The ROYAL COLLEGE of OPHTHALMOLOGISTS

Ophthalmic Services Guidance

Sustainable cataract surgery

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The Royal College of Ophthalmologists 18 Stephenson Way, London, NW1 2HD

Contents

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1. Introduction

Climate change is no longer a distant threat, it is a present-day public health emergency.[1] From heatwaves to floods, the climate crisis is already impacting lives and livelihoods. Ironically, the very systems designed to protect our health—healthcare systems—are contributing significantly to the problem.[2] The NHS alone is responsible for around 4% of the UK's net carbon emissions, producing an estimated 25 million tonnes of CO_2 equivalent annually.[3]

As eye care professionals, we cannot ignore this contradiction. Cataract surgery is the most performed operation in the UK, with over half a million procedures carried out each year.[4 5] This high volume means that even small changes in practice can have a massive environmental impact. In the Netherlands, cataract surgery alone contributes to 0.3% of national carbon emissions.[6] The UK is likely not far behind.

A Toolkit for Change

The Royal College of Ophthalmologists' Net Zero Working Group developed these recommendations to make cataract surgery more environmentally sustainable. These are practical, evidence-based actions we believe can be implemented today without compromising patient safety or outcomes. From reducing unnecessary travel and energy use to rethinking our reliance on single-use plastics, these recommendations offer a roadmap to a greener future. The recommendations are divided into two sets. The first are those which are reasonably straightforward and can be implemented immediately. The second are those which, while evidence based, are likely to need further supporting work in the UK context, especially addressing current infection prevention and control and pharmacy regulation. Further discussion, including supporting evidence, can be found in Section 3. The recommendations are not radical ideas—they are common-sense, cost-effective, and backed by robust international evidence. Of note, the Aravind Eye Care System in India performs cataract surgery with just 5% of the carbon footprint of a UK procedure, while maintaining excellent clinical outcomes.[7-9]

Recommendations which can be implemented now:

1. Use Immediate Sequential Bilateral Cataract Surgery (ISBCS) for routine cases.
2. Reduce theatre ventilation to the minimum required.
3. Switch to reusable gowns and hats.
4. Use alcohol-based hand-rub to clean hands after the first hand wash.
5. Rationalise the cataract surgical packs and only routinely open what is needed.
6. Avoid the routine use of oxygen and adrenaline.
7. Use topical anaesthesia for suitable cases.
8. Avoid the routine use of postoperative antibiotics unless needed.
9. Avoid non-sterile single use gloves unless necessary and recycle waste where possible.

Recommendations which need further work before implementation:

1. Use multi-use eye drop bottles on multiple patients
2. Use one vial of intracameral antibiotic for multiple patients

The Moral and Professional Imperative

We are not powerless. While some sustainability levers—like hospital-wide procurement or energy sourcing—may be beyond our immediate control, we can still lead by example. We can advocate for change, challenge outdated practices, and demand innovation from suppliers and manufacturers.

2. A call to action

We can also learn from each other. At Leeds Teaching Hospitals, a Delphi process led to the creation of “Eco-packs” that reduced landfill waste by 650kg annually.[10] Imagine the impact if every eye department in the UK followed suit.

This is a pivotal moment. The NHS has committed to achieving net zero by 2040.[11] If we are serious about this goal, we must embed sustainability into every aspect of care, including cataract surgery.

We urge all ophthalmology departments to:

1. Review and adopt the Best Practice Recommendations in full or in part.
2. Engage your teams—from surgeons to scrub nurses—in identifying local opportunities for greener practice.
3. Collaborate with infection control teams to safely implement sustainable practices like multi-use drop bottles.
4. Work with suppliers to co-create sustainable solutions.
5. Measure your impact and share your successes to inspire others.

The tools are in our hands. The evidence is clear. The time for incremental change has passed. Let us lead the way in making cataract surgery not only sight-restoring but planet-saving.

