Infection prevention and safety is a discipline that requires constant attention. We need to chart a course to success by steering around obstacles and pitfalls, managing changes in regulations and recommendations and evaluating new products and procedures. So this year Infection Control in Practice is helping you navigate a course to infection prevention and safety by presenting issues titled “Set Your Course for Safe Dental Care”, “Continuing Your Journey to Safe Dental Care”, “Microbes That Challenge the Journey to Safe Dental Care”, “Plotting a Course Around Infection Prevention Pitfalls”, “Plotting a Course to Prevention Through Immunization” and “Steering Toward Patient Safety”.

Plotting a Course Around Infection Prevention Pitfalls

A pitfall is a hidden or unsuspected danger or difficulty. Many pitfalls occur as a result of taking short-cuts, thinking they’ll save resources, either time or money. Other pitfalls occur because a person is simply unaware of the danger or difficulty that exists. In the field of infection prevention the manifestation of pitfalls can lead to the spread of microbes, personal injuries and/or the waste of time or supplies. See the summary chart on page 4 for examples of infection prevention pitfalls and potential consequences.

Scenario 1
The Incident
Mrs. Jude had a bit of a sore throat but kept her appointment with Dr. Blueban’s office for a crown. After completing the crown preparation Dr. B asked his assistant (Marta) to make an impression. Just before placing the impression tray in Mrs. Jude’s mouth, Mrs. Jude said, “Wait, I have to sneeze!”. Marta turned her head as Mrs. Jude sneezed. Marta excused herself from chairside because she felt the spatter on her cheek and in the corner of her eye. She removed her prescription glasses, wiped her skin and eye and quickly returned to make the impression. Three days later, Marta developed an eye infection that her doctor said was pink-eye.

Potential Consequences
A pitfall of not wearing proper protective eyewear can be the development of acute infectious conjunctivitis (also known as pink-eye) from contact with oral/nasopharyngeal droplets. (Note: conjunctivitis also can be transmitted by rubbing the eyes with contaminated hands/gloves.) Pink-eye can be caused by viruses (e.g., adenovirus, enterovirus, coxsackievirus) or bacteria (e.g., Chlamydia trachomatis, Hemophilus influenza, Staphylococcus aureus, Streptococcus pneumonia, Moraxella lacunata). It is spread through mucous membrane contact with contaminated respiratory fluids and hands.

Health care workers with conjunctivitis should be restricted from patient contact and contact with patients’ environments until the discharge ceases.¹ Conjunctivitis usually subsides in 2-5 days without treatment. Antibiotics may be prescribed if a bacterial infection is suspected. While pink-eye can be painful and irritating, Marta is fortunate Mrs. Jude did not have a cold sore, as her cough secretions could have contained herpes simplex virus. If Marta was exposed to that, she could develop a herpes eye infection that can recur with a potential to cause blindness. Most people are infected with herpesvirus type 1 that resides in the nerve tissue associated with the upper respiratory tract. About 10% of those infected experience recurrent oral/facial skin lesions that contain the live virus until the lesions are crusted over. Some of those infected can also shed the virus in their saliva even when they have no active lesions.

Learning Objectives
After reading this publication, the reader should be able to:
- describe three general problems manifested by infection prevention pitfalls;
- describe pitfalls associated with several infection prevention procedures;
- give some examples of how to prevent some infection prevention pitfalls.

Contents
1. Scenario 1
2. Scenario 1 (Continued)
3. Scenario 2
4. Infection Prevention Pitfalls Chart
5. Around the World
6. Explore and Learn at OSAP
7. Continuing Education
8. What’s It All About?
continued from page 1

Prevention

Prevention of conjunctivitis involves wearing protective eyewear with solid side shields whenever there is a chance for eye contact with oral spatter from a patient or with any contaminated fluid or chemical solution. Also, since we often touch our face and eyes with our hands, hand hygiene is important in preventing the spread of microbes causing eye and facial skin infections. Marta turned her head when Mrs. Jude sneezed, but since her eyeglasses did not have solid side shields, her eye was not properly protected. Clip-on solid side shields are available for prescription glasses. Note: The clip-on side shield and the prescription glasses should both be big enough to give adequate protection.

