day;
  - For every patient
- **Protect** patients/personnel from infection
  - And potential litigation

### Infection Control Is Not Optional!!!!

- Patients have been put at significant risk of acquiring infectious diseases from dental practices in CO, OK, AK and PA.
  - In each instance breaches in infection control occurred.
- Oral health practitioners have the moral, legal and ethical responsibility to deliver oral health care in as safe a manner as possible.

### Infection Control Is Not Optional!!!!

#### Question # 1:

- Do you heat-sterilize all your instruments, including handpieces, between patients?
  - In keeping with CDC, ADA and OSAP recommendations, your dentist should be heat-sterilizing all instruments that penetrate or contact a patient's oral tissues.
    - Although autoclaves are most commonly used to sterilize dental instruments, some offices may have other types of heat sterilizers.
    - Chemical-vapor sterilizers ("Chemiclaves") and dry-heat sterilizers also are appropriate for sterilizing dental instruments.
  - Your dentist (or his or her staff) should heat-sterilize instruments that have been used on a patient before they are introduced to treat the next patient.
    - Most dental instruments are designed to withstand repeated heat sterilization.

http://www.osap.org/?Patient\_FiveQuestion

### Infection Control Is Not Optional!!!!

#### Question # 2:

- How do you know that the sterilizer is working properly?
  - Most practices use a variety of methods to ensure that the office sterilizer is doing its job.
  - In addition to monitoring the sterilizer's gauges and readouts for proper temperature and (for autoclaves and chemical-vapor sterilizers) pressure, the staff of your dental office should wrap and seal instruments in packaging equipped with a chemical that changes color on exposure to heat and/or some other combination of sterilizing conditions.
    - These color-change indicators also help to identify instrument packages that have been sterilized, so there's no chance that contaminated instruments could inadvertently be selected to treat the next patient.
  - In addition, your dentist should routinely test his or her sterilizer using a vial or envelope containing spores
    - Called biologic monitoring, subjecting commercially prepared, sealed spore strips or vials to a sterilization cycle, then culturing the spores to ensure they have been killed, is the highest guarantee that a sterilizer is functioning and being utilized properly. Most practices use biologic monitoring weekly or monthly in combination with color-change indicators on each instrument packet and monitoring of the sterilizer gauges and readouts.

http://www.osap.org/?Patient\_FiveQuestion

## Infection Control Is Not Optional!!!!!!

### Question # 3:

- **Do you change your gloves for every patient?**
  - Every dental care provider should use new gloves for each and every patient.
  - For procedures that are likely to involve splash or spatter, your dental team will also don a new mask as well as wear protective eyewear and apparel (possibly a gown or clinic jacket).

[http://www.cdcap.org/?Patient\\_FiveQuestion](http://www.cdcap.org/?Patient_FiveQuestion)

## Infection Control Is Not Optional!!!!!!

### Question # 4:

- **Do you disinfect the surfaces in the operatory between patients?**
  - Between patients, your dental team should disinfect all the surfaces they are likely to touch during treatment. This eliminates the possibility of a dentist or auxiliary dental care provider transferring germs from a contaminated surface to the patient. To save time in preparing the treatment room for the next patient (and hopefully minimize your time in the waiting area), many practices choose to cover surfaces such as light handles, tubing, and chair controls with a plastic barrier film that keeps the surface underneath free of debris. Instead of disinfecting these surfaces between patients, the dentist or dental team member simply removes and discards the barrier and places a new, clean barrier on the surface for the next patient.
  - Most practices choose to cover some surfaces and disinfect others between patients. Some practices disinfect all surfaces between patients; others use protective barriers for all surfaces in the treatment room.

[http://www.cdcap.org/?Patient\\_FiveQuestion](http://www.cdcap.org/?Patient_FiveQuestion)

## Infection Control Is Not Optional!!!!!!

### Question # 5:

- **If you are unclear on or uncomfortable with the precautions your dental practice takes to protect you during treatment, talk to your dentist or dental team member about your concerns and ask to see the office's instrument processing area.**
  - The overwhelming majority of dental practices work very hard to ensure your safety and health during treatment and will be happy to show you what they do to protect against disease transmission.
  - Feel free to ask questions and communicate any concerns you may have so your dentist, hygienist, or dental assistant can properly address them.

[http://www.cdcap.org/?Patient\\_FiveQuestion](http://www.cdcap.org/?Patient_FiveQuestion)

## Infectious Disease Control Objectives

### Cross-Contamination Prevention

- **Almost everything in a healthcare setting can serve as a reservoir and a vector for opportunistic pathogenic organisms.**
- **This includes but is not limited to:**
  - Surfaces,
  - Hands of HCWs,
  - Medical/dental equipment and devices.

### Cross-Contamination Prevention

- **Factors that increase the acquisition of infections in any healthcare setting, inclusive of dental, include:**
  - The persistence of some bacteria and viruses on inanimate objects and surfaces for days, weeks and months,
  - The lack compliance with of hand hygiene recommendations,
  - Breaches in evidence-based infection prevention practices,
  - The tendency to cut corners by existing staff,
  - The growing volume of patients admitted in acute-care hospitals,
  - The growing shortage of healthcare professionals,
  - Poor sanitation in healthcare facilities.

### Cross-Contamination Prevention

- Surfaces may play a significant role in the acquisition, persistence and spread of infections.
- Clinically important microorganisms that can cause HAIs have been shown to persist in the environment for considerable periods of time.
  - Most Gram-positive bacteria can survive for months on dry surfaces.<sup>1</sup>
  - Many Gram-negative species can also survive for weeks to months.<sup>1</sup>
  - *Candida albicans* can survive up to four months on surfaces.<sup>1</sup>

1. Kramer et al. BMC Infectious Diseases. 2006; 6:130.

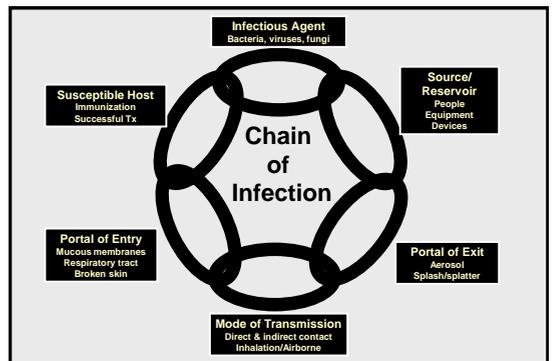
### Cross-Contamination Prevention

- Persistence of clinically relevant bacteria on dry inanimate surfaces:<sup>1</sup>
  - *Acinetobacter* spp. 3 days to 5 months
  - *Clostridium difficile* (spores) 5 months
  - *Escherichia coli* 1.5 hours-16 months
  - *Pseudomonas aeruginosa* 6 hours-16 months
  - *Serratia marcescens* 3 days-2 months
  - *Staphylococcus aureus* 7 days-7 months

1. Kramer et al. BMC Infectious Diseases. 2006; 6:130.

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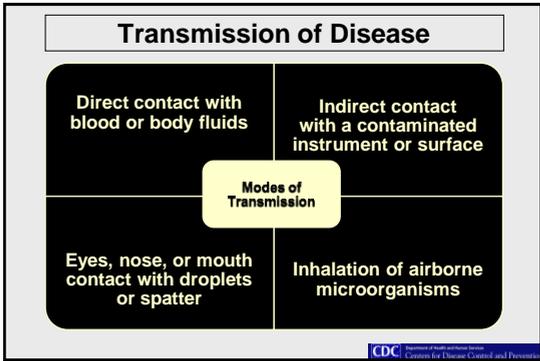


### Transmission of Infectious Diseases



Wherever It Is Doable, Practical & Cost-Effective  
Reduce the Amount of Contamination





### Infectious Disease Risk in Dental Practice

- Dental patients and DHCP can be exposed to pathogenic microorganisms including:
  - Hepatitis B Virus, Hepatitis C Virus\*
  - Human Immunodeficiency Virus\*
  - Cytomegalovirus (CMV)
  - Herpes simplex virus types 1 and 2
  - *Mycobacterium tuberculosis*,
  - Staphylococci, streptococci, and other viruses and bacteria that colonize or infect the oral cavity and respiratory tract.