3. Rationale and evidence for recommendations

Recommendations which can be implemented now:

1. **Use Immediate Sequential Bilateral Cataract Surgery (ISBCS) for routine cases.**

Approximately 3.5% (9.5 billion miles) of all road travel in England relates to patients, visitors, staff and suppliers to the NHS, contributing around 14% of the system's total emissions, with patient travel the largest contributor.[11] Travel has been estimated to be a significant contributor of the overall carbon footprint for cataract surgery.[12 13]

The NICE guidelines 2017 'Cataracts in adults: management' recommends routinely considering bilateral simultaneous cataract surgery for patients who are at low risk of ocular complications during and after surgery.[14] Concerns about ISBCS include the risk of bilateral complications and not being able to adjust the refractive outcome for the second eye. However, recent reviews and meta-analyses, including a Cochrane review, provide evidence that there are no clinically important differences in outcomes between immediate sequential and delayed sequential surgery, with reduced costs and travel with ISBCS and a good safety profile.[14-17] A subsequent randomised controlled trial in the Netherlands in 2023 confirmed similar outcomes and safety, with superior cost-effectiveness of ISBCS.[18] ISCBS has been routinely used in other countries for many years, including Sweden, with uptake increasing over time.[19]

Joint guidelines issued by the RCO and UKISCRS during Covid-19 provide a high level of detail on how to safely undertake ISCBS and minimise any potential risks.[20] Additionally, patients can be advised that if there any issues or concerns with the surgery on the first eye then surgery on the second eye will be delayed to a future date.

2. **Reduce theatre ventilation to the minimum required.**

Discuss with the surgical management team that ventilation only needs to be enabled 30 minutes before surgery, rather than keeping it on continuously. Operating theatres are one of the most energy intensive areas of hospitals, with heating, ventilation and air conditioning (HVAC) contributing to more than 90% of surgical theatres energy usage.[21] Theatre ventilation should be turned off overnight or when unoccupied, an operating theatre can achieve safe operating conditions from a flow and temperature perspective after 20-30 minutes of full power ventilation.[22 23]

3. **Switch to reusable gowns and hats.**

Reuseable gowns and hats should be used rather than disposable ones. Single-use surgical gowns produce huge amounts of waste, with reusable gowns reducing carbon emissions by around 250%, water usage by 300% and solid waste by 750%.[24] There is no evidence that reusable gowns increase surgical site infections, and reusable gowns may actually offer better protection from superior water resistance and durability.[25 26] Reusable gowns for surgeons and assistants are also supported by the RANZCO Sustainable Practice Guide on

reducing waste in cataract surgery.[27 28] Studies have also demonstrated no difference in surgical site infections with disposable bouffant caps compared to traditional, reusable cloth caps, with reusable caps being more cost efficient in the long run.[29-31]

Arm rests, if used, can be covered with the surgeon gown, rather than using separate arm covers. The ESCRS' Young Ophthalmologists for Sustainability provide a guide on how the surgeon gown can be used to cover arm rests, including photos as below.[32]

Image provided courtesy of Cees Verdoorn, cataract surgeon the Netherlands

4. Use alcohol-based hand-rub to clean hands after the first hand wash.

NICE guidelines recommend that after the first water-based hand wash of the day, alcohol-based hand-rub (ABHR) can be used on clean hands for subsequent antisepsis between surgical cases: "Rub, don't scrub".[24 33] ABHR achieves hand decontamination for a wide range of organisms and has been shown to have equal or superior efficacy to traditional scrub. ABHR reduces the duration of the decontamination process and has a favourable user profile, attributed to lower rates of skin irritation and dryness.[24] Studies have demonstrated that many litres of water are saved when using ABHR, with one hospital estimating saving 2.7 million litres of water annually by switching to waterless scrub.[34] ABHR is used routinely in many independent service providers between cataract surgery cases. Water-based hand washing should still be used if hands are visibly soiled or have come into contact with any bodily fluids or other organic material.

5. **Rationalise the cataract surgical packs and only routinely open what is needed.**

Unnecessary equipment and instrumentation may often be opened for surgery. The 'Suggested ESCRS Sustainable Cat-Pack' is shown below and can be used as a sustainable benchmark to guide what is put in the cataract set and routinely opened:

1. Use a small, disposable face drape should be used for the patient and avoid using a full body drape.
2. Avoid using patient gowns or head/hair coverings.
3. Reusable, sterile microscope handles should be used instead of single use disposable sterile handles.
4. Avoid routinely using a pad under the patient head or a sheet on the operating table/chair, as recommended by the Dutch Ophthalmic Society, these can be cleaned with a wipe after each patient.[6]

Suggested ESCRS Sustainable Cat-Pack: Lowest common denominator of Cat-Packs used within Europe. Based on analyses covering 44 different surgical centres spread across 12 different countries and using packages from nine different suppliers.[35]

Suggested ESCRS Sustainable Cat-Pack: Lowest common denominator of Cat-Packs used within Europe. Based on an analysis covering 44 different surgical centres spread across 12 different countries and using packages from nine different suppliers.