Scenario 2

The Incident

Dr. Magna’s practice was growing rapidly, so he hired an extra dental assistant (Selma) to handle some of the “behind the scenes” activities like instrument processing. Since Selma worked for 12 years with another dentist who just closed his practice, she had experience with instrument processing and steam sterilization monitoring. Dr. M trained her on their instrument processing procedures and in-office spore testing procedures for their new dry heat sterilizer. He told her that they used to use steam sterilization but switched to dry heat to prevent corrosion of the instruments and burs. Dr. M also told Selma that since spore testing was regularly performed, there was no need to use chemical strips or record the sterilizer temperatures.

Related Regulations and Recommendations

► Wear a surgical mask and eye protection (eyewear with solid side shields or a face shield) to protect mucous membranes of the eyes, nose and mouth during procedures likely to generate splashing or spattering of blood or other body fluids (Centers for Disease Control and Prevention - CDC).²

► Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin-length face shields shall be worn whenever splashes, sprays, spatter or droplets of blood or other potentially infectious materials may be generated and eye, nose or mouth contamination can be reasonably anticipated (Occupational Safety and Health Administration - OSHA).³

Four days later when the weekly spore testing for the dry heat sterilizer was scheduled, Selma placed a single species spore strip (containing *Bacillus atrophaeus* for dry heat monitoring) inside a package of burs and processed it through the dry heat sterilizer in a regular sterilizer load. When the burs were unpackaged that afternoon she carefully retrieved the strip and placed it in a tube of pre-sterilized culture medium and incubated it. Seven days later the culture tube remained clear (no growth), so Selma recorded the re-

**Note:**

Infection Control In Practice is a resource prepared for clinicians by the Organization for Safety, Asepsis and Prevention (OSAP) with the assistance and expertise of its members. OSAP is a nonprofit, independent organization providing information and education on infection control and prevention and occupational health and safety to dental care settings worldwide. Infection Control In Practice is published six times per year and is a trademark belonging to OSAP. OSAP and the Editorial Team for Infection Control In Practice assume no liability for action taken based on information herein. The Organization for Safety, Asepsis and Prevention has no financial interest in any commercial products or services that may be mentioned in editorial content. Further, OSAP requires all authors and editors to disclose any financial or other interests they may have in any commercial products or services.

Printing and mailing of ICIP is made possible through a generous support grant from Patterson Dental. Contents of the issue copyright © 2013 by OSAP. All rights reserved under international and Pan-American copyright conventions. Printed in USA. Reproduction in whole or part is forbidden without prior written permission. Back issues are available for a small fee. Send requests for permissions, purchases of back issues and address changes to OSAP, P.O. Box 6297, Annapolis, MD 21401 or office@osap.org.
result as successful sterilization. However, she noticed that the cord for the sterilizer had two small cuts in the insulation. She informed Dr. M, and he secured a loaner dry heat sterilizer from the local dental supplier and had them check out his dry heat sterilizer. A week later the supplier called Dr. M and said they replaced the cord but that there was another problem. The unit did not always reach full temperature, and it failed their spore testing twice. Dr. M said that it spore tested fine just before they sent the unit out.

Potential Consequences
Since there were conflicting spore testing results between the office and the dental supplier, Dr. M sat down with Selma and went over the exact procedures she used to monitor sterilization. They discovered that the Bacillus atrophaeus spore strips for dry heat monitoring need to be incubated at 37°C. When the office was using a steam sterilizer, the spore strips used contained Geobacillus stearothermophilus spores and were incubated at 56°C. Selma just used the same incubator for the B. atrophaeus spores that do not grow at 56°C. As a result the in-office spore testing yielded a false negative, and the sterilizer malfunctioning was not detected.