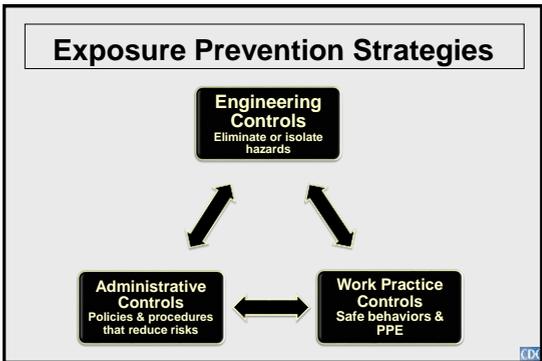
Bloodborne Pathogens

CDC Division of Field Epidemiology  
Division of Disease Control and Prevention

### Exposure Control Plan

- **Mandatory**
  - Required by OSHA BBP Standard
- **Develop standard operating procedures**
  - List infection control practices
  - Document adverse outcomes
  - Document work-related illnesses
  - Monitor health care-associated infections
- **Protects those at risk of exposure to blood or other potentially infectious materials**

CDC



### Post-Exposure Management Program

- Clear policies and procedures
- Education of dental health care personnel (DHCP) regarding:
  - Infection prevention strategies
    - How could the exposure have been prevented?
  - Principles of post-exposure management
  - The importance of prompt post-exposure reporting
  - Post-exposure prophylaxis (PEP)
- Rapid access to
  - Clinical care
  - Post-exposure prophylaxis (PEP)
  - Testing of source patients/HCP

CDC

### OSHA Bloodborne Pathogens Standard

General Requirements

**Mandates Universal Precautions.**

- This is an approach to infection control in which blood and certain body fluids are treated as if known to be infectious for:
  - HIV,
  - HBV
  - HCV
  - Other bloodborne pathogens

## Standard Precautions

- **Standard Precautions:**

Based on the principle that all the following may contain transmissible infectious agents:

- Blood,
- Body fluids,
- Secretions,
- Excretions except perspiration (sweat),
- Contact with non-intact skin,
- Contact with mucous membranes.

CDC National Center for Disease Control and Prevention

## Standard Precautions

- **Standard Precautions:**

- The cornerstone of infection control
- Should be used for every patient contact
  - Regardless of infectious status.
- Apply to contact with:
  - Blood
  - All body fluids
    - Secretions, and excretions
      - Except sweat
    - Regardless of whether they contain blood
  - Non-intact skin
  - And mucous membranes.

CDC National Center for Disease Control and Prevention

## New Elements of Standard Precautions

- Three areas of practice have been added:
  - Respiratory Hygiene/Cough Etiquette,
  - Safe injection practices,
  - Use of masks for insertion of catheters or injection of material into spinal or epidural spaces via lumbar puncture.

CDC National Center for Disease Control and Prevention

## Respiratory Etiquette Transmission of Respiratory Infection(s)

- Respiratory infections can be acquired from exposure to pathogens contained in:
  - Droplets/droplet nuclei
    - Aerosolized oral/nasal secretions from infected patients
- Direct contact transmission of expelled during coughing/sneezing

### Pathogens transmitted by this route:

- *Influenza* viruses
- Rhinoviruses
- RSV

## Respiratory Etiquette

- The goal is to contain respiratory secretions in all persons with signs and symptoms of a respiratory-tract infection regardless of the presumed cause.
- The specific recommendations are:
- Cover nose and mouth when coughing or sneezing.
  - Tissues should be used to contain respiratory secretions.
  - Tissues should be disposed of in a waste receptacle.

<http://www.cdc.gov/ncidod/dars/guidance/Crecommended.htm>

CDC National Center for Disease Control and Prevention

## Respiratory Etiquette

- Hand hygiene should be used after contact with respiratory secretions and contaminated material.
  - To facilitate these strategies, healthcare facilities should provide tissues, no-touch receptacles for used-tissue disposal, dispensers with alcohol-based hand rubs and soap, plus disposable towels for hand washing at locations of sinks.

<http://www.cdc.gov/ncidod/dars/guidance/Crecommended.htm>

CDC National Center for Disease Control and Prevention

## Respiratory Etiquette

- Separation of persons with symptoms of a respiratory infection:
  - When respiratory infections are increased in the community, persons who cough should be offered masks, either procedure masks (with ear loops) or surgical masks (with ties), to contain respiratory secretions.
  - Persons who are coughing should sit at least 3 feet away from other patients in common waiting areas.
- Droplet precautions:
  - Healthcare workers should practice droplet precautions that include the requirement of wearing a surgical or procedure mask for close contact.
  - During exams of patients with symptoms,
    - There should be standard precautions.

<http://www.cdc.gov/ncidod/diseases/guidance/C/recommended.htm>

CDC Centers for Disease Control and Prevention

## IMPORTANT NOTICE TO ALL PATIENTS

Please tell staff immediately if you have flu symptoms

Flu symptoms include fever, headache, sore throat, dry cough, runny nose, nasal congestion and body aches.



- 1 Cover Your Cough and Sneeze
  - Use a tissue to cover your mouth and nose when you cough or sneeze.
  - Drop your used tissue in a waste basket.
  - You may be asked to wear a mask if you are coughing or sneezing.

and

- 2 Clean Your Hands
  - Wash your hands with soap and warm water or clean with gels or wipes with alcohol.
  - Cleaning your hands often keeps you from spreading germs.



