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1. INTRODUCTION

This Optometry Infection Control protocol describes relevant precautions for clinical procedures in the School of Optometry and Vision Science. It outlines an acceptable minimum standard of control to minimise transmission of infectious disease between students, staff and patients. The document also includes instructions for the cleaning, disinfection and sterilization of contact lenses and other instruments used in the Optometry Clinic.

These guidelines were developed in accordance with the “Infection Control in the Health Care Setting: Guidelines for the Prevention of Transmission of Infectious Diseases 1996” (NHMRC/ANAC)\(^1\), QUT Health and Safety and other relevant infection control publications.

Standard precautions described in the present document are applicable to optometry practice because of the possibility of contact with mucous membranes, tears and blood. These standard precautions and special procedures are applied to Clinic practices, which assume that all patients are potentially infectious, and should be used as a first line approach to infection control.

Infection in optometric practice can occur during contact lens fitting, foreign body removal, assessments of patients with ocular trauma, conjunctivitis or microbial keratitis, expressions of glands or cysts, lacrimal lavage and removal of eyelashes.\(^2\)

2. HEPATITIS, HIV/AIDS, CJD AND ADENOVIRUSES

Hepatitis B antigen has been identified in tears\(^2\), which may be transferred to tonometer probes or contact lenses. HIV has been found in tears\(^3\), contact lenses\(^4\) and ocular tissue\(^5\), although these routes of transmission have not been reported. HIV-infected blood entering an open cut or mucous membrane has been reported to cause HIV infection\(^6\).

Lakkis and co-workers\(^7\) recommend optometrists be immunised against influenza yearly and also for hepatitis B. The School of Optometry and Vision Science requires students and staff who come in contact with patients or research participants to be immunised against hepatitis B.

Clinic staff and students undertaking procedures where there is a risk of exposure have an ongoing responsibility to know their infectious status for HIV, hepatitis B and hepatitis C and should exercise appropriate care when performing exposure-prone
procedures where there is established evidence of a risk of transmission of infection from themselves to the patient.\(^1\)

Please refer to the Faculty of Health documents regarding vaccination, which are located in the Health and Safety section of the Faculty of Health Student Zone on the QUT Students site.

3. STANDARD PROCEDURES

3.1. HANDWASHING

Hand washing is generally considered to be the most important measure in preventing the spread of infection. Hands should be washed before contact with any patient and after activities likely to cause contamination.

Activities that can cause contamination include:

- Handling equipment and/or instruments soiled with blood or other body substances;
- Direct contact with body secretions or excretions;
- Going to the toilet.

In the optometric setting, hands should be washed in front of the patient prior to the commencement of an examination, prior to each procedure described in Section 3.4 and also at the conclusion of the examination.

Table 1. Hand washing technique.

<table>
<thead>
<tr>
<th>Type</th>
<th>Technique (How)</th>
<th>Duration</th>
<th>Drying</th>
<th>Example (When)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine hand wash</td>
<td>• Wet hands thoroughly and lather vigorously using neutral pH soap.</td>
<td>10-15 seconds</td>
<td>Pat dry using paper towel</td>
<td>• Before eating or smoking&lt;br&gt;• After going to the toilet&lt;br&gt;• Before significant contact with patients e.g. physical examination&lt;br&gt;• Before and after use of gloves&lt;br&gt;• After handling any instruments or equipment exposed to tears, saliva, or any body fluid.</td>
</tr>
<tr>
<td></td>
<td>• Rinse under running water.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Do not touch taps with clean hands – use paper towel to turn taps off</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Neutral pH soap (with no added substances which may cause irritation or dryness) should be used for routine hand washing. If liquid soap is dispensed from reusable containers, these must be cleaned when empty and dried prior to refilling with fresh soap. Scrub brushes should not be used routinely as their use may result in abrasion of the skin, and they may be a source of infection.