Proper biological monitoring (spore testing) can detect most sterilization failures.* The simple act of not using the proper incubation temperature for spore testing presents a major pitfall with significant consequences. Sterilization failures indicate that improperly sterilized instruments could have been used on patients. This could lead to cross-contamination and may result in the need for patient notification of the possible transmission of blood-borne pathogens.

Potential Consequences
Since there were conflicting spore testing results between the office and the dental supplier, Dr. M sat down with Selma and went over the exact procedures she used to monitor sterilization. They discovered that the Bacillus atrophaeus spore strips for dry heat monitoring need to be incubated at 37°C. When the office was using a steam sterilizer, the spore strips used contained Geobacillus stearothermophilus spores and were incubated at 56°C. Selma just used the same incubator for the B. atrophaeus spores that do not grow at 56°C. As a result the in-office spore testing yielded a false negative, and the sterilizer malfunctioning was not detected.

Proper biological monitoring (spore testing) can detect most sterilization failures.* The simple act of not using the proper incubation temperature for spore testing presents a major pitfall with significant consequences. Sterilization failures indicate that improperly sterilized instruments could have been used on patients. This could lead to cross-contamination and may result in the need for patient notification of the possible transmission of blood-borne pathogens.

* Spore testing will not detect improperly cleaned instruments containing blood, body fluids or debris that can impede sterilization and lead to cross contamination. The steam must contact the surface of each instrument to achieve sterilization.

Related Recommendations
- Use mechanical, chemical and biological monitors according to the manufacturer’s instructions to ensure the effectiveness of the sterilization process (CDC).²
- Monitor sterilizers at least weekly by using a biological indicator with a matching control (i.e., biological indicator and control from the same lot number) (CDC).²

Refer to the Infection Prevention Pitfalls chart on page 4, for a better understanding of infection pitfalls in the dental environment.
### Some Common Examples and Potential Consequences of Infection Prevention Pitfalls

