Special Series on Consequences

Our series of topics for this year will address the consequences of improper infection control and safety procedures by exploring various incidents (scenarios) that could occur in the dental care setting. Each issue will also address how the incidents could have been prevented as well as related regulations and recommendations. This issue explores “The Spread of Diseases” and subsequent issues will cover “First, Do No Harm”, “Are You Exposing Yourself - Part I?”, “Are You Exposing Yourself - Part II?”, “What’s Growing on Your Instruments?” and “Are You Keeping Your Patients Safe?”.

The Spread of Diseases

Scenario 1

The incident:
June (a new dental assistant) dismissed her last patient of the morning, removed her gloves at chairside and discarded them in the waste basket. She then went to the break/locker room, grabbed and removed her mask with attached face shield and discarded it in the waste basket. Her nose was itchy so she rubbed it but then thoroughly washed her hands. She removed her clinic gown, put on her heavy coat and snow boots, joined her fellow workers and went out for pizza.

Potential consequences:
The winter season is the most prominent time for colds and influenza. People infected with seasonal or 2009 H1N1 influenza shed virus and may be able to infect others from 1 day before getting sick up to 5 to 7 days or more after. Some persons can be infected with an influenza virus and have no symptoms but may still spread the virus to others. Influenza viruses are spread when infectious droplets directly contact mucous membranes, by inhalation of aerosol particles and by indirectly touching respiratory droplets on contaminated surfaces.\(^1\)

June touched the outside of her mask with bare hands and then rubbed her nose before any hand hygiene was performed. Remember - the outside of masks worn at chairside are commonly contaminated with patients’ oral fluids. Also June removed some of her contaminated protective equipment in the break/locker room where there may have been food, personal items and non-clinical surfaces that could have become contaminated.

Prevention:
Patients with detectable symptoms such as coughing or sneezing are obvious shedders of microbes. However, it’s essentially impossible to determine if patients without visible symptoms are carrying pathogenic microbes that can make you sick.

Learning Objectives

After reading this article, the reader should be able to:
- understand the consequences of some breaches in infection control protocol;
- recite some of the disease agents that may be present in patients’ oral fluids;
- understand how hands may be involved in the spread of disease agents;
- understand how to prevent the spread of some diseases in a dental setting.

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Thus we have to consider ALL patients as well as ourselves as potential carriers of pathogenic microbes and apply our infection control protocols universally.

In regard to the scenario presented, don’t touch your body with contaminated hands. Avoid those hands-to-nose and hands-to-eyes motions. Whenever you remove your gloves wash your hands or use an alcohol hand-rub, and do the same if your bare hands become contaminated with patient materials. Remove masks by touching the elastic bands or ties which are less likely to be contaminated. The Centers for Disease Control and Prevention (CDC) offers information on proper removal of personal protective equipment available at: http://www.cdc.gov/ncidod/dhqp/ppe.html. See the Did You Know section on page 4 for further information on the prevention of H1N1 influenza.

Related regulations and recommendations
► “Remove barrier protection, including gloves, mask, eyewear and gown before departing work areas (e.g., dental patient, instrument processing, or laboratory areas)”2 (Centers for Disease Control and Prevention - CDC).
► “When personal protective equipment is removed it shall be placed in an appropriately designated area or container for storage, washing, decontamination or disposal”3 (Occupational Safety and Health Administration - OSHA).

Scenario 2
The incident:
Edgar, a 3rd year dental student, was extracting his first tooth. It was a simple removal of #7. Immediately after the tooth was removed the patient cleared her throat. This caused some spatter of oral fluid to escape her mouth. Just as she coughed, Edgar turned and looked at her, and sure enough, those droplets hit Edgar right in his eyes. Edgar mentioned this to his instructor who asked if he was wearing glasses. Edgar showed the instructor the prescription glasses. They were the “John Lennon” type with lenses about the size of a quarter.

Potential consequences:
One concern with getting oral fluids spattered in your eyes is the potential development of conjunctivitis from the many bacteria and viruses present in saliva. For example most people are infected with the human herpes virus type I (herpes simplex), and a small percent of them shed this virus in their saliva even when they have no obvious symptoms. A new herpes infection in or around the eye can occur even if you are already infected with herpes somewhere else or have recurrent herpes infections (e.g., fever blisters).
There are many other potential causes of conjunctivitis and respiratory diseases that may be present in patients’ oral fluids. These include rhinoviruses (common cold viruses), influenza viruses (such as 2009 H1N1 and seasonal), Hemophilus influenzea type b (a bacterial cause of “pink-eye”) and a dozen or so others.4

Another concern with spatter-contamination of the eye is the apparent potential for acquiring hepatitis B, if you’re unvaccinated. A study in chimpanzees showed that eye contamination with human serum containing the hepatitis B virus led to hepatitis.5

Prevention:
Wearing appropriate eye protection will prevent eye contamination from oral droplets. Glasses that have small lenses and/or lack solid side shields do not give adequate protection.

