Emerging Issues in Infection Prevention & Control in Dentistry

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Toronto Academy of Dentistry
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Declaration —
No conflict of interest

Agenda

Part 1
1. Objectives
2. Why IPAC in dentistry
3. Case Reports

Part 2
4. History of IPAC
5. Basic IPAC Principles
6. Interactive exercise #1

Break
Part 3
7. Toronto Public Health’s Role
8. IPAC Complaints vs. Lapse
9. Public Health Requirements

Part 4
10. Emerging Infectious Diseases and their impact on Dentistry
11. RCDSO Core 1 Required Evaluation
12. Questions & Answers

Course Objectives
1. Describe key Infection Prevention & Control practices expected in the dental office.
2. Evaluate emerging infection control issues that dentists face in the current environment.
3. Discuss the role of public health in responding to complaints and infection control issues reported to public health.

Why IPAC in dentistry?
- Both patients and dental workers can be exposed to pathogens
- Contact with blood, oral and respiratory secretions, and contaminated equipment occurs
- Proper IPAC can prevent transmission of infections
**Why IPAC in dentistry?**

1974 - 1986 – 9 outbreaks of hepatitis B linked to infected dentists / oral surgeons; number of infected patients in each outbreak ranged from 3 to 55

1990s – possible transmission of HIV to 6 cases from an infected dentist

2001 – patient to patient transmission of hepatitis B documented in an oral surgeon’s office

2006 – 5 transmissions of hep B from a portable dental clinic

**Other infections seen:**
Gingivostomatitis caused by herpes simplex transmitted by a dental hygienist with herpetic whitlow
Pseudomonas abscesses from a contaminated water system
TB from a dentist with infectious TB
Why IPAC in dentistry?

Take home messages:

• Transmissions of infections, including BBIs not frequent (none documented in Canada) but they do happen in this setting
• Risk can be further minimized by appropriate IPAC practices

Case examples from Toronto Investigations

Multiple health care associated outbreaks investigated; many the result of patient to patient transmission
• EEGs and hepatitis B
• Acupuncture and Mycobacterium
• Blood-Glucose Monitoring and hepatitis B
• Dialysis and hepatitis B and C
• Colonoscopy and hepatitis C

Welcome to the Lingo…

IPAC: Infection Prevention & Control

ABHR: Alcohol Based Hand Rub is used to kill organisms on the skin aka Alcohol hand rinse

Hand Hygiene: Process of removing debris and or organisms from ones hands either through use of soap and water or ABHR

PPE: Personal Protective Equipment
Let’s get started…

With some history!

Important IPAC History…

Dr. Ignaz Semmelwies (1818-1865)
• “Father of IPAC”
• MD at Vienna’s General Hospital 1830’s – 40’s
• ~2000 women died/yr of childbirth fever in Vienna
• Mortality rate differed b/w Midwife ward and the MD/Medical student L&D ward
• What was the difference?

Louis Pasteur (1822-1895)
• French chemist and microbiologist
• Renowned for discoveries of the principles of:
  • vaccination,
  • microbial fermentation, and
  • pasteurization
Dr. Joseph Lister (1827-1912)
- English MD
- Pioneer of antiseptic surgery/medicine
- Using phenol as an antiseptic, he reduced the mortality rate in his ward to 15 percent within four years

Dr. Robert Koch (1843-1910)
- German Physician
- Founder of modern bacteriology
- Identified specific causative agents of TB, cholera, and anthrax
- Gave experimental support for the concept of infectious disease
- Koch’s 4 Postulates (link of cause & effect of an infectious disease)

IPAC Timeline in North America
- 1633-1634: Smallpox Epidemic in New England
- 1793: Yellow Fever Outbreak in Philadelphia
- 1830-1851: Second Cholera Pandemic
- 1916: 1st Polio outbreak in the USA
- 1918: Spanish Flu Pandemic
- 1949: Last case of smallpox in the USA
- 1952: Polio Epidemic
1957: Asian Flu Pandemic
1976: 1st Outbreak of Ebola (in Zaire)
1981: The start of the "AIDS Epidemic"
2003: SARS
2008: Measles in Ontario
2009: Pandemic Influenza (H1N1)
2015: Measles in Ontario

*** we are going to talk about MERS CoV and Ebola 2014 later

**Infection Prevention and Control Today**

Infection Prevention and Control (IPAC):
- Evidence-based practices and procedures that, when applied consistently in health care settings, can prevent or reduce the risk of transmission of microorganisms to health care providers, other clients/patients/residents and visitors

(Source: PIDAC definitions)

**Evolution of IPAC Practices**

USA
1985-88 – Universal Precautions
1987 – Body Substance Isolation
1996 – Standard Precautions

Canada
**Routine Practices**

- IPAC practices recommended by PHAC
- To be used with all clients/patients during all care to prevent and control transmission of microorganisms in all health care settings.
- Concept that all patients (their body fluids) are potentially infectious

**Protect:**
- Staff to patient
- Staff to staff
- Patient to staff
- Patient to patient
- Staff to home
- Patient to home
- Home to patient
- Home to staff...

