



PPE: Where to from here?

• Bare below the elbow: short sleeved clothing for non-surgical work

- ADA ICG4 describes appropriate use of level 1, 2 and 3 surgical masks (based on AS 4381: 2015 from HE:013)
- Mask testing now onshore in Australia (CSIRO)
- Masks & surgical respirators on shore production (2 in Brisbane)
- Lack of fit testing facilities for private sector
- Problems in fit testing N95/P2 to staff members
- ADA ICG4 and NHMRC 2019 point out limits of corrective spectacles
- New Aust Std in development for Visors and Face Shields (SF:006)



Glove	Indications for use	Examples
Non-sterile gloves	 Potential for exposure to blood, body substances, secretions or excretions Contact with non-intact skin or mucous membranes 	 Venepuncture Vaginal examination Dental examination Emptying a urinary catheter bag Naso-gastric aspiration Management of minor cuts and abrasions
Sterile gloves (see 3.1.8 Aseptic technique for further detail)	 Potential for exposure to blood, body substances, secretions or excretions Contact with susceptible sites or clinical devices where sterile conditions should be maintained 	 Surgical aseptic technique procedures e.g. Urinary catheter insertion Complex dressings Central venous line insertion site dressing Lumbar puncture Clinical care of surgical wounds or drainage sites Dental procedures requiring a sterile field
<u>Reuseable</u> utility gloves	Indicated for non-patient-care activities (c) 202	 Handling or cleaning contaminated equipment or surfaces General cleaning duties Instrument cleaning in sterilising services unit 5





Glove materials



- **Vinyl** [Polyvinyl chloride (PVC)] **exam gloves**: inferior to others; low barrier protection due to its susceptibility to tears, breakage, and pinholes.
- Latex exam/ sterile surgical gloves
- Nitrile exam / sterile surgical gloves: excellent tear and chemical resistance
- Neoprene exam / sterile surgical gloves: give a "latex-like" feel, particularly with newer thinner neoprene gloves. Excellent puncture resistance.
- **Polyisoprene: only sterile surgical gloves**. Popular alternative to latex. Has both a fit and feel that are very close to latex.

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8

Nitrile versus NRL Latex



Thermoplastic – need to warm up to adapt No elastic properties No RSI/MSD No NRL proteins

Stronger More tear resistant More puncture resistance More solvent resistance



Surgical gloves: Nonlatex synthetic rubber polymers with "latexlike feel" and elastic properties

Polyisoprene Neoprene











Poor work practices – eye protection for patients









NHMRC 2019

Face and	eye protection
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Type of care	Examples	Face and eye protection required	
Routine care	General examination (e.g. medical, physiotherapy, nursing) Routine observations	Not required unless caring for a <u>patient</u> on droplet precautions (surgical mask) (see Section 3.2.3) or airborne precautions (P2 respirator) (see Section 3.2.4)	
Procedures that generate splashes or sprays Dental procedures Nasopharyngeal aspiration Emptying wound or catheter bag		Protective eyewear/full-length face shield Surgical mask	
Procedures involving the respiratory tract (including the mouth) Intubation Nasopharyngeal suction		Protective eyewear Surgical mask	









Eyewear rationale

- Many clinical procedures generate particles that are **travelling towards the face** of the clinical operator or their chairside assistant.
- Reusable or disposable eyewear supplied for use in dental practice is required to conform to AS/NZS 1337:2012 Personal eye protection. Part 6 of that standard describes minimum requirements for eye protectors fitted with prescription lenses intended to provide low or medium impact eye protection from flying particles and fragments in occupational situations.
- Prescription lenses that are worn for vision correction can become a suitable form of protective eyewear when the lenses are inserted in frames designed to provide a suitable level of protection to the orbital region. A variety of corrective lenses (including bi- and tri-focals or transition lenses) can be put into frames that are approved as protective safety glasses.



Faceshield - *clarification*

- An alternative to protective eyewear is a face shield.
- Corrective glasses or magnifying loupes may be worn beneath a face shield.
- A face shield may be an **independent** transparent visor supported in front of the face to shield the face and front of the neck, or it may be **attached** to a mask as a single unit.
- Because a face shield does not protect the wearer from inhaled microorganisms, it must always be worn in conjunction with a surgical mask.

Key compliance points for eyewear

- Both staff and patients use protective eyewear that protects the orbit fully and has side protection.
- Regular corrective spectacles worn by staff are not used as a substitute for protective eyewear.
- Eyewear worn by clinical staff is decontaminated between patients.
- Reusable eyewear for patients is treated as a noncritical item and is cleaned with detergent.

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Infection Control Best practice for

Personal eyeglasses and contact lenses are not considered adequate eye protection.

Best practice for protective eyewear

Many procedures generate particles that are travelling towards the face of the clinical operator or their chairside assistant, as well as particles that will be in the air of the breathing zone of both individuals. Common causes are the ultrasonic scaler, the highspeed air rotor handpiece, and the triplex syringe. These particles may originate from the patient or from the waterlines of dental equipment, and from cleaning procedures undertaken as part of instrument reprocessing.