Downloadable at:

<http://www.cdc.gov/ncidod/dhqp/N/NEET/RespiratorPoster.pdf>

## Respiratory Hygiene/Cough Etiquette

- When examining and caring for patients with signs and symptoms of respiratory infection:
  - Wear mask
  - Perform hand hygiene
- Dental providers who have a respiratory infection should:
  - Avoid direct patient contact
  - If direct contact cannot be avoided, a mask should be worn
  - Perform hand hygiene

## Persistent Coughing



- Any care provider who has a persistent cough (lasting 3 weeks or more),
- Especially in the presence of other signs or symptoms compatible with active TB, (weight loss, night sweats, bloody sputum, anorexia, and fever) should be evaluated promptly for TB
  - **Do not** return to work/school until:
    - A diagnosis of TB has been excluded
    - or-
    - Therapy is underway and medical doctor has determined you no longer infectious

## Comparison of Seasonal vs. Pandemic Influenza

Seasonal Flu	Pandemic Flu
Predictable annual appearance with seasonal pattern usually late fall-winter.	Relatively uncommon, only 3 in 1900's: 1918, 1957 & 1968.
Viruses different from previously circulating, but still similar. Immune recognition from previous exposure.	Never before seen in humans; no one has immunity, entire population vulnerable.
Most serious complications in > 65 & < 2 years old, and medically compromised.	May disproportionately adversely affect young, healthy adults.
Health-care facilities, while often stretched, capable of meeting demand.	Health-care facilities overwhelmed; cannot cope with surge of serious flu cases.
Seasonal influenza available, but at times may be a poor match for circulating strains.	No available vaccine; May take many months to develop safe and effective vaccine.
Antiviral supply usually adequate, but resistance of circulating strains common.	Antivirals may not be effective against novel viruses; Supply unable to meet demand resulting in hoarding and shortages.
Every year in the USA and average of 36,000 Americans die from infection with seasonal flu.	Potential death rate in the hundreds of thousands or higher. In 1918-1919 pandemic 500,000 died in the USA.
Mild to moderate impact on society and the economy.	Drastic and possible cataclysmic impact on society (widespread travel restrictions, closings of schools and businesses, cancellation of large public gatherings). Major negative impact on economy and dental practice.

## Seasonal Influenza in the USA

- Up to 26% of adults develop influenza annually
- Associated with **36,000 deaths** in USA every year
  - > 90% of the deaths attributed to pneumonia and influenza occurred among persons aged  $\geq$  65 yrs
- Associated with substantial absenteeism

**Total costs \$37.5 billion annually;  
36,000 deaths!**

CDC

## Influenza A, H1N1 2009 "Swine Flu"

- H1N1 (swine flu) was first reported in Mexico in March of 2009.
- The first U.S. case of was diagnosed on 04/15/09.
  - Infection spread rapidly across the USA and the around the world.
  - On 04/26/09, declared H1N1 a public health emergency in USA.
- WHO declares H1N1 a pandemic on June, 11, 2009.
  - By 06/09, 18,000 cases reported in the USA.
    - 74 countries reported H1N1 cases.
  - By 11/09, 48 states had reported cases of H1N1, mostly in young people.
- A vaccine was developed; by November, '09 > 61 million doses available.
  - An estimated 80 million Americans were vaccinated against H1N1.
    - Greatly minimized the impact of the illness.
- The CDC estimates that 43 - 89 million cases of H1N1 between 04/09-04/10.
  - They estimate between 8,870 and 18,300 H1N1 related deaths.
- On 08/10/10 the WHO declared H1N1 flu pandemic ends.

CDC: The 2009 H1N1 Pandemic: Summary Highlights. April 2009-April 2010. June 2010. <http://www.cdc.gov/flu/inf/inf/2009/h1n1.htm>



## Prevention of 2009 H1N1 Influenza Transmission in Dental Health Care Settings: 11/23/2009

### Transmission of 2009 H1N1 Influenza:

- Exposure to 2009 H1N1 influenza virus occurs in household, community, and occupational settings, and transmission is thought to occur through:
  - Droplet exposure of mucosal surfaces;
  - Through indirect contact, usually via the hands, with respiratory secretions from an infectious patient or contaminated surface;
  - And through inhalation of small particle aerosols in the vicinity of the infectious individual.



[www.cdc.gov/OralHealth/infectioncontrol/factsheets/2009\\_h1n1.htm](http://www.cdc.gov/OralHealth/infectioncontrol/factsheets/2009_h1n1.htm)



## Prevention of Influenza

- The best way to manage the threat of H1N1 is to take every step possible to prevent the infection.
- The basic strategies for the prevention of influenza inclusive of seasonal and H1N1 are:

### Get vaccinated for both seasonal and H1N1 influenza.

**Practice respiratory hygiene and cough etiquette.**  
Cover your nose and mouth with a tissue when you cough or sneeze.  
Throw the tissue in the trash after you use it.  
The complete protocol from the CDC can be downloaded at <http://www.cdc.gov/flu/professionals/infectioncontrol/respihygiene.htm>

### Use Standard Precautions for every patient contact.

Perform hand hygiene. Wash your hands often with soap and water or alcohol-based handrub before touching your eyes, nose mouth or mucous membranes and especially after you cough or sneeze.  
The complete protocol from the CDC can be downloaded at <http://www.cdc.gov/flu/professionals/infectioncontrol/healthcarefacilities.htm>

### Try to avoid close contact with sick people.

Reschedule patients who present with symptoms of cold/flu, especially in temperature >100°F.  
If urgent care required, perform least invasive procedure until the patient is afebrile for at least 24 hours without the use of a fever-reducing medicine, such as Tylenol®.

Use respiratory precautions as recommended by the CDC downloadable at <http://www.cdc.gov/flu/professionals/infectioncontrol/healthcarefacilities.htm>

Stay home if you are sick and avoid, if at all possible, clinical contact.

Follow public health advice regarding school closures, avoiding crowds and other social distancing measures.

## H1N1 Vaccine Priority Groups

The CDC's Advisory Committee on Immunization Practices (ACIP), a panel made up of medical and public health experts, recommends several groups receive the H1N1 flu vaccine ASAP:

**Pregnant women** and recently pregnant women because they are at higher risk of complications and can potentially provide protection to infants who cannot be vaccinated.  
Note that pregnant women should get the nasal-spray flu vaccine LAIV (FluMist®)

**Household contacts and caregivers** for children younger than 6 months of age because younger infants are at higher risk of influenza-related complications and cannot be vaccinated. Vaccination of those in close contact with infants less than 6 months old might help protect infants by "cocooning" them from the virus.

**Healthcare and emergency medical services personnel** because infections among healthcare workers have been reported and this can be a potential source of infection for vulnerable patients.  
Also, increased absenteeism among healthcare professionals could reduce healthcare system capacity.

### All people from 6 months through 24 years of age

Children from 6 months through 18 years of age because there have been many cases of H1N1 flu in children and they are in close contact with each other in school and day care settings, which increases the likelihood of disease spread.  
Young adults 19 through 24 years of age because there have been many cases of H1N1 flu in these healthy young adults and they often live, work, and study in close proximity, and they are a frequently mobile population.

**Persons aged 25 through 64 years who have health conditions associated with higher risk of medical complications from influenza.**

HCWs who are pregnant or have chronic medical conditions are at high risk and CDC recommends they be vaccinated.

The decision to receive a vaccination should be determined by the current recommended guidelines in conjunction with evaluation and/or consultation with a licensed physician.



## Prevention of 2009 H1N1 Influenza Transmission in Dental Health Care Settings: 11/23/2009

### Control of 2009 H1N1 Influenza:

- A hierarchy of control measures should be applied to prevent transmission of 2009 H1N1 influenza in all health care settings.
- To apply the hierarchy of controls, facilities should take the following steps, ranked according to their likely effectiveness:
  - Elimination of potential exposures
    - Deferral of ill patients and source control by masking coughing individuals.
  - Engineering controls that reduce or eliminate exposure at the source without placing primary responsibility of implementation on individual employees.
  - Administrative controls including sick-leave policies and vaccination that depend on consistent implementation by management and employees.