**Basic Components of Routine Practices**

- Hand hygiene program
- Patient placement/flow
- Aseptic technique
- Use of PPE
- Sharps safety
- Environmental Cleaning
### The Chain of Transmission

**Source:** PIDAC: Routine Practices and Additional Precautions in All Health Care Settings | November, 2012

### BREAKING the Chain of Transmission

**Source:** PIDAC: Routine Practices and Additional Precautions in All Health Care Settings | November, 2012

### The Chain Consists of...

<table>
<thead>
<tr>
<th>Links of the Chain</th>
<th>Examples of How to Break the Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious Agent</td>
<td>Appropriate medications</td>
</tr>
<tr>
<td></td>
<td>Sterilization, disinfection…</td>
</tr>
<tr>
<td>Reservoir</td>
<td>Cleaning…</td>
</tr>
<tr>
<td>Portal of Exit</td>
<td>Hand Hygiene</td>
</tr>
<tr>
<td></td>
<td>Proper disposal of waste</td>
</tr>
<tr>
<td>Mode of Transmission</td>
<td>See next slide**</td>
</tr>
<tr>
<td>Portal of Entry</td>
<td>Broken skin, Mucosa, PPE</td>
</tr>
</tbody>
</table>
4 Modes of Transmission

**Air**
- Chicken pox
- Measles
- TB

**Droplet**
- Influenza
- Norwalk
- Common cold
- Pertussis (whooping cough)

Aerosolization & Droplets

- Not airborne (not floating on air currents)
- Droplet pattern – a 1-2m arc to the "ground"
- Aerosol-producing procedures (e.g., high-speed drill) can spread droplets further...

Contact (direct/fecal-oral, bloodborne)
- Norwalk
- Salmonella
- MRSA

Zoonotic/Vectorborne (animals, and bugs)
- WNV & Lyme
- Rabies
- Malaria
Hand Hygiene

- “Single most important way to reduce the spread of infections” – CDC
- Removes organisms
- Breaks mode of transmission
- Breaks means of entry/exit by keeping hands healthy

Hand Hygiene – 2 ways

Hand Hygiene continued

What to look for when purchasing?

- DIN
- 70% isopropyl alcohol
- Expiry date

- DO NOT top up!
- What areas people forget.

Source: Hamilton Health Sciences Centre online
July 6, 2015
**Vaccines**

- remove susceptible hosts & reduces reservoirs
  - Killed virus vaccines
  - Safe
  - Prevent deaths
  - Keep self healthy to be able to care for others not able to be vaccinated

**Barriers & PPE (Personal Protective Equipment)**

- Treat all body fluids/people as potentially infectious (eg. hepatitis)
- All body fluids potentially infectious
  - Blood
  - Saliva
  - Excretions / Secretions
  - Mucous
  - Diarrhea & Vomit

**PPE – Personal Protective Equipment**

**AIRBORNE**
- N95 mask

**DROPLET**
- Mask
- Gloves
- Eye protection

**DIRECT CONTACT**
- Gloves*

***Must change/remove barriers before leaving the Operatory/lab AND HAND HYGIENE***
Scenario #1

Based on the information we have just reviewed:

1. What are the physical risks associated with conducting a new patient exam?
   Sick, cold sore, vomit, saliva, carriers...
2. What PPE would you wear?
   Gloves, eye protection, and a mask

Scenario #2

During a routine restorative procedure, what are the potential diseases one may be exposed to?
   HBV, HCV, HIV, Herpes, cold, flu, TB, other vaccine preventable diseases...
What PPE does the Dentist need to wear?
   Mask, Gloves, Eye protection
What PPE does the Dental Assistant need to wear?
   Same

Scenario #3

For the person performing the cleaning, disinfection, and sterilization of the instruments, what physical risks are there?
   Droplets, splashes, blood, saliva, needles, etc
What PPE should be worn?
   Gloves**, mask, eye protection, apron
What About IPAC in Dentistry

