The Royal Australian and New Zealand College of Ophthalmologists

Options to Reduce Waste in Cataract Surgery

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We acknowledge the Aboriginal and Torres Strait Islander Peoples, the Traditional Owners of Country throughout Australia and recognise their continuing connection to land, waters and community. We pay our respects to them and their cultures; and to their Elders past, present and emerging.
In recognition that we are a bi-national College, we also acknowledge the Rangatiratanga of Māori as Tangata Whenua and Treaty of Waitangi partners in Aotearoa New Zealand.

1. Purpose and Scope

The unnecessary use of disposable items in cataract surgery drives up the price of medical procedures and increases their detrimental environmental impact. As such they represent a significant risk to the sustainable provision of medical services to the maximum number of people.

This guide will be continually developed and built upon using an evidence-based approach to identify best practice to reduce both waste and the cost of ophthalmic procedures for patients, hospitals, surgery centres, medical practices and insurers, without compromise to patient care.

It is important that all clinical decisions prioritise safety and consider the needs of the patient. There will be some patients for whom the least environmentally impactful options are unsuitable, or increase risk, and for these patients their clinical safety must come first.

We also acknowledge that the greatest impacts on the sustainability of cataract surgery occur at a higher level than the immediate practice decisions made by ophthalmologists. For example: reducing packaging, facilitating re-usable items, increasing renewable energy use, effective recycling, are all system-level changes that require advocacy.

2. Considerations

Anaesthetic considerations

Best practice	More wasteful	Notes
Topical anaesthesia for suitable cases	Injected anaesthetic for every case	01

Surgical considerations

Best practice	More wasteful	Notes
Peri-operative topical medications from multi-use bottles, following safe protocol, until bottle is empty or expired.	Separate single-use sterile minims of peri-operative topical medications for all patients.	04
Small disposable drape	Full body drape, mixed/non-recyclable	02
No medical air or oxygen unless required	High-flow oxygen for every case	

Postoperative care

Best practice	More wasteful	Notes
No topical antibiotic drops in routine cases using intracameral antibiotics	Topical antibiotics for all cases, despite intracameral antibiotics	03

The RANZCO Sustainability Committee is seeking feedback from ophthalmologists and managers about areas where waste is problematic and can be improved. Please reach out to us with suggestions: sustainability@ranzco.edu

3. Notes

01 **Topical anaesthesia** avoids the need for additional instrumentation (speculum, scissors), syringes, cannula, hyaluronidase, repeat iodine sterilisation, and reduces the number of steps in the procedure, which reduces consumption of time and human resources, potentially improving throughput or reducing staffing.

References

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Minakaran N, Ezra DG, Allan BDS. Topical anaesthesia plus intracameral lidocaine versus topical anaesthesia alone for phacoemulsification cataract surgery in adults. Cochrane Database Syst Rev. 2020(7):CD005276

02 **Small drapes without medical gases** reduce consumption of plastic/paper and gases which cost money and have a emissions footprint. Increased CO_2 pressures, hyperventillation and increased temperatures occur under cataract surgery drapes, which were not mitigated by provision of oxygen or paper drapes. Smaller drapes reduce consumption, anxiety related to claustrophobia, temperature related discomfort, and improve gas circulation.

References

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Schlager A. Heat trapped under paper and plastic ophthalmic drapes during eye surgery using local anesthesia. J Cataract Refract Surg. 1999;25(11):1532-4.

Schlager A, Luger TJ. Oxygen application by a nasal probe prevents hypoxia but not rebreathing of carbon dioxide in patients undergoing eye surgery under local anaesthesia. Br J Ophthalmol. 2000;84(4):399-402.

03 **Avoiding postoperative antibiotic drops** is supported by two large Scandinavian studies and more recent retrospective studies in Australia. In the Swedish registry of 464 996 operations the rate of endophthalmitis was 0.025% in 396 894 with intracameral antibiotics alone, and 0.019% in 10 382 with intracameral antibiotics plus postoperative antibiotic drops (NS). In a Norway hospital they stopped topical postoperative antibiotics in 2007 and the rate of endophthalmitis was 0.070% in 7123 operations before 2007 (with postoperative antibiotics) as compared to 0.049% in 8131 surgeries after 2007 (without postoperative antibiotics) (NS). In Melbourne, two large hospital units have ceased routine use of postoperative topical antibiotics. In The Alfred the rate of endophthalmitis was 0.034% in 2946 surgeries from 2015-2017 (with postoperative antibiotics) and 0.000% in 2954 surgeries from 2017-2018 (without postoperative antibiotics, NS). In the Royal Victorian Eye and Ear Hospital the rate of endophthalmitis was 0.026% in 30,429 surgeries from 2014-2019 (with postoperative antibiotics) and 0.036% in 12,448 surgeries from 2019-2021 (without postoperative antibiotics, NS). In USA 24% of those surgeons using intracameral antibiotics have stopped giving postoperative topical antibiotics, and current European Society of Cataract and Refractive Surgeons (ESCRS) guidelines on preventing endophthalmitis indicate that postoperative antibiotic drops should be used at the discretion of the surgeon when wound healing might be suboptimal.

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Akkach S, Kam J, Meusemann R. Post-cataract surgery endophthalmitis: The role of prophylactic antibiotic eye drops. Clin Exp Ophthalmol. 2019 May;47(4):555-556.
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Chang DF, Rhee DJ. J Cataract Refract Surg. 2021 Jul 19 (ePub).

04 **Multi-use bottles of topical medications** (mydriatics, anaesthetics, antibiotics, anti-inflammatories) are recommended by a joint statement from American Academy of Ophthalmology, American Society of Cataract and Refractive Surgeons, American Glaucoma Society, and Outpatient Ophthalmic Surgery Society. This statement outlines the vast amount of wasted medication in cataract surgery, and how this contributes to shortages, costs, and emissions. Multi-use topical medications did not affect the rate of endophthalmitis in two large studies from Utah, and analysis of eye drop technique showed that multi-use bottles can be used without contamination. The American Society of Ophthalmic Registered Nurses has produced a protocol for administration of multi-use eye drops, and if the bottle tip is contaminated the bottle should be discarded. Bottles that have been used and stored safely do not need to be discarded after one month. In situations where patients receive their first drop of postoperative medications in the surgical facility, the same bottle should be taken home for use by the patient, rather than requiring them to get drops dispensed from a pharmacy.

References

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American Society of Ophthalmic Registered Nurses. Recommended practice for registered nurses: use of multi-dose medications. Accessed March 11, 2022. https://asorn.org/professional-resources/policies-and-recommendations/asorn-recommended-practice-use-of-multi-dose-medications/

4. Record of amendments to this document

Page	Details of amendment	Date approved
Entire Document	Created	3/12/2021
Page 2	Reviewed considerations section. Under ‘surgical considerations’ section, added multi-use of topical medications (04 in notes) consideration	27/6/2022

Entire Document	Updated title of document to read “Options to reduce waste in Cataract Surgery”	30/06/2022