For routine hand washing, wet hands thoroughly and lather with soap, vigorously rubbing hands together for at least 10-15 seconds. Rinse under running water. Dry hands with disposable paper towel (Table 1). To minimise ‘chapping’ of hands, pat dry rather than rub them. If cloth towels are used, a fresh towel (or fresh portion of towel if a roller towel is used) must be used for each patient. Electric hand dryers should not be used as these may disperse microorganisms. Do not touch taps with clean hands – if elbow or foot controls are not available, use paper towel to turn taps off.

Cuts and abrasions should be covered by water-resistant occlusive dressings prior to application of gloves. The dressings should be changed as necessary or when the dressing becomes soiled. Staff or students who have skin problems such as exudative lesions or weeping dermatitis must seek medical advice and must be removed from direct patient care until the condition resolves.³

Repeated hand washing and wearing of gloves can cause irritation or sensitivity, leading to dermatitis or allergic reactions. This can be minimised by the use of suitable hand creams.

If gloves are used (as an adjunct to hand washing in the rare circumstance when contamination of hands with body fluid is possible), they should be changed and hands washed after each patient procedure and also during multiple procedures on the same patient where a risk of cross-contamination exists ¹.

Please note:

- The person using the Clinic consulting room is responsible for advising the technical staff when the paper towel or soap level is low.

3.2. PERSONAL PROTECTION

Students are required to wear the designated Health Clinics uniform, although this is not related to infection control. Footwear should be enclosed and capable of protecting the feet from injury.
Close contact with the patient, especially during ophthalmoscopy, can occur. Hair should not touch a patient's face during the examination. Hair should be arranged such that it does not hang too widely or loosely ¹ ².

Hands and fingernails should be clean and well groomed. Nails should not be of unreasonable length or exotically lacquered ³.

Students or staff who are unwell should, where possible, not attend clinic or examine research participants. As a minimum, those suffering from any respiratory or oral infection that might be transferred to the patient should wear a disposable surgical face mask to minimise the possibility of infection (masks are located in various locations throughout the clinic) or should arrange for a fellow student to examine the patient ⁴.

Cuts and abrasions should be covered by water-resistant occlusive dressings prior to application of gloves. The dressings should be changed as necessary or when the dressing becomes soiled. Staff or students who have skin problems such as exudative lesions or weeping dermatitis must seek medical advice and must be removed from direct patient care until the condition resolves ⁵.

Please note:

- Disposable latex gloves and masks are available in the Contact Lens Lab in the clinic and the teaching laboratories in O Block.

3.3. CONSULTING ROOM

Surfaces that have come in contact with the patient's skin or clothing directly, or indirectly, should be cleaned with disinfectant e.g. ISOWIPE® before and after each patient. They include, but are not limited to, the consulting room chair, the desk area, trial frames, phoroptor/refractor head, PD rule, occluders, chinrests and headrests of all chair-mounted and free-standing instruments, ophthalmoscopes, condensing lenses and eye patches.

Please note:

- Do not rub or touch the specialised lenses in the above instruments as this will damage them; clean only the plastic casings or mountings, where appropriate.
3.4. PROCEDURES REQUIRING SPECIFIC ATTENTION

Additional disinfection and infection control measures are required for specific procedures detailed below. Preserved or unpreserved saline (unit-dose, aerosol) may be used in the procedures below in accordance with Section 3.4.10.

Please note:

- If there is an indication of an ocular infection/inflammation the procedures involving probes or lenses that contact the eye should be avoided and undertaken when the condition has resolved.

3.4.1. Tear Film Assessment

Tear film assessments include, but are not limited to, Schirmer test, phenol red thread test, fluorescein instillation and non-invasive tear film examination.

3.4.1.1. Schirmer and Phenol Red Thread Test

i. Wash and dry hands (see Section 3.1).

ii. Remove test strip (if appropriate) from packaging without touching the part to contact the mucosa.

iii. Place the test strip/thread into the temporal portion of the inferior cul de sac, leave for the appropriate amount of time, and then carefully remove.

iv. Discard strip immediately after applicable measures have been recorded.

v. Wash hands again, where appropriate, prior to manipulation of lids or further evaluations.