Categories (package average)	Single-use product	Quantity [per pack]	Comments
OR-Gowns	OR-Gown surgeon	1	
	OR-Gown Nurse	1	
Drapes&Covers	Face/Body drape - as small as possible (smallest used in analysis 100x120cm)	1	Incase armrests are needed: Preferably repurpose OR gown to use over armrests instead of using armrest covers
	Back table cover - as small as possible (smallest used in analysis 100x140cm)	1	
Postoperative eye cover	Eye-pad/eye-shield	0	Postoperative eyecovers are not essential for postoperative protection as shown by the dutch sustainability taskforce and can therefore be left out
OR-Containment System	Cup/Bowl/Tray	0	It is not recommended to use single-use kidney bowls or cups, as metal reusable cups can be resterilised in the instrument tray
Fluidmanagement	Gauze-swabs (5x5cm)	5	5 gauze swabs are enough for average procedure, if more is needed open separately to reduce unused single-use products
	Wooden stickswabs	2	
	Instrumentwipe	1	
	Surgical towel	1	
Knives	Slit knife	1	
	Sideport knife	1	
Syringes	Syringe for BSS (5ml)	1	
	Syringe for antibiotic (3ml)	1	
Cannulas&Needles	Cannula for hydrodissection, intracameral medication and sideport hydration	1	
	Cystotome	1	
Bags&Pouches	Bag for fluidmanagement	0	

Images provided courtesy of the European Society of Cataract and Refractive Surgeons

6. Avoid the routine use of oxygen and adrenaline and postoperative antibiotics unless needed.

There is no proven benefit from routinely delivering oxygen to the patient during surgery. Increased carbon dioxide pressures, hyperventilation and increased temperatures occur under cataract surgery drapes, but these are not mitigated by the provision of oxygen or paper drapes.[36-38] Smaller drapes should be used, as recommended above, and these reduce waste, anxiety related to claustrophobia, temperature related discomfort and improve gas circulation.[27]

Modern cataract surgery does not need the routine addition of adrenaline to the bottle saline used for irrigation.[6]

7. Use topical anaesthesia for suitable cases.

Using an injected anaesthetic adds additional instrumentation and equipment, with topical anaesthesia being safe and acceptable to patients and surgeons, especially if combined with intracameral anaesthesia.[27 39 40] Many units now use topical +/- intracameral anaesthesia on almost all patients.[41] Some patients may still need injected, or even general, anaesthesia. Administering a small amount of 'on table' sub-Tenon's anaesthetic injection, after the patient has been cleaned and draped, may also be a suitable option for some patients (as well as allowing good visualisation under the operating microscope).

8. Avoid the routine use of postoperative antibiotics unless needed.

There is now good evidence that postoperative antibiotic eyedrops convey no additional benefit with modern cataract surgery which includes the use of prophylactic intracameral antibiotic. This was reviewed in the RANZCO guidelines. [27 42-44] They point out that 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 antibiotic plus postoperative antibiotic drops. 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). 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). 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).

In the 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.[45 46]

9. Avoid non-sterile single use gloves unless necessary and recycle waste where possible.

Huge numbers of non-sterile gloves are used in the NHS every year, often in circumstances in which they are not required.[24] Studies have found that their use is inappropriate in more than 50% of cases and could even hinder hand hygiene due to the potential for cross-contamination.[47] Gloves are generally not needed if there is no potential exposure to blood, bodily fluids, mucous membranes, or non-intact skin, e.g., taking blood pressure, temperature and pulse, hand-holding.[48] Hands should be cleaned with alcohol based hand rub as appropriate. The inappropriate use of non-sterile single-use gloves is damaging both to the environment and healthcare professionals' hands.