[www.cdc.gov/OralHealth/infectioncontrol/factsheets/2009\\_h1n1.htm](http://www.cdc.gov/OralHealth/infectioncontrol/factsheets/2009_h1n1.htm)



## Prevention of 2009 H1N1 Influenza Transmission in Dental Health Care Settings: 11/23/2009

### Control of 2009 H1N1 Influenza continued:

- Personal protective equipment (PPE) for exposures that cannot otherwise be eliminated or controlled.
- PPE includes:
  - Gloves,
  - Surgical facemasks,
  - Respirators,
  - Protective eyewear, and
  - Protective clothing.
- **Vaccination, an administrative control, is one of the most important interventions for preventing transmission of influenza to HCWs.**
  - For more information on this hierarchy of controls, see CDC's Interim Guidance on Infection Control Measures for 2009 H1N1 Influenza in Healthcare Settings, Including Protection of Healthcare Personnel.



[www.cdc.gov/OralHealth/infectioncontrol/factsheets/2009\\_h1n1.htm](http://www.cdc.gov/OralHealth/infectioncontrol/factsheets/2009_h1n1.htm)



## Vaccination of Pregnant Women

- Risks are largely theoretical
  - Generally live-virus vaccines contraindicated
- Benefit of vaccination outweighs risk if:
  - Risk for exposure to disease is high
  - Infection poses a risk to fetus
  - Vaccine is unlikely to cause harm
- Acceptable
  - Hepatitis B
  - Influenza
  - Tetanus/Diphtheria
  - Meningococcus
  - Rabies
- Contraindicated
  - Measles
  - Mumps
  - Rubella
  - Varicella
  - BCG
  - Vaccinia

National Immunization Program www.cdc.gov/nip



## MMR Vaccine Not Associated With Increased Incidence of Autism

Following the judgment of the UK General Medical Council's Fitness to Practice Panel on Jan 28, 2010, it has become clear that several elements of the 1998 paper by Wakefield et al (1) are incorrect, contrary to the findings of an earlier investigation. (2) In particular, the claims in the original paper that children were "consecutively referred" and that investigations were "approved" by the local ethics committee have been proven to be false. **Therefore we fully retract this paper from the published record.**

The Editors of The Lancet, February 10, 2010; The Lancet, London NW1 7BY, UK

1 Wakefield AJ, Murch SH, Anthony A, et al. Ileal-lymphoid nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. Lancet 1998; 351: 637-41.

2 Committee of the Royal Society (2009) 'Coping Medical Evidence' Published from [www.royalsociety.org](http://www.royalsociety.org) (2009) 986-991.

**Dentistry involves up close and personal contact with multiple patients over the average day.**

**Are you up to date on your vaccinations???**

- All HCWs, including DHCWs, should be vaccinated against:
  - Influenza (annually)
  - Hepatitis B
  - Measles, mumps, rubella
    - MMR
  - Tetanus, diphtheria, pertussis
    - DPT, DTP and DTwP
  - Varicella

## CDC's Advisory Committee on Immunization Practices (ACIP) Recommends Universal Annual Influenza Vaccination

- February 24, 2010
  - A panel of immunization experts voted today to expand the recommendation for:

**annual influenza vaccination to include: all people aged 6 months and older.**

- The expanded recommendation is to take effect in the 2010 - 2011 influenza season.
- The new recommendation seeks to remove barriers to influenza immunization and signals the importance of preventing influenza across the entire population.

CDC Division of Field Epidemiology  
Centers for Disease Control and Prevention

## Vaccination

- The decision to receive a vaccination should be determined by the current recommended guidelines in conjunction with evaluation and/or consultation with a licensed physician.

## Antimicrobial Resistance

- Worldwide problem
  - Dramatic increase in antimicrobial-resistant community-acquired and nosocomial pathogens
- Major risk factors:
  - Indiscriminate use of antibiotics
    - Overuse of Rx for viral infections
      - Colds, flu & other
    - Antibiotics in food products
      - Used in cattle, chickens & pigs
  - Infection control practices
    - Noncompliance
  - Bacterial mutation

CDC Division of Field Epidemiology  
Centers for Disease Control and Prevention

## Antimicrobial Resistant Organisms: 2011-2012

- **Tuberculosis (TB):**
  - 440,000 new multidrug resistance (MDR) TB cases annually;
  - Extensively drug resistance (XDR) TB cases reported in 64 countries so far
- **HIV:**
  - With expanded use of antiretroviral therapy (ART), resistance is a concern,
    - Especially when inappropriate drugs are used; and/or patient not adherent to ART regimen.
- **Methicillin-resistant *Staphylococcus aureus* (MRSA):**
  - Lethal infections in hospital settings becoming increasingly frequent
- **MDR *E.coli*, *K. pneumoniae* and *Enterobacter* sp.:**
  - Infections are on the rise
  - New beta-lactamase, NDM-1, is causing alarm
- ***Neisseria gonorrhoeae* and *Shigella*:**
  - Becoming increasingly resistant to drugs

## Methicillin-Resistant *S. aureus* (MRSA)

- **MRSA the *mode* or *modes* of transmission:**
  - Patients who are already colonized are the most common sources of transmission.
  - The main mode of transmission to other patients is through human hands.
    - Especially HCWs' hands.

MRSA in Healthcare Settings  
 Rosemary DeBorja, MD  
 The CDC will use the information, MRSA, available on this page.

CDC Center for Disease Control and Prevention

## Healthcare-Associated Infections (HAI): Major Public Health Concern

- The CDC estimates 1.7 million HAIs occur each year.
- Contribute to the death of 99,000 patients annually
- HAIs are the 4th leading cause of death in the USA.
  - Kill more people annually than AIDS, breast cancer and auto accidents combined.
- Estimated the annual medical costs of HAIs in US hospitals estimated to be between \$28 & \$45 billion.
  - Adjusted to 2007 dollars.

Source: The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention, 2000 (accessed August 4, 2010)  
 URL: [http://www.cdc.gov/ncez/haipdf/haicosts\\_comp.pdf](http://www.cdc.gov/ncez/haipdf/haicosts_comp.pdf)

## Healthcare-Associated Infections (HAI): Major Public Health Concern

- HAIs are a threat to patient safety and the most common adverse events resulting from a stay in the hospital.<sup>1</sup>
  - Approximately 5 to 10% of hospitalized patients in the developed world acquire such infections.<sup>2</sup>
  - In developing countries the acquisition of HAIs is much higher.<sup>2</sup>
- Proper use of hand hygiene is a critical to the prevention of these infections.<sup>2</sup>
  - Compliance among HCWs is usually below 40%.<sup>1,2</sup>

1. WHO guidelines on hand hygiene in health care. Geneva: World Health Organization, 2009. [http://whqlibdoc.who.int/publications/2009/9789281227506\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789281227506_eng.pdf)  
 2. Longtin Y, et al. Hand Hygiene. N Engl J Med 2011; 364:424

## New Hand Hygiene Video Offered by NEJM

- The *New England Journal of Medicine* is featuring a 14-minute hand hygiene video as part of its Videos in Clinical Medicine:
  - Longtin Y, Sax H, Allegranzi B, Schneider F, and Pittet D. *N Engl J Med* 2011; 364:e24
- Downloadable at:
  - <http://www.nejm.org/doi/full/10.1056/NEJMc0903599>

## The 10 Most Common Causes of Infection

**The 10 Most Common Causes of Infection**



**WASH YOUR HANDS**

**Handwashing is the Most Effective Way to Stop the Spread of Illness**

Wash Your Hands After:	Here's How:
<ul style="list-style-type: none"> <li>■ your hands/ Handling food or eating</li> <li>■ Using the bathroom or changing diapers</li> <li>■ Sneezing, blowing your nose or coughing</li> <li>■ Touching a cut or open sore.</li> <li>■ Playing outside or with pets.</li> </ul>	<ol style="list-style-type: none"> <li>1. Wet your hands with WARM, running water.</li> <li>2. Add soap and rub hands together, front and back, between fingers, and under nails for about 20 seconds.</li> <li>3. Rinse. Dry hands with a clean paper towel.</li> <li>4. Turn off water with used paper towels before throwing it away.</li> </ol>

Provided by University of Nebraska - Cooperative Extension, A Lincoln County and 10 Nebraska Counties Child Health Partnership.