3.4.1.2. Fluorescein

i. Wash and dry hands (see Section 3.1).

ii. Wet fluorescein strip with saline without letting the nozzle touch the strip; shake excess saline from strip.

iii. Touch the superior or inferior bulbar conjunctiva with the strip.

iv. Dispose of the strip; a fluorescein strip may only be used for the contralateral eye if there is reasonable confidence that there is no infection in the eye assessed first and the strip has not been in contact with any surface.
v. Wash hands again, where appropriate, prior to manipulation of lids or further evaluations.

### 3.4.2. Applanation Tonometry

When the student takes control of the room it is their responsibility to ensure the following procedures are followed to maximise infection control.

For disinfection, the probe of the applanation tonometer must be removed from the collar.

i. Wash and dry hands (see Section 3.1).

ii. Clean the tonometer probe thoroughly with a 70% isopropyl alcohol swab and allow to air-dry.

iii. Insert the probe into the collar of the tonometer ensuring the ocular end of the probe is not touched.

iv. Instil topical anaesthetic (see Section 3.4.11, Instillation of Drops).

v. Instil fluorescein (see Section 3.4.1.2)

vi. Following use, clean the tonometer probe thoroughly with 70% isopropyl alcohol swab and allow to air-dry before returning to the case and the appropriate storage location.

Please note:

- Soaking tonometer probe in isopropyl alcohol and other agents may damage them over time.

### 3.4.3. Confocal Microscopy

The Nidek confocal microscope has a lens (which comes in contact with the eye) that can be unscrewed from the holder for disinfection or cleaned in situ.

i. Wash and dry hands (see Section 3.1).

ii. Clean the confocal microscope lens thoroughly with a 70% isopropyl alcohol swab and allow air-drying. (The lens can also be immersed 20mm into 70% isopropanol alcohol solution for 10 minutes and allowed to air-dry before remounting).
iii. Apply a pea-sized drop of transparent gel to the tip of the lens [e.g. Viscotears (Alcon), GenTeal gel (Novartis)] – start from the top until the drop completely covers the lens objective.

iv. Instil topical anaesthetic (see Section 3.4.11, Instillation of Drops).

v. If the gel needs to be reapplied, remove existing gel with Kimwipes, re-disinfect the lens and reapply the gel.

vi. Following use, clean the lens again thoroughly with a 70% isopropyl alcohol swab and allow air-drying.

The Heidelberg HRT3 with Cornea Rostock Module uses a sterile cap that comes in contact with the eye. The cap can be cleaned with isopropyl alcohol, however the lens should be cleaned with Kimwipes and distilled water (never with alcohol).

3.4.4. Ultrasound

The probes of the ultrasound devices are attached to the instruments via a cable.

i. Wash and dry hands (see Section 3.1).

ii. Clean the ultrasound probe thoroughly with a 70% isopropyl alcohol and allow air-drying, ensuring the ocular end of the probe is not touched.

iii. Instil topical anaesthetic (see Section 3.4.11, Instillation of Drops).

iv. Moisten the tip of the probe with a drop of lubricant (eg. Refresh™, Celluvisc™, unit-dose saline).²

v. Following use, clean the ultrasound probe thoroughly with a 70% isopropyl alcohol swab and allow air-drying.

3.4.5. Gonioscopy

The gonioprisms are stored in individual cases in the clinic. Disinfection of at least 1cm of the adjacent mount is appropriate.

i. Wash and dry hands (see Section 3.1).

ii. Clean the gonioprism thoroughly with a 70% isopropyl alcohol swab and allow to air-dry, ensuring the ocular end of the lens is not touched.

iii. Rinse with sterile saline and dry with a clean tissue.

iv. Instil topical anaesthetic (see Section 3.4.11, Instillation of Drops).
v. Following use, clean the gonioprism thoroughly with a 70% isopropyl alcohol and allow to air-dry before storing dry in their own storage case and placed in the appropriate location in the clinic.