Key IPAC in Dentistry

- Hand hygiene ✓
- PPE ✓
- Occupational Health (immunizations) ✓
- Reprocessing
- Environmental cleaning
- Aerosolization
- Sharps management
- SUDs

VIDEO

“If Saliva Were Red”
Reprocessing

The steps performed to prepare used medical equipment/devices for use

e.g., cleaning, disinfection &/ sterilization

Source: Best Practices for Cleaning, Disinfection and Sterilization in All Health Care Settings | May 2013

Cleaning

- The physical removal of foreign material (e.g., dust, soil) and organic material (e.g., blood, secretions, excretions, microorganisms).
- physically removes rather than kills microorganisms.
- with water, detergents and mechanical action.
- Ensure licenced for use in Canada

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
<th>Level of Processing/Reprocessing</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Equipment/ Device</td>
<td>Equipment/device that enters circulate tissues, including the vascular system</td>
<td>Cleaning followed by Sterilization</td>
<td>Surgical instruments, graspers, Biopsy instruments, Foot care equipment, Eye and dental equipment</td>
</tr>
<tr>
<td>Semicritical Equipment/Device</td>
<td>Equipment/device that comes in contact with non-intact skin or mucous membranes but does not penetrate them</td>
<td>Cleaning followed by High Level Disinfection (as a minimum) Sterilization is preferred</td>
<td>Respiratory therapy equipment, Anaesthesia equipment, Tonometer</td>
</tr>
<tr>
<td>Noncritical Equipment/Device</td>
<td>Equipment/device that touches only intact skin and not mucous membranes, or does not directly touch the skin/patient/involved</td>
<td>Cleaning followed by Low Level Disinfection (in some cases, cleaning alone is acceptable)</td>
<td>EEG machines, Ophthalmometers, Bellows, stethoscopes, sphygmomanometers</td>
</tr>
</tbody>
</table>
Disinfection

• The inactivation of disease-producing microorganisms.
  • Does not destroy bacterial spores.
  • Low (LLD), intermediate, and high (HLD)
• Item must be cleaned thoroughly before disinfection can take place.
• When purchasing – look for claims for appropriate usage
• Follow manufacturer’s instructions for use
• Ensure licensed for use in Canada

Sterilization

• Required for critical medical/dental equipment/devices.
• Destroys of all forms of microbial life including bacteria, viruses, spores and fungi.
• Item must be cleaned thoroughly before sterilization can take place.
• Ensure licensed for use in Canada
• Follow manufacturer’s instructions for use
- PIDAC Best Practices for Cleaning, Disinfection, & Sterilization, PIDAC – May 2013
  - Appendix G: Advantages and Disadvantages of Currently Available Reprocessing Options
  - Manufacturers’ recommendations for product, concentration and exposure time must be followed


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**PIDAC Summary of Reprocessing Methods**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>EQUIPMENT</th>
<th>PREPARATION</th>
<th>EFFECTIVE REPROCESSING METHOD</th>
<th>COMPLETELY KILLS ALL FORMS OF MICROBIAL LIFE INCLUDING SPOROS</th>
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<td>Sterilization</td>
<td>Critical equipment/utensils, Some semi-critical equipment/utensils</td>
<td>Disinfectant, steam, high-level disinfectant</td>
<td>Ethylene oxide, steam, high-level disinfectant</td>
<td>Ethylene oxide, steam, high-level disinfectant</td>
</tr>
<tr>
<td>Steam</td>
<td>Ethylene Oxide (EtO)</td>
<td>Ethylene Oxide, Steam, Hot Dry</td>
<td>Steam, Ethylene Oxide</td>
<td>Steam, Ethylene Oxide</td>
</tr>
<tr>
<td>Heat</td>
<td>Ethylene Oxide, Steam, Hot Dry</td>
<td>Ethylene Oxide, Steam, Hot Dry</td>
<td>Steam, Ethylene Oxide</td>
<td>Steam, Ethylene Oxide</td>
</tr>
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Source: Best Practices for Cleaning, Disinfection, & Sterilization, PIDAC – May 2013

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**Sterilization – Steam**

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Source: Best Practices for Cleaning, Disinfection, & Sterilization, PIDAC – May 2013
ALWAYS USE PPE
Change gloves for cleaning the operatory

In Operatory:
• Remove gross debris from instruments in the operatory
• Package the disposable items before transport or dispose of in the operatory
• Cover trays for travel to reprocessing area
• Wipe down operatory once all soiled items out of room

Reprocessing area
• USE PPE (mask, gloves, apron, and eye protection!)
• Avoid pile-ups
• Always flow Dirty → Clean → Sterile
• Clean instruments under the water level
• Use ultrasonic or mechanical instrument washer where available to reduce exposures/risks
Packaging

- Bag/package/wrap “clean” instruments
- Sterilize bagged/packaged/wrapped items
- Date, sign and label packages
- Open sterile bagged instrument in front of patient
- Note: not all integrators are the same!

