

Veterinary sustainability

The Grass Roots Committee

With some help of VetSustain – North Downs Specialists Referrals



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“The life of every child born today will be profoundly affected by climate change. Without accelerated intervention, this new era will come to define the health of people at every stage of their lives.”

—The 2019 report of the Lancet Countdown

Watts N, Amann M, Arnell N, et al. The 2019 report of The Lancet Countdown on health and climate change: ensuring that the health of a child born today is not defined by a changing climate. *Lancet*. 2019;394(10211):1836–78



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Why?

Review | [Open Access](#) | [Published: 11 October 2021](#)

Ophthalmology Going Greener: A Narrative Review

[Yee Ling Wong](#) , [Maha Noor](#), [Katherine L. James](#) & [Tariq M. Aslam](#)

[Ophthalmology and Therapy](#) **10**, 845–857 (2021) | [Cite this article](#)

- Healthcare sector responsible for 4-6% carbon emission globally
- Delivery of care contributes to 4-5% total greenhouse gas
- Predictions: increase as aging population and increasing health care expenditure
- NHS emissions come from a number of sources
 - Transport contributes significantly - 6.7 billion road miles each year are from patients and visitors travelling to access the healthcare sites (NHS)



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Index

- General principles
 - House keeping
 - Some research on washing fabrics
- Particular actions:
 - Theatre:
 - Sterilisation
 - Rub or scrub
 - Use of gowns and hats
 - Anaesthesia
 - Ophthalmology



General principles

- House-keeping

Think about energy usage

- Electricity consumed
- Consumables purchased
- How is our energy provided?
- Water consumption



General principles

- House-keeping: reduction light consumption:
 - Light sensors
 - Place signals to remind staff to switch off lights
 - Move to LED lightning
 - Specific staff in charge to switch off lights and computers at end of day
 - Set computers to auto-shut down at the end of the day



General principles

- House-keeping:
 - Reduce heating/ air conditioning in non-clinical areas
 - Maximise isolation of rooms
 - Use of sensor taps
 - Duel flush cisterns in toilets
 - Use dishwasher with high energy rating only when full
 - Use of rechargeable batteries



General principles

- House-keeping:
 - Consider eco-friendly products for cleaning hands, and surfaces
 - Consider choosing products and distributors that use less packaging
 - Reducing the use of bleach and other caustic products for routine cleaning



Sterilization efficiency of pathogen-contaminated cottons in a laundry machine

Yoonjae Shin ¹, Jungha Park ², Woojun Park ³

Affiliations + expand

PMID: 31768938 DOI: 10.1007/s12275-020-9391-1

Abstract

Pathogenic bacteria on abiotic surfaces such as fabrics, bedding, patient wears, and surgical tools are known to increase the risk of bacterial diseases in infants and the elderly. The desiccation tolerance of bacteria affects their viability in cotton. Thus, washing and drying machines are required to use conditions that ensure the sterilization of bacteria in cotton. The objective of this study is to determine the effects of various sterilization conditions of washing and drying machines on the survival of three pathogenic bacteria (*Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*) commonly presented in contaminated cotton and two non-pathogenic bacteria (*Bacillus subtilis* and *Escherichia coli*) in cotton. High survival rates of *A. baumannii* and *S. aureus* in desiccated cotton were observed based on scanning electron microscope and replicate organism direct agar contact assay. The survival rates of *A. baumannii* and *S. aureus* exposed in desiccated cotton for 8 h were higher (14.4 and 5.0%, respectively) than those of other bacteria (< 0.5%). All tested bacteria were eradicated at low-temperature (< 40°C) washing with activated oxygen bleach (AOB). However, bacterial viability was shown in low temperature washing without AOB. High-temperature (> 60°C) washing was required to achieve 99.9% of the sterilization rate in washing without AOB. The sterilization rate was 93.2% using a drying machine at 60°C for 4 h. This level of sterilization was insufficient in terms of time and energy efficiency. High sterilization efficiency (> 99.9%) at 75°C for 3 h using a drying machine was confirmed. This study suggests standard conditions of drying machines to remove bacterial contamination in cotton by providing practical data.

Keywords: *Acinetobacter baumannii*; *Staphylococcus aureus*; desiccation tolerance; dry conditions; drying machine; washing machine.

Factors affecting the bacteriological contamination of commercial washing machines

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Affiliations + expand

PMID: 9638885

Abstract

Wash water from self-service washing machines in three commercial laundrettes of Bologna (Italy) were examined to verify which factors affect their bacterial contamination and to determine which procedures in the laundering process have the most significant effects on the removal of bacteria. Four washing formulas were compared: a delicates cycle (programmed temperature 25-30 degrees C; actual temperature: 28-31 degrees C); a whites cycle (programmed temperature: 80-90 degrees C; actual temperature: 50-57.5 degrees C); a delicates cycle with the addition of an oxygen-based bleach safe for delicate fabrics and a whites cycle with the addition of an oxygen-based bleach. Bacterial contamination of washing machines was higher in the launderette most heavily used, and, furthermore, it was in relation with the washing temperature and the use of bleaches. The low temperature laundering cycle (20-30 degrees C) did not guarantee elimination of bacterial content from either the inside of the washing machine or from the fabric being washed. Washing with water at a higher temperature, of about 55 degrees C, or adding an oxygen-based bleach to the low temperature cycle did ensure a significant reduction in bacterial recovery from water samples and fabrics, but did not prevent bacteria such as *P. aeruginosa* from surviving inside the washing machine. Only the addition of bleaches to the hot water program ensured the almost total elimination of bacteria and also guaranteed their elimination from protected parts of the drum.