**Handwashing**

**CDC CLEAN HANDS SAVE LIVES**  
Protect patients, protect yourself

Handed risk or wash before and after EVERY contact. [www.cdc.gov/handhygiene](http://www.cdc.gov/handhygiene)

**COMPLIANCE CONTROL CENTER**

**HyGard™**

**"Handwashing is the single most important means of preventing the spread of INFECTION."**  
- US CENTERS FOR DISEASE CONTROL -

**The Most Effective Way to Prevent The Spread of Microorganisms**

CDC

**“Infection Protection: It’s in Your Hands”**

- In U.S. hospitals alone, healthcare-associated infections account for an estimated:
  - 2 million infections,
  - 90,000 deaths and
  - \$4.5 billion in excess health care costs annually.

[www.cdc.gov/ncidod/hin/prevention\\_week.htm](http://www.cdc.gov/ncidod/hin/prevention_week.htm)

CDC

**Guideline for Hand Hygiene in Health-Care Settings**

Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force

MMWR, October 25, 2002 / 51(RR16);1-44

CDC

**Definitions**

- Hand hygiene
  - Performing:
    - Handwashing
    - Antiseptic handwash
    - Alcohol-based handrub
    - Surgical hand hygiene/antisepsis

Guideline for Hand Hygiene in Health-care Settings. MMWR 2002; vol. 51, no. RR-16.

CDC

**Definitions**

- Handwashing
  - Washing hands with plain soap and water
- Antiseptic handwash
  - Washing hands with water and soap or other detergents containing an antiseptic agent
- Alcohol-based handrub
  - Rubbing hands with an alcohol-containing preparation
- Surgical hand hygiene/antisepsis
  - Handwashing or using an alcohol-based handrub before operations by surgical personnel

Guideline for Hand Hygiene in Health-care Settings. MMWR 2002; vol. 51, no. RR-16.

CDC

**Hand Hygiene Technique Routine Dental Procedures**

- Handwashing
  - Wet hands with water, apply soap, rub hands together for at least 15 seconds
  - Rinse and dry with disposable towel
  - Use towel to turn off faucet
- Handrubs
  - Apply to palm of one hand, rub hands together covering all surfaces until dry
  - Volume:
    - Based on manufacturer’s instructions

Guideline for Hand Hygiene in Health-care Settings. MMWR 2002; vol. 51, no. RR-16.

CDC

## Hand Hygiene

- **Rings/Jewelry/Fingernails**
- Use cool or lukewarm water
  - Rinse and dry thoroughly
  - Apply moisturizer lotion prn
- Keep fingernails:
  - Short
    - *Avoid artificial nails*
  - Clean under nails



## Fingernails and Artificial Nails

- Keeping the nails short is important
  - Most flora on the hands are found under and around the fingernails
- Nails should be short enough to allow DHCP to:
  - Thoroughly clean underneath them
  - And to prevent glove tears
- Sharp nail edges or broken short nails are also likely to increase glove failure.

MMWR/December 19, 2003/vol. 52/no. RR-17



## Hand Hygiene

CDC Practical Infection Control In The Dental Office

- Keep nails short
- Avoid wearing rings or false nails
- Routine hand hygiene:
  - Before and after treating each patient
  - Prior to glove placement
  - After glove removal
  - Immediately after skin contact with blood/body fluids(s) or contaminated objects
  - Before leaving the operatory
  - Before touching eyes, nose or mouth



## Oral Surgical Procedures

- The oral cavity is colonized with numerous microorganisms.
  - Oral surgical procedures present an opportunity for entry of microorganisms into the vascular system and other normally sterile areas of the oral cavity
    - Bone or subcutaneous tissue
- Therefore, an increased potential exists for localized or systemic infection.
  - Exogenous and endogenous



MMWR/December 19, 2003/vol. 52/no. RR-17

## Oral Surgical Procedures

- Oral surgical procedures involve:
  - The incision, excision, or reflection of tissue that exposes the normally sterile areas of the oral cavity.
- Include:
  - Biopsy,
  - Periodontal surgery,
  - Apical surgery,
  - Implant surgery,
  - And surgical extraction(s) of teeth.



## Oral Surgical Procedures

- Surgical extraction(s) of teeth.
  - Removal of erupted or non-erupted teeth requiring:
    - Elevation of a mucoperiosteal flap
    - Removal of bone
    - Or sectioning of teeth,
    - And suturing if needed.



## Hand Hygiene

CDC Practical Infection Control In The Dental Office

- Hand hygiene for a ***surgical procedure***:
  - A persistent activity antimicrobial soap or
  - Alcohol-based hand rub should be used before any ***surgical procedure***.



MMWR December 19, 2003/Vol. 52/No. RR-17

## Hand Hygiene

CDC Guideline; MMWR 10/2002

- Alcohol based handrubs greatly improve hand hygiene over using soap & water
  - Superior to antimicrobial soaps.
- Hand asepsis adherence has failed:
  - Infrequent washing
  - Short wash times
  - Inconvenient sink locations
  - Lack of awareness about cross-contamination
  - Skin sensitivity
  - Misconception:
    - Gloves reduce need for handwashing

Courtesy of SOD Form

## Computer Keyboards

- Computers and keyboards are heavily contaminated with bacteria and viruses
  - Serve as a source of cross-contamination
- Disinfecting computer keyboards is effective
- Disinfection should typically be done daily
  - *Data suggests that this would not be necessary if handwashing guidelines were followed.*

## HCW's With Skin Lesions

- Evaluate on *case by case basis*
- May have to *refrain* from performing invasive procedures
- Cover lesions
  - Protect HCW from patient and patient from HCW

## Personal Protective Equipment

- Type of engineering control
  - BOPIIM barrier
  - Appropriateness (size, fit, compatibility)
  - Task specific
  - Provided and maintained at employer's expense
  - Includes:
    - Gloves,
    - Masks,
    - Protective eye wear,
    - And protective attire

## Glove Selection

- **Sterile gloves** for surgical procedures
  - Contact with normally sterile tissues
- **Examination gloves** for procedures not requiring sterile gloves
- **Do not wash/disinfect/reuse surgical/examination gloves**
- **General purpose utility gloves** for housekeeping/instrument cleaning/decontamination

MMWR December 19, 2003/Vol. 52/No. RR-17



**WEAR GLOVES!**  
**CHANGE GLOVES!**  
**WASH HANDS AFTER REMOVING GLOVES!**

## Mask Selection

- There is no one single mask designed for *all* procedures.
- Each clinician must select a mask that will provide adequate protection based on the procedure to be performed.
- The amount of spray/splash/spatter is much greater for some dental procedures than others.
  - Determining the level of risk for each procedure will facilitate the clinician's selection of the most protective mask.