Related regulations and recommendations
► “eye protection devices, such as goggles or glasses WITH SIDE SHIELDS, or chin-length face shields shall be worn whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose or mouth contamination may be reasonably anticipated” (OSHA3).
► CDC has a similar recommendation. “Clean with soap and water, or if visibly soiled, clean and disinfect reusable facial protective equipment (e.g., clinician and patient protective eyewear or face shields) between patients”(CDC2).

Scenario 3

The incident:
It seemed like everyone was putting off their cleaning appointments until after the holidays. Alicia’s first patient after returning from the New Year’s break was Lucy, a long-time friend. Lucy had driven 75 miles to get to the office that morning and was in a hurry to return home. Alicia noticed a lesion on Lucy’s lower lip but didn’t think much about it, for she had seen this before at some of her previous appointments. Alicia began her normal hand hygiene procedures by gently rubbing her hands together with a little liquid soap under a flow of warm water. This was painful due to a long-standing dermatitis on her fingers. After drying her hands with clean paper towels she began her work on Lucy. The treatment was uneventful, and she proceeded to care for subsequent patients. A week later Alicia noticed some new “bumps” on her fingers that appeared different from her dermatitis. A few days later the bumps turned into vesicles that were breaking down, so she went to her physician. He treated her and advised her to quit work until her hands got better or at least start wearing gloves at work. She told him she needed the continued income to pay off some bills. Alicia continued to work but wore fresh gloves with each patient.

Consequences:
Several people in the local community near where Alicia practiced developed new intraoral herpes infections and two had to be hospitalized. When their physicians questioned them, it was discovered independently that 20 of them were Alicia’s hygiene patients. In looking at Alicia’s appointment book, it was then discovered that all of the patients who acquired intraoral herpes had been seen by Alicia between the time when Lucy was treated and when Alicia routinely started wearing gloves.

Note: This scenario is based on a real-life situation before gloves were routinely worn in dental offices (previously reported in the Journal of the American Medical Association6) that caused intraoral herpes in 20 hygiene patients.

Lucy had recurrent active herpes labialis. During her treatment the virus was spread from its original site to adjacent sites increasing the number of lesions on the lip. The virus also contaminated Alicia’s hands. Since Alicia had a painful dermatitis, she did not wash her hands thoroughly, and the dermatitis provided many additional sites for the virus to hide and escape removal by hand hygiene. Since Alicia did not wear gloves, the virus on her hands was available to be spread to subsequent patients. Eventually a harmful visible herpes infection developed on Alicia’s hands, so she started wearing gloves. No more patients developed herpes after she started wearing gloves.

This scenario demonstrates three avenues of disease spread.
► Patient to dental team member (Lucy to Alicia);
► Dental team member to patient (Alicia to several patients);
► Patient to patient (Lucy to several patients through Alicia’s hands).

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A summary of the consequences resulting from breaches in infection control protocol follows.

► Improper screening of the initial patient with active herpes labialis caused a problem for the patient, the dental health care worker (DHCW) and other patients in the practice.
► Since Alicia was not wearing gloves during care of the initial patient, her hands came into direct contact with the patient’s oral microbes allowing their spread to her hands. Alicia’s hand dermatitis provided additional sites on the skin for the virus to hide.
► The dermatitis interfered with proper hand hygiene procedures.
► The virus remained viable on Alicia’s hands and caused a harmful infection.
► The virus was spread from Alicia’s hands to the mouths of several patients.
► Some patients developed intraoral herpes.

Prevention:
Since treating Lucy was not an emergency situation, her cleaning could have been postponed until the herpes lip lesions had at least crusted over. At that time the lesion’s infectiousness would be greatly decreased. If Alicia had been wearing gloves, the spread of Lucy’s herpes virus to Alicia would likely not have occurred. If Alicia could have washed her hands adequately after treating Lucy, the virus might have been removed as a transient contaminant preventing the development of a herpes infection on Alicia and subsequent spread to other patients. However, the dermatitis could have facilitated retention of the virus to a level that even proper handwashing might not have helped. Evidence that gloves really do protect was demonstrated when disease spread was stopped after gloves were routinely worn.\textsuperscript{6, 7}

Related regulations and recommendations
The CDC\textsuperscript{2} and OSHA\textsuperscript{3} have various rules or recommendations related to this scenario.