<table>
<thead>
<tr>
<th>These Infection Prevention Pitfalls Can Lead To ...</th>
<th>Spread of Microbes</th>
<th>Personal Injury</th>
<th>Wasting Time/Supplies</th>
<th>Such As:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using a one-step disinfection when not indicated</td>
<td>✓</td>
<td></td>
<td></td>
<td>Incomplete disinfection</td>
</tr>
<tr>
<td>Using one disinfectant wipe for multiple surfaces</td>
<td>✓</td>
<td></td>
<td></td>
<td>Spreading resistant contaminate to multiple surfaces</td>
</tr>
<tr>
<td>Failure to perform hand hygiene before donning gloves</td>
<td>✓</td>
<td></td>
<td></td>
<td>Skin irritation from build-up of bacteria beneath gloves; potential spread of transient microbes to patients through glove tears or defects</td>
</tr>
<tr>
<td>Failure to perform hand hygiene after removing gloves</td>
<td>✓</td>
<td></td>
<td></td>
<td>Cross-contamination from leaks in gloves</td>
</tr>
<tr>
<td>Not using gloves with family members</td>
<td>✓</td>
<td></td>
<td></td>
<td>Contaminating family members with environmental or other patient’s microbes</td>
</tr>
<tr>
<td>Drying steam sterilized instrument packages outside of the sterilizer</td>
<td>✓</td>
<td></td>
<td></td>
<td>Contamination of instruments through wicking or tearing of the packaging</td>
</tr>
<tr>
<td>Using outdated supplies</td>
<td>✓</td>
<td></td>
<td></td>
<td>Malfunctioning or inactivation of the supply items</td>
</tr>
<tr>
<td>Not using a control with spore testing</td>
<td>✓</td>
<td></td>
<td></td>
<td>Invalid biological monitoring enhancing risk of cross-contamination</td>
</tr>
<tr>
<td>Using immediate use (flash) sterilization when not indicated</td>
<td>✓</td>
<td></td>
<td></td>
<td>Enhanced risk of unnecessary post-sterilization contamination</td>
</tr>
<tr>
<td>Re-using sterile single-use needles and cartridges of anesthetic</td>
<td>✓</td>
<td></td>
<td></td>
<td>Cross-contamination from one patient to another</td>
</tr>
<tr>
<td>Reusing IV medication vials</td>
<td>✓</td>
<td></td>
<td></td>
<td>Cross-contamination from one patient to another</td>
</tr>
<tr>
<td>Not using heavy duty utility gloves for operatory clean-up and instrument processing</td>
<td>✓</td>
<td></td>
<td></td>
<td>Enhanced risk of sharps injuries and exposure to hazardous chemicals</td>
</tr>
<tr>
<td>Using liquid sterilants for surface disinfection</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Exposure to hazardous chemicals</td>
</tr>
<tr>
<td>Leaving contaminated instruments to dry if unable to process immediately after patient care</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>May require more cleaning time</td>
</tr>
<tr>
<td>Routine surface cleaning and disinfection prior to using surface barriers</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>Redundant work because after the initial cleaning, the proper use of fresh barriers between patients will keep the surfaces free of contamination; NOTE: If barriers become torn or slip out of place, then cleaning and disinfection would be necessary.</td>
</tr>
<tr>
<td>Using a barrier on the main body of the dental chair between patients</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>Redundant work because after the initial cleaning, patients’ bodies will prevent contamination of the main body of the chair</td>
</tr>
<tr>
<td>Hand scrubbing contaminated instruments</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Enhanced risk of contaminated sharps injuries</td>
</tr>
<tr>
<td>Hand sharpening contaminated instruments at chairside</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Enhanced risk of contaminated sharps injuries and/or cross-contamination</td>
</tr>
<tr>
<td>Using eyewear without side shields</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Eye infections, irritations or personal injury</td>
</tr>
<tr>
<td>Improper use of personal protective equipment during patient care and instrument processing</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Enhanced risk of exposure to infectious microbes and hazardous chemicals</td>
</tr>
<tr>
<td>Improperly discarding sharps including cartridges of anesthetic after each patient</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Enhanced risk of sharps injuries to housekeeping staff</td>
</tr>
<tr>
<td>Routine hand scrubbing of instruments before ultrasonic cleaning</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>Redundant work because proper ultrasonic cleaning is normally sufficient; enhanced risk of sharps injury.</td>
</tr>
<tr>
<td>Improperly trained volunteers or temporary staff</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Improperly performed procedures causing cross-contamination, infection of patients or staff, enhanced risk of injuries and exposure to infectious agents and hazardous chemicals; redundant work, equipment damage, waste of supplies</td>
</tr>
</tbody>
</table>
Around the World

Last month the Association of Canadian Faculties of Dentistry (ACFD) decided not to accept the 2012 CDC Guidelines for Hepatitis B Infected Students and Healthcare Workers. The Association and the Public Health Agency of Canada (PHAC) will be reviewing this topic to develop Canadian guidelines this summer.

Nita Mazurat, MSc, DDS
University of Manitoba

What’s Wrong With This Picture?

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

**Two Ways to Stay Informed and Prepared**

OSAP makes it easy to stay informed about emerging diseases with online ‘Toolkits’. Each Toolkit provides an overview of the disease, regulations & guidelines, best practices, instructional resources and patient resources.

On the OSAP homepage, access the pull down menu under “Knowledge Center” and go to “Emerging Diseases” for Toolkits on:
- MRSA ([http://osap.org/?page=MRSA_Toolkit](http://osap.org/?page=MRSA_Toolkit))

and the CDC Zombie Pandemic described below.

The CDC has a fun new way of teaching the importance of emergency preparedness. A new graphic novel, "Preparedness 101: Zombie Pandemic" demonstrates the importance of being prepared in an entertaining way that people of all ages will enjoy. Readers follow Todd, Julie, and their dog Max as a strange new disease begins spreading, turning ordinary people into zombies. Included in the novel is a Preparedness Checklist so that readers can get their family, workplace, or school ready before disaster strikes. [www.cdc.gov/phpr/zombies_novella.htm](http://www.cdc.gov/phpr/zombies_novella.htm)

"Thanks" to Our Sponsors

OSAP thanks the following companies that help to underwrite each issue of this special series of Infection Control In Practice in 2013.