An appropriate surgical mask must be worn whenever spray or spatter is anticipated and changed (if contaminated) between patients or sooner.

Masks should have at least 95% particle filtration efficacy for particles 3 to 5 microns in diameter

## Consequences of Missing or Inadequate Eye Protection

- Possible without the use of proper eye protection
- Can have serious long-term effects

## Protective Clothing

- Wear gowns or lab coats that cover skin and personal clothing likely to become soiled with blood, saliva, or infectious material
- Change if visibly soiled
- Remove before leaving the work area
  - **Must not** be worn in non treatment areas such as eating areas.
  - Remove before entering restrooms

## Footwear

- Direct contamination and/or exposure of the skin from blood-borne pathogens is possible if feet are exposed.
  - For safety, clinical footwear should be:
    - Closed toe
    - Closed heel
    - Slip resistant sole
    - Practical
      - Low heel

## Types of Occupational Exposures to Bloodborne Pathogens

- Percutaneous injury
- Mucous membrane exposure
- Non-intact (broken) skin exposure
- Bites

## Definitions

- Occupational Exposure
  - Reasonably anticipated skin, eye, mucous membrane or parenteral contact with blood or other potentially infectious materials (BOPIM)
- Exposure Incident
  - Actual skin, eye, mucous membrane or parenteral contact with blood or other potentially infectious materials

 Department of Health and Human Services  
Centers for Disease Control and Prevention

## Primary Prevention

- Prevent the injury in the first place
  - Standard precautions
    - *Avoid* exposure to eyes, nose, mouth, or skin
  - Engineering controls (EC)
  - Work practice controls (WPC)
  - Personal protective equipment (PPE)
  - Other methods of hazard abatement and risk reduction

## What Must Go in the Sharps Container?

- All recognizable sharps
- Includes:
  - Needles
  - Suture needles
  - Scalpels
  - Scalpel blades
  - Used anesthetic carpules
  - Other sharps

 Department of Health and Human Services  
Centers for Disease Control and Prevention

Bur injuries  
are  
**PREVENTABLE**

Remove the bur  
as soon as  
tooth-preparation  
is completed!!!

## Exposure Protocol

An Exposure Occurs,  
If It Doesn't Endanger The Patient,



Immediately

### Post-exposure Management Steps Summary

- Step 1:
  - Immediate wound decontamination and first aid;
  - No extraordinary measures
- Step 2:
  - Report the incident to designated individual (maintain confidentiality);
  - Determine if the injury resulted in an exposure

### Postexposure Management: Wound Care

- Clean wounds with soap and water
- Flush mucous membranes with water
- No evidence of benefit for:
  - Application of antiseptics or disinfectants
  - Squeezing (“milking”) puncture sites
- Avoid:
  - Use of bleach and other agents caustic to skin

### Mucosal Exposure

- Eye, nose, mouth or other mucous membrane
  - Flush *immediately* with liberal amounts of saline or water

### Post-exposure Management Steps Summary

- Step 3:
  - Discuss incident with source individual
- Step 4:
  - Initiate referral to the HCP
- Step 5:
  - Begin program of medical evaluation and follow-up
    - According to the most current recommendations of the USPHS

### Management of Occupational Blood Exposures

- HBV Exposures
  - Perform follow-up anti-HBs testing for individuals vaccinated for hepatitis B
  - Test for anti-HBs 1-2 months after 3<sup>rd</sup> vaccine
  - Cannot assess anti-HBs if HBIG was received in the previous 3-4 months
- HCV Exposures
  - Perform baseline and follow-up anti-HCV and ALT 4-6 months post-exposure
  - Perform HCV RNA at 4-6 weeks if early diagnosis of HCV infection is desired
  - Confirm repeatedly reactive EIAs

### Management of Occupational Blood Exposures

- HIV Exposures
  - Perform HIV-antibody testing for at least six months after the exposure
    - Baseline, 6 weeks, 12 weeks, 6 months
  - Perform HIV-antibody testing if illness compatible with acute retroviral syndrome occurs
  - Advise exposed person to use precautions to prevent secondary transmission
  - Evaluate those on PEP within 72 hours and monitor for drug toxicity for at least 2 weeks

**Post-Exposure Monitoring and Prophylaxis**

**CDC**

**Update for Management Of Occupational Exposures to HIV and PEP:**

**September 30, 2005**

**CDC** Department of Health and Human Services  
Centers for Disease Control and Prevention

## Antiretroviral Post-exposure Prophylaxis

**Use of PEP reduced the risk of HIV transmission by 79%!**

MMWR 44:929, 1995  
MMWR June 29, 2001/50(RR11)  
MMWR September 30, 2005/ 54(RR9)

### Goals of Post Exposure Prophylaxis

- Prevent viral replication in exposed worker
- Accomplish by:
  - Rapid assessment
  - Immediate PEP
    - Preferably within 1-2 hours after exposure.
      - Inconclusive animal data on effectiveness up to 24-36 hours afterward

CDC Department of Health and Human Services  
Centers for Disease Control and Prevention

### Considerations When Using PEP

Risk of Transmission      PEP      Risk of Adverse Effects

### Initiation of HIV PEP

- If indicated start PEP **As Soon As Possible** after exposure
  - Regard as an urgent medical concern
  - Hours rather than days
- Interval after which PEP is no longer likely to be effective in humans is unknown
  - Initiating PEP days or weeks after an exposure might be considered if warranted for increased risk exposure

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Centers for Disease Control and Prevention

### Preventing Transmission of Bloodborne Viruses in Healthcare Settings

- Promote hepatitis B vaccination
- Treat all patients as potentially infectious
- Use Standard Precautions to prevent contact with:
  - Blood/body fluid
  - Mucous membrane
  - Non-intact skin
- Prevent percutaneous injuries

CDC Department of Health and Human Services  
Centers for Disease Control and Prevention

### Elements of an Effective Postexposure Management Program

- Clear policies/procedures
- Training of healthcare personnel (HCP)
- Rapid access to
  - Clinical care
  - Post-exposure prophylaxis (PEP)
  - Testing of source patients/HCP
- Injury prevention assessment

CDC Department of Health and Human Services  
Centers for Disease Control and Prevention

### Clinical Contact Surfaces

- Any surface touched by DHCW or patient during dental treatment

### General Recommendations for Environmental Surfaces

#### Clinical Contact Surfaces

- Cover with impervious barrier or
- Clean and disinfect clinical contact surfaces that are not barrier protected, between patients
  - Use an EPA-registered hospital disinfectant

### Operatory Asepsis

- Housekeeping Surfaces
  - Not touched during patient treatment
    - Includes non-barrier protected countertops
  - Clean and disinfect with low to intermediate level hospital disinfectant at least daily or when visibly soiled
    - No documentation of transmission of disease from environmental surfaces in dentistry

CDC

### Dental Radiology

- Transport and handle exposed radiographs in an aseptic manner to prevent cross contamination.