Quality Assurance for reprocessing

Foil test for Ultrasonic Sterilizer
- Physical monitoring
- Chemical indicator (CI)/monitoring
- Biological indicator (BI) – spore test

Document, document, document...
- BI – daily! (sterilizer is working)
- CI – with each load! (item undergone sterilization)

Chemical Indicators: Integrators

Reacts to all critical variables – time, temp and pressure

**Implants and Quality Assurance**

- Eg. Implants or implantable devices
  - Test strip (integrator) within package
  - That load needs to be tested
  - Hold the load of implantable devices until BI test results are checked

**Single Use Devices - SUDs**

- Instruments that have only been approved (and tested) to be used once
  - Not to be reused
  - Not to be reprocessed
  - Symbol on packaging

- Always check manufacturers’ recommendations/instructions
  - Eg. Needles, microbrushes, matrix bands, etc

**Failed BI Test**

- Refer to your office policy
- Notify Dentist immediately!
- Do not use instruments from that load, until BI retested and pass
- Office should have a policy for reprocessing and failed BIs
**Environmental Cleaning**

LLD – Low level disinfectant  
- High touch surfaces that can’t be disassembled and cleaned/sterilized  
- Barrier and/or cleaning with LLD (wipes)  
- Remove clutter from operatory or counters to reduce contamination  
- Between patients!!!
Sharps Management

- Sharps bins at point of use
- Proper use and disposal of sharps bins
- Do not overfill
- Replace at "fill line"

Safety Engineered Needles (SENS) if appropriate
- Single Use Devices (SUDs)
- Covered trays for transport
- Disassemble instruments prior to transport

Sharps Management – injuries

- Policies in place for reporting & responding to sharps injuries
- Have system in place with local ER/MD/urgent care centre to have employee assessed asap
- Complete an injury log (including source and injured person)
- Review and educate office staff/DDSs on injuries and prevention

No 2-handed re-capping
- ONLY Single-handed scoop method
- Recapping device
- Dentist (user) re-caps
- Keep needle capped when not in use
Vaccines – for HCWs

Know your baseline & status ...or get the shot!

- Hep A/B (requires follow up testing)
- Chicken pox & Shingles*
- MMR
- DPTP
- Etc...

TB baselines – TST...
Flu – seasonal influenza vaccine!!!
Mobile device Apps

www.immunize.ca
- App keeps you posted
- Keeps your immunization organized
- Notifies you of local outbreaks

Blood Borne Diseases

- Hepatitis B & C, and HIV
- Are transmissible in health care settings
- Can produce chronic infection
- Are sometimes carried by persons unaware of their infection
- Hand hygiene ✓
- PPE ✓
- Occupational Health (immunizations) ✓
- Reprocessing ✓
- Environmental cleaning ✓
- Aerosolization ✓
- Sharps management ✓
- SUDs ✓

Questions?

10 minute break
Is there anything wrong with this picture?

Let's get interactive!

Always remember your patients too!
What's wrong with this picture
Do you have to wear a mask if you are wearing a face shield?

Yes!
Emerging Infections

<table>
<thead>
<tr>
<th>The Host/Agent</th>
<th>The Host Environment</th>
<th>The Human Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic adaptation and change</td>
<td>Human susceptibility to infection</td>
<td>Climate and weather</td>
</tr>
<tr>
<td>Humanized existing</td>
<td>Human demographics and behavior</td>
<td>Changing ecosystems</td>
</tr>
<tr>
<td>International trade and travel</td>
<td>Economic development and land use</td>
<td></td>
</tr>
<tr>
<td>Interspecies (zoonotic)</td>
<td>Technology and industry</td>
<td></td>
</tr>
<tr>
<td>Inappropriate use of antibiotics</td>
<td>Treatment and social inequality</td>
<td></td>
</tr>
<tr>
<td>Lack of public health systems</td>
<td>Antimicrobial resistance</td>
<td></td>
</tr>
<tr>
<td>War and famine</td>
<td>Loss of political will</td>
<td></td>
</tr>
</tbody>
</table>

Emerging / Re-emerging Infections


http://journals.plos.org/plospathogens/article?id=info:doi/10.1371/journal.ppat.1003467
Emerging Infections – Categories that may be of interest in dentistry