**SUPER SPONSORS**
- Air Techniques ([airtechniques.com](http://airtechniques.com))
- Biolase ([biolase.com](http://biolase.com))
- Crosstex ([crosstex.com](http://crosstex.com))
- Hu-Friedy ([hu-friedy.com](http://hu-friedy.com))
- Medicom ([medicom.com](http://medicom.com))
- SciCan ([scican.com](http://scican.com))
- Sultan Healthcare ([sultanhealthcare.com](http://sultanhealthcare.com))
- TotalCare ([kerntotalcare.com](http://kerntotalcare.com))

**SPONSORS**
- A-dec ([a-dec.com](http://a-dec.com))
- Bosworth ([bosworth.com](http://bosworth.com))
- Cetylite, Inc. ([cetylite.com](http://cetylite.com))
- DentalEZ Group ([dentalEZ.com](http://dentalEZ.com))
- Dux ([duxdental.com](http://duxdental.com))
- Henry Schein ([hangerworldwide.com](http://hangerworldwide.com))
- Hager Worldwide ([hangerworldwide.com](http://hangerworldwide.com))
- Henry Schein ([henryscheindentinal.com](http://henryscheindentinal.com))
- Miele ([miele.com](http://miele.com))
- Patterson Dental ([pattersondental.com](http://pattersondental.com))
- SmartPractice ([smartpractice.com](http://smartpractice.com))

"Thanks" to Our Sponsors
Explore and Learn at OSAP.org

Need some help in continuing your journey for safe dental care? Visit www.osap.org and simply select your job role category at the top of the OSAP home page. You will land on a page customized with resources specifically designed to meet your needs. It’s your online tool to resources that help the dental team practice infection prevention and deliver safe dental care.

OSAP Membership

OSAP member categories are designed to meet the needs of dental health care professionals in a variety of job roles:

- **Professional Practice**: Includes up to 10 individual email address log-ins $150
- **Academic I**: Includes up to 10 individual email address log-ins $150
- **Academic II**: Includes up to 25 individual email address log-ins $250
- **Associate**: Nonprofit or consulting organizations serving dental or healthcare professions $250. Includes up to 25 individual email address log-ins.
- **Individual**: Anyone interested in or involved with infection prevention in oral healthcare $115
- **Web-only**: Anyone who wishes to receive member benefits electronically $100
- **Student**: Must provide proof of full-time enrollment $25
- **Corporate** memberships are welcome; please contact OSAP for information.

Contact us at www.osap.org, or by phone: 1-800-298-OSAP (6727) within the U.S. or 1-410-571-0003 outside the U.S.

Glossary

**Flash sterilization** (now termed **immediate use sterilization**): This is steam sterilization of unpackaged items at higher temperatures and shorter exposure times. Items must be maintained as sterile during removal from the sterilizer and during transport to the point of use. This method of sterilization should be reserved for special circumstances when a sterile item in short supply is needed as quickly as possible.

**One-step disinfection process**: Some disinfectants have been properly registered with the Environmental Protection Agency as being effective without a separate precleaning step (simultaneous cleaning and disinfection of a non-critical surface or item). The labels of all disinfectants need to be carefully reviewed before use.

**Single species spore strip**: A spore strip containing either spores of *Bacillus atrophaeus* (used to monitor the dry heat or ethylene oxide sterilization process) or spores of *Geobacillus stearothermophilus* (used to monitor the steam or unsaturated chemical vapor sterilization process).

**Dual species spore strip**: A spore strip that contains spores of both of these species (described above). A dual species strip can be used to monitor the steam or unsaturated chemical vapor sterilization process, when incubated at 56°C to detect growth of the *G. stearothermophilus* or to monitor the dry heat or ethylene oxide sterilization process, when incubated at 37°C to detect growth of *B. atrophaeus*.