3.4.6. Cilia Removal

The cilia tweezers/forceps are stored in the clinic. The tweezers should be smooth and free from rust.

i. Wash and dry hands (see Section 3.1)

ii. Clean the internal and external aspects of the tweezers thoroughly with a 70% isopropyl alcohol and allow to air-dry, ensuring the ends of the tweezers are not touched.

iii. Following use, clean the tweezers thoroughly with a 70% isopropyl alcohol swab and allow air-drying before returning to the appropriate location in the clinic.

3.4.7. Lacrimal Lavage

i. Wash and dry hands (see Section 3.1)

ii. Remove punctal dilation device from autoclave bag, ensuring the ends are not touched.

iii. Following use, clean the device thoroughly with a 70% isopropyl alcohol swab and allow air-drying before placing in the appropriate location for autoclaving.

3.4.8. Soft Contact Lens Handling

Trial soft contact lenses should be used only once. If it’s necessary to reuse trial lenses they must be cleaned and rinsed just prior to and immediately after use. Patients should be warned of the risks of reused contact lenses.

The International Organisation for Standard (ISO) instructions for cleaning soft contact lenses recommends autoclaving at 134°C for minimum 3 minutes or 121°C for minimum 10 minutes (ISO 19979 cited in Lakkis7). The alternative is thermal disinfection unit at approximately 85°C for 60 minutes. Thermal disinfection is carried out in the contact lens laboratory in the clinic. The following procedures are applied to re-used contact lenses.
1. Clean the lens using a hydrogel contact lens cleaner by rubbing the lens in the palm of the hand with a few drops of cleaner for 20 secs each side.

2. Rinse the lens with sterile preserved/aerosol saline.

3. Fill the glass vial with sterile saline.

4. Label with lens parameters and date of heating.

5. Place vial in thermal disinfection unit for approximately 85°C for 60 minutes.

In the consulting room, the following procedures apply when using re-useable trial lenses:

i. Wash and dry hands (see Section 3.1)

ii. Open the vial cap with the vial openers (don’t use fingers because the aluminium caps are sharp). Remove the lens from the vial with the plastic tweezers supplied. Check the lens integrity by holding it up to a light.

iii. Clean the lens using a hydrogel contact lens clear by rubbing the lens in the palm of the hand with a few drops of cleaner for 20 secs each side). Rinse the lens with sterile preserved/aerosol saline. The lens is now ready for insertion into the patient’s eye.

iv. Record the trial lens parameters and date and method of hygiene management in the patient record.

v. After removing the lens from the eye, clean the lens with lens cleaner. Rinse the lens with sterile preserved/aerosol saline.

vi. Discard existing saline from the vial and replace it with fresh sterile preserved/aerosol saline.

vii. Replace the lens in the vial using the plastic tweezers and replace the rubber stopper in the vial. Do not reuse the same trial lens before it has been disinfected.

viii. Following use, the plastic tweezers should be cleaned manually with a contact lens daily surfactant cleaner, rinsed with sterile preserved/aerosol saline, dried with a tissue and left dry before reuse.

Please note:

- If plastic tweezers are discoloured, cracked or damaged in any way, they should be discarded.
• 3% hydrogen peroxide is unsuitable for contact lens disinfection due to parameter changes and the need for neutralization.

• Chemical disinfectants are unsuitable due their unknown efficacy against viruses and limiting biofilm formation and fungal growth.

3.4.9. Rigid and RGP Contact Lens Handling

The following procedures and information are important for infection control and care of lenses relating to insertion and removal of trial rigid (PMMA) and RGP (rigid gas permeable) contact lenses, and are described in the Contact lens Studies Prac Manual.