<table>
<thead>
<tr>
<th>Severe Respiratory illness – eg. MERS-CoV, Avian Influenza, SARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AROs – MRSA, VRE, MDR-TB</td>
</tr>
<tr>
<td>Vector-Borne Diseases – Lyme, West Nile</td>
</tr>
<tr>
<td>Body Fluid exposure – Ebola, HIV</td>
</tr>
</tbody>
</table>

Emerging Infections – Categories that may be of importance in dentistry

<table>
<thead>
<tr>
<th>Body Fluid exposure – HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>AROs</td>
</tr>
<tr>
<td>To a much lesser extent – severe respiratory illnesses</td>
</tr>
</tbody>
</table>

Emerging Infections – Control Strategies
Who are the Public Health Players - Federal

**PHAC:** Public Health Agency of Canada
- A Federal Agency which promotes improvement in the health status of Canadians through public health action and the development of national guidelines

Public Health Players - Provincial

**PHO:** Public Health Ontario
- The operating name for the Ontario Agency for Health Protection & Promotion (OAHPP)

**MOHLTC:** The Ministry of Health & Long Term Care
- The Provincial Level of government that oversees healthcare in Ontario

**PIDAC:** Provincial Infectious Diseases Advisory Committee
- The multidisciplinary scientific advisory body that provides to the Chief MOH evidence-based advice regarding multiple aspects of infectious disease identification, prevention and control
• 36 Local PHUs (Public Health Units) in Ontario

• TPH (Toronto Public Health)
  • Communicable Disease Control Division
    • Control of Infectious Diseases & Infection Control Program
      • Bloodborne Diseases & Infection Prevention & Control Team

Legislation & Other Guiding Documents

HPPA, RSO 1990, c.H.7
Ontario Public Health Standards (OPHS), 2015
Infectious Diseases Prevention and Control Standard

IPAC Complaints - Purpose

• To:
  • report,
  • investigate and
  • respond to
  • ...IPAC complaints associated with a non-PSS premise or where services are provided by a Regulated Health Professional (eg. MD, DDS, Acupuncturist)
**Definitions**

**Health Hazard:** a condition of a premise, substance, thing, plant or animal other than man, solid, liquid, gas or combination of any of them, that has or that is likely to have an adverse effect on the health of any person.

**CAUTION**

**Health Hazard!**

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**Infection Prevention and Control Complaint:** Information provided to TPH that alleges a lack of appropriate IPAC practices in the delivery of a program or service.

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**OPHS… IDP&C Standard Req #9**

**Requirement**

- MOH or designate receives reports of complaints regarding IPAC
- Responds, and/or
- Refer to appropriate regulatory bodies (aka Regulatory Colleges)
Complaint vs Lapse

1. Complaint from public (not internal)
   - Eg. public complaining about dirty dental office
   - … COMPLAINT
   - Can lead to a Lapse

2. Info from Public Health Investigation (internal)
   - Risk factor identified via CD investigation
   - Eg. Colonoscopy as only risk factor for HCV transmission to a client
   - …LAPSE

Possible Investigation f/up

- Risk Assessment
- IPAC Audit
- Share info with Regulatory College (CPSO, RCDSO, CNO, etc.)
- Transparency with the public

What does TPH do at the audit?

- Observe & Ask Questions
- Document observations, questions, answers
- Take photos
- Provide resources
- May serve a public health order to take action
I think I have found an issue…

- Crucial/Critical IPAC Issue
  - No HH sink
  - No running water
  - No sterilizer (where one is required)
  - Sterilizer not tested
  - Re-use of single use devices
  - Lack of reprocessing (including Sterilization or HLD)
  - Inappropriate storage or management of sharps/instruments
  - Inappropriate use of PPE
  - The list goes on…

What’s next?

If a health hazard exists, TPH may order the operator/premises under Section 13 of the HPPA to:

- stop performing a procedure
- take action
- close the premise

...until there is no longer a health hazard.
TPH Posts IPAC Investigations

How Can Dentists Stay Prepared?

• Keep P&Ps up to date
• Screen patients for emerging infectious disease
• Screen for ill patients
• Ensure staff up to date on vaccinations (routine and annual)
• Practice proper IPAC
• Educate staff and yourself
• TPH Health Professionals Communiqué

Resources - online

www.rcdso.org
www.toronto.ca/health
www.publichealthontario.ca
www.phac-aspc.gc.ca/dpg-eng.php
http://www.cdc.gov/oralhealth/infectioncontrol/