The highest carbon footprint for disposal is high temperature incineration (~1074 kgCO2e) and the lowest is recycling (~21 kgCO2e).[24] While recycling as a strategy is far inferior to reusing, recycling should be prioritised where possible, or put through a domestic waste stream, rather than incinerated. Further guidance is available, and several companies provide more environmentally sustainable options.[49]

Recommendations which need further work before implementation:

1. Use multi-use eye drop bottles on multiple patients

Single-use eye drops are widely used within ophthalmic surgery in the UK. However, multi-use bottles can be safely used on multiple patients if appropriate protocols are followed, helping to reduce plastic waste and associated emissions. A position paper was published in 2022 by the Ophthalmic Instrument Cleaning and Sterilization Task Force, with representation and endorsement from the American Society of Cataract and Refractive Surgeons, American Academy of Ophthalmology, American Glaucoma Society and Outpatient Ophthalmic Surgery Society.[50] The evidence was reviewed and a consensus position reached, with the following recommendations:

1. Topical drugs in multidose containers can be used on multiple patients in surgical facilities if proper guidelines are followed. The American Society of Ophthalmic Registered Nurses has produced a strict protocol for administration of multidose drops, e.g., if the bottle tip is contaminated the bottle should be discarded.[51]
2. Topical drugs in multidose containers can be used until the manufacturer's labelled date of expiration if proper guidelines are followed.
3. When applicable, patients should be able to bring their partially used medication home for postoperative use

However, using multi-use eye drop bottles on multiple patients is not currently common practice in the UK and is likely to need work on regulatory approval with IPC, pharmacy and theatre governance boards.

2. Use one vial of intracameral antibiotic for multiple patients

While there is emerging international evidence supporting the safe use of multi-dose vials in high-volume settings under strict aseptic protocols, such as the Aravind Eye Care System's use of intracameral moxifloxacin across multiple patients supported by the RANZCO guidelines [27]. This practice must be approached with caution in the UK context.[*]

For example, Aprokam, a licensed intracameral cefuroxime product widely used in the UK, is clearly labelled for single use only. The Summary of Product Characteristics (SmPC) states that the vial should be used immediately after reconstitution and not reused. Using a product in a manner that contravenes its marketing authorisation—such as sharing a single vial between patients—raises regulatory, clinical safety, and legal risks, particularly if adverse events occur. Therefore, while international models

[**] They point out that the Aravind Eye Care System has published a huge retrospective study of 2 million operations which showed that intracameral moxifloxacin prophylaxis reduced their postoperative endophthalmitis rate.[52] They also established that their method involved sharing the 1ml bottle of moxifloxacin (Auromox) between approximately 7 patients.)

like Aravind demonstrate promising outcomes, current UK practice must remain aligned with the product licence. Further research and regulatory engagement are needed before multi-dosing from single-use vials can be recommended.

It is anticipated that future developments, such as the forthcoming UKISCRS practice recommendation on dropless cataract surgery (expected 2025), may provide additional options for safe and efficient prophylaxis. Until then, adherence to existing product guidance and national protocols remains essential.

It is anticipated that further recommendations are likely to become possible soon, once there is adequate evidence to support their use. These include the use of dropless cataract surgery (UKISCRS practice recommendation being produced 2025).

4. Case Study

Steps to Sustainability: Our experience using the Delphi Process at Leeds Teaching Hospitals NHS Trust

Jonathan Malcolm, John C Buchan

Achieving the NHS aspiration of becoming net zero by 2040 is by no means a small goal. It is estimated that the NHS produced 25 megatonnes of carbon dioxide equivalent in 2019.[3] Ophthalmology, as one of the highest volume specialties, is likely responsible for a substantial part of carbon footprint associated with delivering health care. Eye care professionals therefore have an important role to play in decarbonizing the NHS.

Here, we present an example of how a Delphi process was used by a team at St James's University Hospital (SJUH), Leeds, to make meaningful changes to improve the environmental sustainability of local cataract services. It is hoped that the example provided will inspire and empower eye departments across the country to take their first steps towards more sustainable practices.

The Delphi process is an evidence-based methodology for determining solutions to problems using a consensus and co-creation of ideas. In Leeds, we have found the Delphi process to be a valuable tool for tackling environmental issues and have successfully applied it to both our cataract and medical retina services.[10 53] Based on our experiences, any eye department should be able to improve its environmental sustainability using a Delphi process by following these six simple steps:

1. **Write an email** – Survey all doctors, nurses, health care assistants, optometrists, administrative and domestic staff asking them for any ideas they can think of to improve the environmental sustainability of services.
2. **Collate those ideas into a list** – Produce an anonymized and de-duplicated list of the ideas suggested during the survey.
3. **Organise a meeting** - Invite multidisciplinary team members (MDT) team members to a meeting to discuss the ideas and discard those that are unrealistic.