The following procedures apply to trial lenses and patients’ own contact lenses.

i. Wash and dry hands (see Section 3.1)

ii. Clean the lens using an RGP daily cleaning solution using digital cleaning for 20 seconds each side.

iii. Rinse the lens with sterile preserved/aerosol saline

iv. Soak in 3% hydrogen peroxide for minimum 3 hours.

v. Rinse with sterile preserved/aerosol saline

vi. Dry with a clean tissue for storage

For use on a patient:

i. Hold the lens up to the light to check lens integrity and to verify the BOZR, which is sometimes engraved near the edge of the lens

ii. Apply an RGP wetting solution and apply the lens to the eye.

iii. After removal, follow the procedures i to vi above before replacing into the fitting set.

iv. Record the trial lens parameters and date and method of hygiene management in the patient record.

Please note:

• Ensure that the sink has a strainer or plug before rinsing in tap water. It is easy to lose the lens down the sink.

• Tap water should not be used on RGP lenses
• Dry storage affords less risk of contamination than storage in conditioning solutions (CDC 1985 cited in Lakkis’)

3.4.10. Application of Contact Lens Care Systems

There are a variety of soft and rigid contact lens care systems in use. These include, but are not limited to, disinfection solutions, cleaning solutions, preserved and unpreserved (unit-dose, aerosol) saline and multipurpose solutions.

Please note:

• Contact lens care systems should be stored in a cool, dark place.

• When solution bottles are first opened, the date must be written on the bottle. Opened bottles of solution will normally be discarded within 30 days of opening.

• Discard solutions that are beyond their expiry date or as per the instructions on the label/package insert.

• Always replace the cap on the bottle when it is not in use.

• Discard the bottle if nozzle touches the brow, skin, lashes or hair.

• Put first drops into the washbasin and if discoloured or smells unusual, discard.

• Minims (unit-dose) of saline must be discarded after use.

3.4.11. Instillation of Drops

QUT Health Clinics has SOPs regarding drug records, storage, use and purchase which can be accessed via area specific SOPS in the Health and Safety section of the Faculty of Health Student Zone on the QUT Students site.

There are several diagnostic drugs in drop form in use in the Clinic. These include but are not limited to topical mydriatics, cycloplegics, anaesthetics and saline. Drops are stored in the locked designated refrigerator in the clinic. The Drug Register Book must be completed for each minim removed or received.

The procedure for instillation of drops is as follows:

i. Wash and dry hands (see Section 3.1)

ii. If using a multiple dose drop-tainer, put first drop into the washbasin - if discoloured or smells unusual, discard.
iii. Gently pull down the lower lid, let the drop form on the tip of the drop-tainer and from a height of at least 5mm allow the drop to fall into the lower cul de sac.

iv. Occlude the patient’s puncta for a minimum of 60 seconds (where appropriate).

v. Recap the drop-tainer and replace in the refrigerator (dated where appropriate).

Please note:

- Drop-tainers and minims used in the Optometry Clinic are to be disposed of in the orange pharmaceutical waste bins located in the reception area of the Clinic and in the lab at the back of Clinic. Minims used in teaching and research laboratories in O Block should be disposed of in the yellow path waste bins provided.

- During clinic teaching periods, the supervising clinician is responsible for discarding the opened minims at the end of the day or teaching session (outside the teaching periods this duty lies with the optometric staff).

- Discard the drop-tainer if the tip touches the brow, skin, lashes or hair.

- Multiple dose (preserved) drop-tainers should be refrigerated after opened if recommended by the manufacturer.

- Discard multiple dose (preserved) drop-tainers when empty, when suspected or visible contamination occurs, when the manufacturers' stated expiration date is reached, or 30 days after opening.

3.4.12. Cochet-Bonnet Aesthesiometry

Although not routinely used in the Clinic, the disinfection procedure for this instrument is described below.

i. Fully extend the filament to the 6cm mark

ii. Hold the instrument vertically, with the extended filament at the bottom, so that alcohol cannot drip back into the main body of the instrument when the filament is cleaned.

iii. Gently wipe the nylon filament with an alcohol wipe and wait for the alcohol to dry before the filament is put back into the body of the aesthesiometer.