Links to Resources

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. Educational Method: Self-Instruction. OSAP is recognized by the American Dental Association as a CERP Provider.*

For each item, select the best answer.

1. What is a pitfall associated with not performing hand hygiene before donning exam gloves?
   a. Increased risk of tearing the gloves
   b. Increased risk of latex allergy
   c. Increased risk of bacterial skin irritation
   d. Increased risk of sharps injury

2. What is a pitfall associated with drying steam sterilized instrument packages outside of the sterilizer?
   a. Rapid corrosion of the metal instruments
   b. Contamination of the instruments through wicking
   c. Enhanced dulling of sharp edges
   d. Makes the chemical indicator unreadable

3. What is the pitfall associated with sharpening a contaminated instrument at chairside?
   a. Increased risk of contaminated injury
   b. Prevents achieving a sharp edge on the instrument
   c. Requires obtaining permission from the patient
   d. Requires obtaining permission form the dentist employer

4. What is the pitfall associated with not using a control when spore testing the steam sterilization process?
   a. Invalidating the mechanical monitoring of that steam sterilizer
   b. Invalidating the chemical monitoring of that steam sterilizer
   c. Invalidating the electrical safety of that steam sterilizer
   d. Invalidating the spore testing of that steam sterilizer

5. What special feature of protective eyewear is recommended by the CDC and required by OSHA?
   a. Ability to withstand steam sterilization
   b. Solid side shields
   c. Shatter-proof lenses
   d. Tinted lenses

6. What bacterium is used to test the steam sterilization process?
   a. Geobacillus stearothermophilus
   b. Bacillus cereus
   c. Bacillus atrophaeus
   d. Staphylococcus aureus

7. Spore tests for monitoring the steam sterilization process need to be incubated at:
   a. 100°C
   b. 56°C
   c. 37°C
   d. 7°C

8. Spore tests for monitoring the dry heat sterilization process need to be incubated at:
   a. 100°C
   b. 56°C
   c. 37°C
   d. 7°C

9. The CDC recommends that dental office sterilizers be biologically monitored at least:
   a. monthly
   b. bi-weekly
   c. weekly
   d. daily

10. When should immediate use sterilization be used?
    a. Routinely for all sterilization activity
    b. Only on packaged items
    c. On items requiring an extended heat exposure time
    d. In a special circumstance when a sterile item in short supply is needed as quickly as possible

*ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry. Concerns or complaints about a CE provider may be directed to the CE provider or to ADA CERP at ADA.org/goto/cerp. Please email the OSAP central office at office@osap.org or call 410-571-0003 if you wish to be in contact with the course author/creator(s) with any questions or for clarification of course concepts. All participants assume individual responsibility for providing evidence of contact hours of continuing education to the appropriate authorities and for the maintenance of their individual records. Publication date: August, 2013. Expiry date: August, 2016.

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

Your Name: ______________________________________ OSAP Member Name: ___________________________

Address: ______________________________________ City: __________________________ State: ______ ZIP: ______

Email: __________________________

Fees:  ○ OSAP MEMBER $15  ○ NON-MEMBER $20  Payment:  ○ MASTERCARD  ○ VISA  ○ CHECK ENCLOSED

Name on Card: __________________________ Card Number: __________________________ Exp. Date: _____ / _____

After completing the information above:

mail to: OSAP CE, P.O. Box 6297, Annapolis, MD 21401, USA  or fax to: 1-410-571-0028
What’s It All About?

This issue describes some pitfalls that can occur if infection prevention procedures are not performed properly.

What’s the importance of using a control when spore testing the sterilization process?

What’s the pitfall associated with drying steam sterilized instrument packages outside of the sterilizer?

What’s the pitfall associated with using a disinfectant wipe on multiple surfaces?

Read On!

In the next issue: Plotting a Course to Infection Prevention Through Immunization