► Develop a written health program for dental health care workers (DHCW) that includes policies, procedures, and guidelines for education and training; …medical conditions, work-related illnesses and associated work restrictions; contact dermatitis and latex hypersensitivity … (CDC).
► Health care workers with herpes infections on their hands should be restricted from patient contact and contact with patient’s environment until the lesions heal (CDC).
► Educate DHCW regarding the signs, symptoms, and diagnosis of skin reactions associated with frequent hand hygiene and glove use (CDC).
► Wear gloves whenever there is a potential for contact with blood, other potentially infectious materials, mucous membranes and non-intact skin (OSHA & CDC).

Did You Know?  
Did you know that on November 23, 2009 the CDC published “Prevention of 2009 H1N1 Influenza Transmission in Dental Health Care Settings”? It provides updated guidance on preventing 2009 H1N1 influenza transmission in dental health care settings. Guidance includes new recommendations on using airborne infection isolation rooms, N95 respirators, and infection control measures for personnel with influenza-like illness.

You can access this document at OSAP’s special H1N1 webpage at www.OSAP.org.
Mexico
National University
Enrique Acosta-Gio, DDS, PhD

Mexico, the annual cost approaches US$ 1.5 billion. Is between US$ 4.5 billion and US$ 5.7 billion per year. In England, more than 100,000 cases of health care-associated infection lead to over 5,000 deaths directly attributed to infection each year.

In Mexico, an estimated 450,000 cases of health care-associated infection cause 32 deaths per 100,000 inhabitants each year.

Health care-associated infections in England are estimated to cost £1 billion a year. In the United States, the estimate is between US$ 4.5 billion and US$ 5.7 billion per year. In Mexico, the annual cost approaches US$ 1.5 billion.

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Mexico

What’s Wrong With This Picture?

Can you identify any breach in infection control and safety procedures in this photo? Check your answers below.

1. There is no headrest cover on the dental chair.
2. The dentist is wearing a surgical mask, but the assistant is not.
3. The assistant is holding a blood pressure cuff on the patient’s arm.
4. The patient is lying on the treatment table with their head elevated.
5. The assistant is wearing gloves while washing the patient’s mouth with a towel.

Around the World

To emphasize the importance of patient safety, the WHO Patient Safety Curriculum Guide for Medical Schools provides the following information on Healthcare Associated Infections.

- Between 5% and 10% of patients admitted to modern hospitals in the developed world acquire one or more infections.
- The risk of health care-associated infection in developing countries is from 2 to 20 times higher than in developed countries. In some developing countries, the proportion of patients affected by a health care-acquired infection can exceed 25%.
- In the United States, 1 out of every 136 hospital patients becomes seriously ill as a result of acquiring an infection in the hospital; this is equivalent to two million cases and about 80,000 deaths a year.
- In England, more than 100,000 cases of health care-associated infection lead to over 5,000 deaths directly attributed to infection each year.
- In Mexico, an estimated 450,000 cases of health care-associated infection cause 32 deaths per 100,000 inhabitants each year.
- Health care-associated infections in England are estimated to cost £1 billion a year. In the United States, the estimate is between US$ 4.5 billion and US$ 5.7 billion per year. In Mexico, the annual cost approaches US$ 1.5 billion.
Roadmap to OSAP

If you have received this newsletter from a friend or associate, you can access other helpful resources and timely information on infection control and safety by becoming a member of the OSAP community.

**Member resources include:**

- **NEW OSAP discount on all Continuing Education at [www.needce.com](http://www.needce.com)** (see Member Orientation at OSAP website for details)
- Topical updates such as recent information on influenza A (H1N1)
- Written referenced responses to your IC questions (“Ask OSAP”)
- Surface disinfectants chart
- Free online CDC Guidelines course
- Weekly and monthly online IC news round-ups
- Annual infection prevention symposium – June 10-13, 2010 in Tampa, FL
- Infection Control Educator’s Kit
- Free downloads of mission trip IC guide, traveler's guide and much more!