Please note:
• If the nylon filament is cleaned with alcohol and put away before the alcohol has dried, the alcohol corrodes the inside of the aesthesiometer, making it very difficult, if not impossible, to repair.

3.4.13. Frame Selection

Routine frame selection does not require special procedures; however, frames that come in contact with any patient displaying facial lesions should be disinfected with 70% isopropyl alcohol as per the following instructions.

i. Wash and dry hands (see Section 3.1).

ii. Clean the frame thoroughly with a 70% isopropyl alcohol and allow to air-dry before replacing on the display (where appropriate).

4. ADDITIONAL PRECAUTIONS

Additional precautions, such as use of facemasks and gloves, are used for the examination of patients known or suspected to be infected or colonised with epidemiologically important or highly transmissible pathogens that can cause infection by:

• Airborne transmission (e.g. mycobacterium tuberculosis, measles virus, chickenpox virus); or

• Droplet transmission (e.g. mumps, rubella, pertussis, influenza); or

• Direct or indirect contact with dry skin (e.g. colonisation with Methicillin Resistant Staphylococcus aureus), or with contaminated surfaces; or

• Any combination of these routes.

Where possible, a P2/N95 respirator mask should be worn by the examiner. The patient should wear a surgical mask. The respirator must be tightly fitted to the face. Respirator masks are not recommended for people with facial hair (beards, etc), as the hair interferes with the seal around the face. In such cases, a surgical mask should be worn by the examiner instead.

P2/N95 respirator masks are available in the Contact Lens Laboratory in the clinic.

Patients’ rights should be considered when applying infection control standards. Infectious patients should be adequately informed about the risks of transmission of their infection to others, and the need for any additional precautions prior to these precautions being implemented.
Please note:

- Disposable latex gloves and facemasks are available in the Contact Lens Lab in the clinic and the teaching laboratories in O Block. Disposable nitrile gloves are also available in some consultation rooms in the clinic.

- Masks should be changed every couple of hours, as they quickly become saturated, and masks and gloves must be discarded as soon as practicable after use.

5. AUTOCLAVING CONTACT LENSES & OTHER INSTRUMENTS

The most efficient and reliable form of sterilization of instruments and equipment is by steam under pressure (autoclaving) and is the preferred method of sterilization in office practice. All steam sterilizers must meet the requirements of relevant Australian Standards (AS 2192-2002, AS 2182-1998) and be operated according to AS 4187-2003.

Optometry staff will liaise with the Podiatry lab staff regarding items that require autoclaving.

The microbiocidal effect of steam sterilization is due to latent heat of condensation being transferred to the load causing it to heat rapidly. Where cleaning may not have completely removed contaminating microorganisms, this process results in coagulation of microbial protein structures.

The following procedures are for preparation of contact lenses and other instruments for autoclaving.

Contact Lenses

- Clean the soft contact lens with daily cleaner and rinse with saline.
- Fill the vial ¾ full with saline, stopper and crimp the vial.

Metal Instruments

Metal instruments (e.g. cilia forceps) may be sterilized in the autoclave, although disinfection with isopropyl alcohol is presently sufficient for external ocular use. For sterilization in the autoclave, these instruments must be cleaned with soap and water, dried and placed in an autoclave bag. The correct procedure for sealing the bag is described below.

- Fold the corners of the bag in and double fold the opening.
b. Apply autoclave adhesive tape around the entire pack leaving tabs at each side for easy removal.

c. Label the bag with item enclosed, initials of user and date using the felt tipped marker.

6. REFRIGERATORS

Ophthalmic drops are stored in the locked refrigerators in the clinic.

Please note:

- Under no circumstance should staff or students use this refrigerator for storage of food items.

7. STUDENT COMPETENCY

Clinical skills relating to infection control, including associated risks and management, are taught in various units during the first three years of the Optometry course. Therapeutic aspects of management of risk are taught in the 4th year of the course. Any student who passes these units and enters the 5th year of the course is deemed clinically competent to deal with these risks.

8. REFERENCES