4. **Rank the ideas from best to "least-best"** – Email the refined list of ideas to all staff, asking them to rank the ideas in order of how likely they are to increase sustainability.
5. **Turn the top ideas into action points** - Form a team to design and implement an action plan that targets the highest ranked ideas.
6. **Estimate the savings** – Quantify the environmental and monetary benefits achieved by the action plan.

By following the above six steps, our small but motivated team from SJUH cataract services conducted a Delphi process in 2021/22 with promising results.

The email survey sent in Step 1 saw strong engagement from a range of staff cadres, generating over 30 suggestions for improving the environmental sustainability of local cataract services.

These suggestions were condensed into 23 discrete ideas in Step 2. During Step 3 and 4, a face-to-face meeting further refined this list to 15 ideas, which were then ranked by 24 MDT members.

In Step 5, highly ranked ideas were combined into an action plan aiming to reduce the waste produced by pre-made cataract packs. Cataract packs that contain only clinically essential equipment—known as "Eco-packs"—were designed in collaboration with suppliers (Bausch & Lomb), local cataract surgeons and scrub teams. Details of the items included in our "Eco-packs" are published elsewhere.

Finally, in Step 6, it was calculated that the introduction of "Eco-packs" reduced waste sent to landfill by 0.135kg per cataract operation, resulting in a total saving of 650kg of landfill waste over the 5,000 cataract operations performed annually at SJUH.

Decarbonising the NHS requires more than the individual efforts of a few; each of us must take responsibility and act. We suggest that a good starting point for those looking to design greener ophthalmic services would be to conduct a Delphi Process. While the accomplishments of the Delphi Processes run in our cataract and intravitreal injection services are in isolation modest, if all eye departments across the country were able to achieve similar environmental benefits using this approach the cumulative effect would be substantial.

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6. References

1. Climate change. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health.
2. Rodríguez-Jiménez L, Romero-Martín M, Spruell T*, et al*. The carbon footprint of healthcare settings: A systematic review. *J Adv Nurs* 2023;79:2830-44.
3. Tennison I, Roschnik S, Ashby B*, et al*. Health care's response to climate change: a carbon footprint assessment of the NHS in England. *Lancet Planet Health* 2021;5:e84-e92.
4. Buchan JC, Norman P, Shickle D*, et al*. Failing to plan and planning to fail. Can we predict the future growth of demand on UK Eye Care Services? *Eye (Lond)* 2019;33:1029-31.
5. Year 5 Annual Report - The Fourth Prospsective Report of the National Ophthalmology Database Audit. 2020. https://nodaudit.org.uk/sites/default/files/2022-06/Annual%20Report%202020%20%20Year%205%20National%20Cataract%20Audit.pdf.
6. Banens R, van Leeuwen R, Elferink S, Henry Y, on behalf of the Dutch Working Group on Sustainable Ophthalmology. Proposal to make cataract surgery more sustainable. 2022. Public Report.
7. Thiel CL, Schehlein E, Ravilla T*, et al*. Cataract surgery and environmental sustainability: Waste and lifecycle assessment of phacoemulsification at a private healthcare facility. *J Cataract Refract Surg* 2017;43:1391-98.
8. Ravindran RD, Gupta S, Haripriya A*, et al*. Seven-year trends in cataract surgery indications and quality of outcomes at Aravind Eye Hospitals, India. *Eye (Lond)* 2021;35:1895-903.
9. Buchan JC, Thiel CL, Steyn A*, et al*. Addressing the environmental sustainability of eye health-care delivery: a scoping review. *Lancet Planet Health* 2022;6:e524-e34.
10. Malcolm J, Dodd A, Shaikh M*, et al*. Reducing the carbon footprint of cataract surgery: co-creating solutions with a departmental Delphi process. *Eye (Lond)* 2024;38:1349-54.