### Dental Radiography Sensors

- Use FDA-cleared barriers
- Ideally, clean & heat sterilize or high-level disinfect sensors between patients
- At a minimum clean & disinfect with an EPA-registered hospital disinfectant (tuberculocidal)

CDC

## Single-use (disposable) devices

- Use single-use devices for one patient only and dispose of them appropriately

CDC

## Impression Disinfection

- Employ appropriate PPE
- Follow mixing instructions and make impression
- Remove from the mouth
- Rinse thoroughly
  - 1-2 minutes
- Shake dry
- Spray with disinfectant
  - Do this over the sink
- Place in head-rest cover
- Disinfect for 10 minutes
- Rinse thoroughly; Then pour

## Infection Control Definitions

- **Cleaning**
  - Physically removing debris
  - Reduce number of microorganisms (MOs)
  - Remove organic material (bioburden)
- **Sterilization**
  - Process that kills ALL organisms
  - Kills bacterial spores
    - The most difficult MOs to kill
- **Disinfection**
  - Process that kills disease-causing MOs
    - But not necessarily all MOs

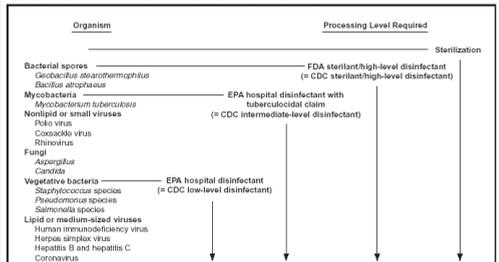
## Choosing a Germicide

- Look for EPA Registration Number
- Ease of use:
  - Pre-mixed or concentrate
  - Shelf life
  - Use life
- Cleaner/disinfectant vs disinfectant for use on “pre-cleaned surfaces”
  - One-Step vs Two-Step product
- Toxicity
- Materials Compatibility
- Cost

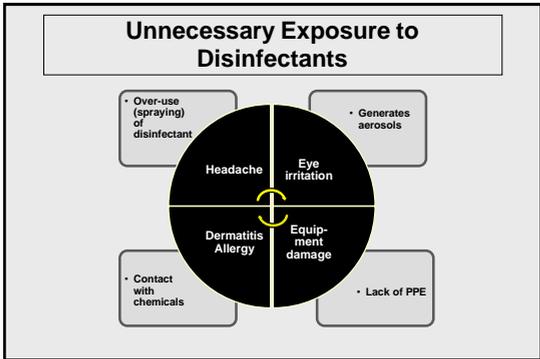
## Tuberculocidal Activity

- *Mycobacterium tuberculosis* is an airborne pathogen that rarely contaminates environmental surfaces
  - Not commonly found in the dental operatory.
- Very difficult to kill TB
  - Only bacterial spores are more difficult to inactivate.
- Activity of a disinfectant against TB (intermediate-level) is a good indicator of broad spectrum germicidal activity
  - Exposure to a tuberculocidal disinfectant kills most viruses inclusive of the bloodborne pathogens (HBV, HCV, HIV), as well as most fungi, and bacteria.

FIGURE. Decreasing order of resistance of microorganisms to germicidal chemicals



Source: Adapted from Bond WW, Or SJ, Franke K, McCracken JE. Ethical use of liquid chemical germicides on medical devices, instrument design problems. In: Block SS, ed. Disinfection, sterilization and preservation. 4<sup>th</sup> ed. Philadelphia, PA: Lea & Gebiger, 1991:1100.



**Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008**

William A. Ribicki, Ph.D., M.P.H.<sup>1,2</sup>, David J. Weber, M.D., M.P.H.<sup>1,3</sup>, and the Healthcare Infection Control Practices Advisory Committee (HICPAC)<sup>1</sup>

<sup>1</sup>National Center for Infection Control, University of North Carolina Health Care System, Chapel Hill, NC 27514  
<sup>2</sup>Division of Infectious Diseases, University of North Carolina School of Medicine, Chapel Hill, NC 27599-7020

[http://www.cdc.gov/nccid/dhqp/pdf/guidelines/Disinfection\\_Nov\\_2008.pdf](http://www.cdc.gov/nccid/dhqp/pdf/guidelines/Disinfection_Nov_2008.pdf)

**Handpieces can be contaminated internally with patient material and should be sterilized after each patient.**

**Handpieces that cannot be heat sterilized *SHOULD NOT* be used.**

### Pneumonia Associated With Dental Unit Waterlines

Ricci ML, et al, Lancet 2012; 379:684

**Pneumonia associated with a dental unit waterline**

*Legionella pneumophila* serotype 4 was cultured from a dental unit waterline (DUWL) in a dental practice in North Carolina. The patient, an 82-year-old woman, was admitted to intensive care with respiratory distress and fever. The diagnosis of pneumonia caused *Legionella pneumophila* (Legionnaires' disease) was made and despite antibiotic therapy, the woman died. The source of the infection was investigated and she was found to have no contacts outside of her home except for two dental appointments within the incubation period for *Legionella*.

**First documented case of disease transmission from a DUWL.**

**Cultures of DUWL grew 6.2 X 10<sup>6</sup> CFU/L *L. Pneumophila***

### Pneumonia Associated With Dental Unit Waterlines

Ricci ML, et al, Lancet 2012; 379:684

- In this case, an 82 year old woman was admitted to intensive care with respiratory distress and fever.
  - The diagnosis of pneumonia caused *Legionella pneumophila* (Legionnaires' disease) was made and despite antibiotic therapy, the woman died.
- The source of the infection was investigated and she was found to have no contacts outside of her home except for two dental appointments within the incubation period for *Legionella*.

### Pneumonia Associated With Dental Unit Waterlines

Ricci ML, et al, Lancet 2012; 379:684

- Microbial samples from the dental practice were positive for *L. pneumophila*; the woman's her home were negative.
  - The dental office cold-water tap contained 1.5x10<sup>3</sup> CFU/L, the sample from the DUWL was 4x10<sup>3</sup> CFU/L, and the sample from the high-speed turbine of the DUWL was 6.2x10<sup>6</sup> CFU/L. 10
  - The *L. pneumophila* isolated from the dental offices samples found to be identical to those from the bronchial aspirate.
- No other cases of *Legionella* were identified during this investigation.
- The advanced age of the patient and increased susceptibility of the elderly to infection undoubtedly played a role in the transmission of this infection.

### Dental Unit Waterlines, Biofilm, and Water Quality

- Despite the lack of documented adverse health effects, exposing patients or DHCP to water of uncertain microbiological quality, is inconsistent with generally accepted infection control principles.
  - Thus, the number of bacteria in water used as a coolant/irrigant for nonsurgical dental procedures should be as low as reasonably achievable
  - And, at a minimum, less than the 500 CFU/ml
    - Standard for safe drinking water established by the EPA and the APHA/AWWA.