An alternative to protective eyewear is a face shield. Corrective glasses may be worn beneath a face shield. A face shield may be an independent transparent visor supported in front of the face to shield the face and front of the neck, or it may be attached to a mask as a single unit. A face shield blocks projectile material, but it does not protect the wearer from inhaled microorganisms. This is why a conventional disposable surgical mask must always be worn in conjunction with a face shield.







Figure 3. Examples of the orbital coverage of eyewear, on the one operator. Panels A and B both show Australian Standard compliant protective eyewear, with full coverage of the orbit. Panel C shows corrective visual spectacles, which have no side protection. Panel D shows the situation when those corrective spectacles are worn beneath the eyewear from Panel B. Panels E and F show magnifying loupes with side shields, which offer full side protection.



Reusable or disposable eyewear supplied for use in dental practices is required to conform to AS/NZS 1337:2012 *Personal eye protection*. Part 6 of that standard describes minimum requirements for eye protectors fitted with prescription lenses intended to provide low or medium impact eye protection from flying particles and fragments in occupational situations.

Prescription lenses that are worn for vision correction can become a proper form of protective eyewear when the lenses are inserted in frames designed to provide a suitable level of protection to the orbital region. A variety of corrective lenses (including bi- and trifocals or transition lenses) can be put into frames that are approved as protective safety glasses. (Fig. 1) More than 30 such frames are available commercially.



Face shields















Infection Control Best practice for wearing masks



Masks – requirement for splash protection

- AS/NZS 4381:2015 'Single-use face masks for use in health care'.
- Disposable surgical masks used in dentistry
 - Must have 98% or greater bacterial filtration efficiency
 - Must be splash resistant (equivalent to ASTM level 2 splash protection) so that they are resistant to the penetration of fluid.
- The level of protection should be clearly labelled on the mask box or on the mask itself.
- Where more than minimal blood droplet exposure is expected, e.g. complex oral surgery procedures such as multiple implant placement, a risk assessment should be undertaken to determine whether the mask type should be **upgraded to level 3 splash protection** to cope with greater potential exposure to blood and other body fluids.

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42



Characteristics*	Level 1 barrier	Level 2 barrier	Level 3 barrier
Application	For general purpose medical procedures, where the wearer is not a risk of blood or body fluid splash, or to protect staff and/or the patient from droplet exposure to microorganisms	For use in emergency departments, dentistry, changing dressings on small wounds or healing wounds where minimal blood droplet exposure may occur	For all surgical procedures, major trauma first aid or in any area where the healthcare worker is at risk of bloody or body fluid splash
Bacterial filtration efficiency (BFE), %	≥95	≥98	≥98
Differential pressure, mm, H ₂ 0/cm ²	<4.0	<5.0	<5.0
Resistance to penetration by synthetic blood, minimum pressure in mmHg for pass result	\$0 mmHg	120 mmHg	160 mmHg

How well do masks filter?

 Current disposable face masks are generally <u>weakest</u> at removing particles in the range from 0.1µm to 0.5µm in diameter, which are small enough to <u>escape</u> the forces of mechanical filtration yet large enough to <u>avoid</u> being entrapped by electrostatic or Brownian motion.



45

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N95/P2 respirators





























Masks - filtration performance

- Most masks have **reduced** filtration performance for particles ranging from 0.1-0.3 microns in size, which is the diameter range for human influenza virus (0.08-0.12 microns).
- Thus, it is recommended when assessing the performance data on a disposable surgical mask to check both the value for particle filtration efficiency (PFE) from 0.1-0.3 microns, as well as the value for bacterial filtration efficiency (BFE) from 1-3 microns.



Mask adaptation

- To provide effective filtration, it is critical that a mask is **fitted closely** to the user's face, by adapting the nose bridge piece and the sides to reduce leakage of air.
- The design of the mask influences how well it can be adapted to the face of the wearer.
- An ear loop mask tends to allow greater leakage of air compared to a surgical mask that has two separate ties, because of the tendency of ear loop masks to gape at the sides.
- Ear loop masks cover less of the face and neck than masks with two ties.

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Mask performance

- A surgical mask that has been properly adapted to the face can block entry of up to 95% of microorganisms, but this filtration capability falls away quickly when the mask is not fitted tightly against the face.
- To provide effective filtration, it is critical that a mask is fitted closely to the user's face, by adapting the nose bridge piece and the sides to

59

61

Mask longevity - *clarification*

- The filtration abilities of a mask begin to decline **significantly** after approximately 20 minutes, because of moisture on the inner and outer surfaces of the mask.
- After this time, the performance reduces progressively but it is not necessary to change masks **during** long procedures (such as surgical procedures), unless the mask becomes completely **wet** from within or without.
- However, at the end of a long procedure, e.g. 60 minutes in duration, put on a new mask for the next patient.