11. NHS England statutory guidance, July 2022. Delivering a 'Net Zero" National Health Service. https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2022/07/B1728-delivering-a-net-zero-nhs-july-2022.pdf.
12. Morris DS, Wright T, Somner JE, Connor A. The carbon footprint of cataract surgery. *Eye (Lond)* 2013;27:495-501.
13. Latta M, Shaw C, Gale J. The carbon footprint of cataract surgery in Wellington. *N Z Med J* 2021;134:13-21.
14. National Institute for Health and Care Excellence. Cataracts in adults: management, October 2017. https://www.nice.org.uk/guidance/ng77/resources/cataracts-in-adults-management-pdf-1837639266757.
15. Spekreijse LS, Nuijts R. An update on immediate sequential bilateral cataract surgery. *Curr Opin Ophthalmol* 2023;34:21-26.
16. Nowrouzi A, Alio JL. Immediately sequential bilateral cataract surgery. *Curr Opin Ophthalmol* 2024;35:17-22.
17. Aiello F, Gallo Afflitto G, Leviste K*, et al.* Immediate sequential vs delayed sequential bilateral cataract surgery: systematic review and meta-analysis. *J Cataract Refract Surg* 2023;49:1168-79.
18. Spekreijse L, Simons R, Winkens B*, et al.* Safety, effectiveness, and cost-effectiveness of immediate versus delayed sequential bilateral cataract surgery in the Netherlands (BICAT-NL study): a multicentre, non-inferiority, randomised controlled trial. *Lancet* 2023;401:1951-62.
19. Lundstrom M, Kugelberg M, Zetterberg M*, et al.* Ten-year trends of immediate sequential bilateral cataract surgery (ISBCS) as reflected in the Swedish National Cataract Register. *Acta Ophthalmol* 2024;102:68-73.
20. Immediate Sequential Bilateral Cataract Surgery (ISBCS) during COVID recovery: RCOphth/UKISCRS rapid advice document, July 2020. https://www.rcophth.ac.uk/wp-content/uploads/2020/09/Immediate-Sequential-Bilateral-Cataract-Surgery-Guidance.pdf.
21. MacNeill AJ, Lillywhite R, Brown CJ. The impact of surgery on global climate: a carbon footprinting study of operating theatres in three health systems. *Lancet Planet Health* 2017;1:e381-e88.
22. Dettenkofer M, Scherrer M, Hoch V*, et al.* Shutting down operating theater ventilation when the theater is not in use: infection control and environmental aspects. *Infect Control Hosp Epidemiol* 2003;24:596-600.
23. Green Surgery Reducing the environmental impact of surgical care. UK Health Alliance on Climate Change et al. https://s41874.pcdn.co/wp-content/uploads/Green-Surgery-Report-v1.1.pdf.
24. Intercollegiate Green Theatre Checklist Compendium of Evidence. https://www.rcsed.ac.uk/media/vspi2d5g/green-theatre-checklist-compendium-of-evidence-document.pdf.
25. McQuerry M, Easter E, Cao A. Disposable versus reusable medical gowns: A performance comparison. *Am J Infect Control* 2021;49:563-70.
26. Overcash MR, Sehulster LM. Estimated incidence rate of healthcare-associated infections (HAIs) linked to laundered reusable healthcare textiles (HCTs) in the United States and United Kingdom over a 50-year period: Do the data support the efficacy of approved laundry practices? *Infect Control Hosp Epidemiol* 2022;43:1510-12.