**Member registration is easy.**

Online at [www.osap.org](http://www.osap.org) or by phone: 1-800-298-OSAP (6727) within the U.S. or 1-410-571-0003 outside the U.S.

**Current membership levels:**

- Individual member (within the U.S.) $110
- Individual member (outside the U.S.) $160
- Web-only member (anywhere) $100
- Student member $25
- Corporate memberships are welcome; please contact OSAP for more information.

**Glossary**

*H1N1 influenza:* This is a contagious respiratory disease caused by a new type of influenza A virus first detected in people in April 2009. The virus spreads from human to human, and on June 11, 2009, the World Health Organization (WHO) signaled that a pandemic of 2009 H1N1 influenza was underway. It is thought to spread in the same way that seasonal influenza spreads.

*Seasonal influenza:* This is a contagious respiratory disease caused by influenza viruses other than H1N1 influenza virus.

**Links to Resources**

1. CDC. 2009 H1N1 Flu (“Swine flu”) and you. [http://www.cdc.gov/h1n1flu/qa.htm](http://www.cdc.gov/h1n1flu/qa.htm).
If you wish to obtain one (1) hour of continuing education (CE) credit, complete the following test by selecting the best answer and fax or mail it to the OSAP Central Office for grading. Please include a check or credit card to cover the handling charges. Pending satisfactory results (at least seven out of ten), you will be issued a letter for one (1) CE credit hour. OSAP is recognized by the American Dental Association as a CERP Provider. For more information, call OSAP at 800-298-6727 (1-410-571-0003).

For each item, pick the best answer.

1. What infection did Lucy have?
   a. Tuberculosis  
   b. H1N1 influenza  
   c. Herpes labialis  
   d. Hepatitis C

2. What virus did Alicia spread to 20 patients?
   a. HIV  
   b. H1N1 influenza virus  
   c. Herpes  
   d. Hepatitis B

3. How did Edgar breach infection control protocol?
   a. He didn’t wash his hands properly  
   b. He used unsterile instruments on a patient  
   c. He recapped a used anesthetic needle by hand  
   d. He did not wear adequate eye protection

4. When would be the ideal time to provide non-emergency dental care to a patient with herpes labialis?
   a. Anytime  
   b. When the lip lesions have at least crusted over  
   c. Only after giving prophylactic penicillin  
   d. When the lip lesions are weeping

5. The most common ways influenza viruses can be spread are by coughs, sneezes and:
   a. contaminated hands.  
   b. used needles.  
   c. contact with contaminated feces.  
   d. mosquitos.

6. The written health program for dental health care workers recommended by CDC should include policies, procedures, and guidelines for education and training; ...medical conditions, work-related illnesses and associated work restrictions; and:
   a. diseases experienced by the worker’s family.  
   b. pregnancy or menopause status.  
   c. marriage status.  
   d. contact dermatitis and latex hypersensitivity.

7. How did June breach infection control protocol?
   a. She used unsterile instruments on a patient  
   b. She touched the outside of her used mask with bare hands and did not immediately wash her hands  
   c. She wore inappropriate glasses at chairside  
   d. She did not wear gloves when caring for patients

8. Who recently published the document titled “Prevention of 2009 H1N1 Influenza Transmission in Dental Health Care Settings”?
   a. FDA  
   b. OSHA  
   c. OSAP  
   d. CDC

9. Between ____________ of patients admitted to modern hospitals in the developed world acquire one or more infections.
   a. 1% and 2%  
   b. 3% and 4%  
   c. 5% and 10%  
   d. 20% and 30%

10. H1N1 is a designation for a special type of:
    a. influenza virus.  
    b. herpes simplex virus.  
    c. rhinovirus.  
    d. hepatitis B virus.

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Please mail or fax completed test with the appropriate payment to receive one (1) hour of continuing education credit.

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What’s It All About?

This issue will present scenarios describing various breaches of infection control protocol in the dental setting that can lead to the spread of infectious diseases. These include contamination of your hands, eyes and nose with patients’ oral fluids and the documented and potential diseases that may follow.

► Can you determine which patients are carriers of pathogenic agents?
► Do you know your susceptibility to some of your patients’ microbes?
► Do you know how to prevent the acquisition of infectious diseases in your particular dental setting?
► Can you get a new herpes infection if you already have recurrent fever blisters or other herpes infected sites?
► Can you ever get influenza from your patients even though you wear a mask?
► Have you seen the new CDC guidelines for prevention of H1N1 influenza in dental settings?

Read On!