  
**Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008**

William A. Rutala, Ph.D., M.P.H.<sup>1,2</sup>, David L. Ruppel, M.D., M.P.H.<sup>1,2</sup>, and the Healthcare Infection Control Practices Advisory Committee (HICPAC)<sup>3</sup>

1. Centers for Disease Control and Prevention, Division of Field Epidemiology, Atlanta, Georgia, USA; 2. Centers for Disease Control and Prevention, National Center for Healthcare Infection Control, Atlanta, Georgia, USA; 3. American Society for Infection Control, Alexandria, Virginia, USA; 4. Centers for Disease Control and Prevention, Division of Field Epidemiology, Atlanta, Georgia, USA; 5. Centers for Disease Control and Prevention, National Center for Healthcare Infection Control, Atlanta, Georgia, USA

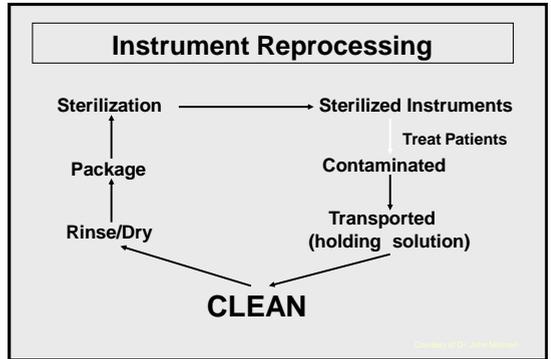
**The Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008, presents evidence-based recommendations on the preferred methods for cleaning, disinfection and sterilization of patient-care medical devices and for cleaning and disinfecting the healthcare environment.**

**When properly used, these cleaning, disinfection, and sterilization processes can reduce the risk for infection associated with use of invasive and noninvasive medical and surgical devices.**

**However, for these processes to be effective, health-care workers should adhere strictly to the cleaning, disinfection, and sterilization recommendations in this document and to instructions on product labels.**

In addition to updated recommendations, new topics addressed in this guideline include:
 

1. Inactivation of antibiotic-resistant bacteria, bioterrorist agents, emerging pathogens, and biothreat organisms.
2. Toxicologic, environmental, and occupational concerns associated with disinfection and sterilization practices.
3. Disinfection of patient-care equipment used in ambulatory settings and home care.
4. New sterilization processes, such as hydrogen peroxide gas plasma and liquid peracetic acid, and
5. Disinfection of complex medical instruments (e.g., endoscopes).



### Spaulding Classification

Category	Definition	Risk	Method of Decontamination
Critical	Touch bone or penetrate soft tissue	Very high to high	Sterilization
Semi-Critical	Contact mucous membranes, or non-intact skin,	Moderate	Sterilization or high level disinfection
Non-Critical	Contact intact skin	Low to none	Intermediate to low level disinfection

# Clean It First!!!

**Sterilization cannot be accomplished without proper cleaning!**

### Ultrasonic Cleaning

- Ultrasonic devices clean by cavitation and implosion of the liquid solution producing waves of acoustic energy that are propagated throughout the aqueous solutions**
  - Disrupt the bonds that hold particulate matter to surfaces.
  - Results in removal of debris/bioburden adherent on the instruments.
- Contaminated instruments should be placed in a wire basket that is lowered into the solution chamber where the sonic action/detergent removes the debris.**
  - To insure thorough cleaning, instruments should be **completely submerged** in the detergent solution in the chamber.
    - Hinged instruments should be opened fully to allow adequate contact with the detergent solution;
    - Stacking of instruments in washers should be avoided;
    - Complex instruments should be disassembled as much as possible.

### Goal of Sterility Assurance

- Goal:**
  - Deliver sterile instruments to every patient; every time
- Steps for infection control assurance:**
  - Select appropriate cleaning, packaging, sterilization, & storage procedures.
  - Written step-by-step training protocols.
  - Perform procedures correctly.
  - Monitor performance
- Human error most common problem!**

**Table 1: Sterilization Times & Temperatures**

Method	Time Minutes	Temperature C/F
Steam Autoclave		
Gravity Displacement	30 min	121°C/250°F
Pre-vacuum Sterilizer	4 min	132°C/270°F
Dry Heat		
Static air	60 min	170°C / 340°F
	120 min	160°C / 320°F
	150 min	150°C / 300°F
Forced air	12 min	190°C / 375°F
Unsaturated Chemical	20 min)	132°C / 270°F

### High-Level Disinfectants or Chemical Sterilants

- No rationale for use of “cold sterilants” in dentistry
- All dental instrumentation is heat sterilizable, or has a heat sterilizable or disposable alternative
- Universal Sterilization concept
  - All reusable critical and semi-critical instruments are heat sterilized between patients

### Common Sterilization Failure(s)

- Improper loading of sterilization chamber
- Improper packaging
- Improper timing
- Improper temperature
- Improper pre-cleaning

### Chemical Monitors

- Chemical indicators usually are either heat-or chemical-sensitive inks that change color when one or more sterilization parameters has been met:
  - Time, temperature and presence of steam.
- Chemical indicators are convenient, are inexpensive, and indicate that the item has been exposed to the sterilization process (the process has occurred).
  - Not an indicator of sterilization
    - Biological monitoring confirms sterilization.
- Chemical indicators should be placed on the outside of each instrument pack/kit.
  - It is also recommended that a chemical indicator also be placed on the inside of each pack to verify sterilant penetration.
- *Any internal and/or external indicator that does not change color suggests inadequate processing and that item should not be used and should be reprocessed*
  - Repetitive failures of a chemical indicator warrant investigation and may indicate a serious malfunction of the sterilization device



### Biological Monitoring

Method	Biological Monitoring (Spore Strip)
Steam Autoclave	
Gravity Displacement	<i>Geobacillus stearothermophilus</i> (Formerly <i>B. stearothermophilus</i> )
Pre-vacuum Sterilizer	<i>Geobacillus stearothermophilus</i> (Formerly <i>B. stearothermophilus</i> )
Dry Heat	<i>Bacillus atropaeus</i> Formerly <i>B. subtilis</i>
Unsaturated Chemical	<i>Geobacillus stearothermophilus</i> (Formerly <i>B. stearothermophilus</i> )

**“Proper functioning of sterilizing cycles should be verified. By the periodic use (at least weekly) of biologic indicators. (i.e. spore tests)”**

CDC/AMWR 5/28/93  
MMWR December 19, 2003/Vol. 52/No. RR-17

## Dental Operatory A Place To Do Dentistry

***Not A Fashion Statement!  
Not A Cafeteria!***

### Infection Control and Regulatory Resources for the Dental Office

- OSHA Bloodborne Pathogens Standard
  - <http://www.osha.gov/SLTC/dentistry/index.html>
- Guidelines for Infection Control in Dental Health-Care Settings, 2003.
  - <http://www.cdc.gov/mmwr/preview/mmwrhtml/s2171a.htm>
- Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care, May 2011,
  - <http://www.cdc.gov/NAAP/pdf/guidelines/standards-of-ambulatory-care-7-2011.pdf>
- Infection Prevention Checklist for Outpatient Settings: Minimum Expectations for Safe Care, May 2011,
  - <http://www.cdc.gov/naap/pdf/guidelines/ambulatory-care-checklist-07-2011.pdf>
- Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis,
  - <http://www.cdc.gov/mmwr/preview/mmwrhtml/r5811a1.htm>
- CDC's Role in Safe Injection Practices
  - <http://www.cdc.gov/injectionsafety/CDCsRole.html>
- Immunization of Health-Care Personnel Recommendations of the Advisory Committee on Immunization Practices (ACIP), November, 2011
  - <http://www.cdc.gov/mmwr/pdf/rr/r1607.pdf>
- Organization for Safety, Asepsis and Prevention
  - [www.osap.org](http://www.osap.org)

## Questions?

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