27. Sustainable Practice Guide on reducing waste in cataract surgery. RANZCO 2024. https://ranzco.edu/wp-content/uploads/2022/08/RANZCO-Sustainable-Practice-Guide-Reducing-waste-in-cataract-surgery.pdf.
28. Reusable surgical gowns position statement. Royal Australasian College of Surgeons. 2023. https://www.surgeons.org/-/media/Project/RACS/surgeons-org/ESSPWP/2023-11-08_Reusable-Gowns-Position-Statement_Final.pdf.
29. Markel TA, Gormley T, Greeley D*, et al.* Hats Off: A Study of Different Operating Room Headgear Assessed by Environmental Quality Indicators. *J Am Coll Surg* 2017;225:573-81.
30. Shallwani H, Shakir HJ, Aldridge AM*, et al.* Mandatory Change From Surgical Skull Caps to Bouffant Caps Among Operating Room Personnel Does Not Reduce Surgical Site Infections in Class I Surgical Cases: A Single-Center Experience With More Than 15 000 Patients. *Neurosurgery* 2018;82:548-54.
31. Elmously A, Gray KD, Michelassi F*, et al.* Operating Room Attire Policy and Healthcare Cost: Favoring Evidence over Action for Prevention of Surgical Site Infections. *J Am Coll Surg* 2019;228:98-106.
32. ESCRS' Young Ophthalmologists For Sustainability. #StartNextMonday. https://www.escrs.org/special-interest-groups/yos/yofs/.
33. National institute for health and clinical excellence (NICE). Surgical Site Infections: prevention and treatment (NG125). Updated 2020. https://www.nice.org.uk/guidance/ng125/resources/surgical-site-infections-prevention-and-treatment-pdf-66141660564421.
34. Wormer BA, Augenstein VA, Carpenter CL*, et al.* The green operating room: simple changes to reduce cost and our carbon footprint. *Am Surg* 2013;79:666-71.
35. ESCRS Suggested Sustainable Cataract Pack. https://www.escrs.org/sidics/suggested-escrs-sustainable-cat-pack/.
36. 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;84:399-402.
37. Schlager A. Accumulation of carbon dioxide under ophthalmic drapes during eye surgery: a comparison of three different drapes. *Anaesthesia* 1999;54:690-4.
38. Schlager A. Heat trapped under paper and plastic ophthalmic drapes during eye surgery using local anesthesia. *J Cataract Refract Surg* 1999;25:1532-4.
39. Guay J, Sales K. Sub-Tenon's anaesthesia versus topical anaesthesia for cataract surgery. *Cochrane Database Syst Rev* 2015;2015:CD006291.
40. Minakaran N, Ezra DG, Allan BD. Topical anaesthesia plus intracameral lidocaine versus topical anaesthesia alone for phacoemulsification cataract surgery in adults. *Cochrane Database Syst Rev* 2020;7:CD005276.
41. Neo YN, Gruszka-Goh MH, Braga AJ*, et al.* Royal College of Ophthalmologists' National Ophthalmology Database study of cataract surgery: report 11, techniques and complications of local anesthesia for cataract surgery in the United Kingdom. *J Cataract Refract Surg* 2023;49:1216-22.
42. Friling E, Lundström M, Stenevi U, Montan P. Six-year incidence of endophthalmitis after cataract surgery: Swedish national study. *J Cataract Refract Surg* 2013;39:15-21.
43. Råen M, Sandvik GF, Drolsum L. Endophthalmitis following cataract surgery: the role of prophylactic postoperative chloramphenicol eye drops. *Acta Ophthalmol* 2013;91:118-22.

44. Akkach S, Kam J, Meusemann R. Post-cataract surgery endophthalmitis: The role of prophylactic antibiotic eye drops. *Clin Exp Ophthalmol* 2019;47:555-56.
45. ESCRS Guidelines for Prevention and Treatment of Endophthalmitis Following Cataract Surgery. 2013. https://www.escrs.org/media/uljgvpn1/english_2018_updated.pdf.
46. Chang DF, Rhee DJ. Antibiotic prophylaxis of postoperative endophthalmitis after cataract surgery: results of the 2021 ASCRS member survey. *J Cataract Refract Surg* 2022;48:3-7.
47. Wilson J, Prieto J, Singleton J*, et al*. The misuse and overuse of non-sterile gloves: application of an audit tool to define the problem. *J Infect Prev* 2015;16:24-31.
48. World Health Organisation. Patient Safety: Glove Use Information. 2009. https://cdn.who.int/media/docs/default-source/integrated-health-services-(ihs)/infection-prevention-and-control/hand-hygiene/tools/glove-use-information-leaflet.pdf?sfvrsn=13670aa_10.
49. Sustainable Healthcare Recycling & Waste Management. NHS Shared Business Services. https://www.sbs.nhs.uk/services/framework-agreements/sustainable-healthcare-recycling/.
50. Palmer DJ, Robin AL, McCabe CM*, et al*. Reducing topical drug waste in ophthalmic surgery: multisociety position paper. *J Cataract Refract Surg* 2022;48:1073-77.
51. American Society of Ophthalmic Registered Nurses. Recommended practice for registered nurses: use of multi-dose medications. https://asorn.org/professional-resources/policies-and-recommendations/asorn-recommended-practice-use-of-multi-dose-medications/.
52. Haripriya A, Chang DF, Ravindran RD. Endophthalmitis reduction with intracameral moxifloxacin in eyes with and without surgical complications: Results from 2 million consecutive cataract surgeries. *J Cataract Refract Surg* 2019;45:1226-33.
53. Malcolm J, Douthwaite H, McKibbin M, Buchan JC. Designing greener intravitreal injection services using the Delphi process. *Eye (Lond)* 2025;39:609-10.