Oxygen Bleach vs Chlorine Bleach

The active ingredient is oxygen, usually as peroxide.



- Gentler and safe for most fabrics.
- Disinfects and whitens.
- More environmentally friendly.
- Do not mix with vinegar.

The active ingredient is chlorine, usually as hypochlorite.



- Strong, but weakens fabrics.
- Disinfects, whitens, deodorizes.
- Releases toxic compounds.
- Do not mix with other products.

Comparative Study > [J Infect Dis.](#) 1984 Jan;149(1):48-57. doi: 10.1093/infdis/149.1.48.

Killing of fabric-associated bacteria in hospital laundry by low-temperature washing

M J Blaser, P F Smith, H J Cody, W L Wang, F M LaForce

PMID: 6693789 DOI: [10.1093/infdis/149.1.48](#)

Abstract

Hospitals using 71.1 C water for laundering consume vast amounts of energy. We studied whether washing at 22 C would result in fabric-associated bacterial counts significantly different from those remaining after the high-temperature wash procedure in general use. Using a standard method to enumerate fabric-associated bacteria, we found that soiled sheets and terry cloth items were contaminated, respectively, with 10(6) and 10(8) cfu/100 cm² of fabric area, predominantly gram-negative rods (especially Enterobacteriaceae and Pseudomonadaceae). Staphylococcus species were the most common gram-positive organisms. A standard low-temperature washing cycle without laundry chemicals removed 3 log₁₀ of bacteria by agitation, dilution, and drainage. When low-temperature laundry chemicals were used, 3 log₁₀ of bacteria were killed after the bleach was added, and sheets and terry cloth items had postwash colony counts of 10(1)-10(2) cfu/100 cm². Drying removed an additional 1-2 log₁₀ organisms. Bacterial counts and species from low- and high-temperature washed fabrics were comparable. Low-temperature washing is therefore as effective as high-temperature washing for eliminating pathogenic bacteria from hospital laundry.

Comparative Study > [Infect Control.](#) 1987 May;8(5):204-9. doi: 10.1017/s0195941700065954.

Effect of water temperature on bacterial killing in laundry

J A Smith, K R Neil, C G Davidson, R W Davidson

PMID: 3647942 DOI: [10.1017/s0195941700065954](#)

Abstract

The increasing cost of energy directed our attention to testing the feasibility of low temperature washing. Hospital laundries use formulated chemicals at high temperature wash waters of 66 degrees C. Wash water effluents and fabric bacterial counts of heavily soiled linen were correlated with alkalinity and temperature measurements to investigate the bacterial killing action of hot and cold wash formulas. Terry towels were found to be contaminated with 10(7) to 10(9) organisms per 100 cm² at the beginning of the washing process. The most common gram-negative rods found were Klebsiella, Enterobacter and Serratia species. Staphylococci were the predominant gram-positives. Both cold and hot water washing including the bleach cycle reduced bacterial counts in fabric by 3 log₁₀. Similarly wash water cfu/mL declined 3 to 4 log₁₀. A further 0.5 to 1.0 log₁₀ reduction was effected in the 93.3 degrees C drying cycle. Low temperature wash formulas were comparable to high temperature laundry with respect to bacterial counts and species. Cold water formulas at 31.1 degrees C offer an alternative method to reduce energy consumption and maintain bacteriological and esthetic linen quality.



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- “Low temperature”: note that some studies describe low temp as 48-60C!

Comparative Study > Appl Environ Microbiol. 1983 Feb;45(2):591-7.
doi: 10.1128/aem.45.2.591-597.1983.

Bacteriological quality of fabrics washed at lower-than-standard temperatures in a hospital laundry facility

R R Christian, J T Manchester, M T Mellor

PMID: 6830218 PMCID: PMC242329 DOI: 10.1128/aem.45.2.591-597.1983
Free PMC article

Abstract

We determined whether the bacteriological quality of fabrics cleaned in a hospital laundry could be maintained at wash temperatures lower than 75 degrees C by the use of economically reasonable formulas and wash conditions. Three groups of bacteria were examined to determine bacteriological quality: aerobic, nonexacting chemoorganotrophs, staphylococci, and total coliforms. The distribution of bacteria on soiled fabric was patchy, with staphylococci and total coliforms ranging from less than 0.1 to greater than 4×10^3 CFU/cm² and chemoorganotrophs ranging from less than 0.1 to greater than 5×10^5 CFU/cm². The washing process routinely produced fabric containing less than 1 CFU/cm². Low-temperature (47.8 to 60.0 degrees C) wash procedures eliminated all bacterial groups at least as effectively as did high-temperature procedures. The effectiveness of bacterial density reduction at low temperature was augmented by increased concentrations of bleach. Successful low-temperature washing such as that shown here may save both energy and money for hospitals.

> J Appl Microbiol. 2014 Dec;117(6):1787-97. doi: 10.1111/jam.12647. Epub 2014 Oct 13.

Impact of wash cycle time, temperature and detergent formulation on the hygiene effectiveness of domestic laundering

M Honisch¹, R Stamminger, D P Bockmühl

Affiliations + expand

PMID: 25207988 DOI: 10.1111/jam.12647

Free article

Abstract

Aims: Investigation of the effect of temperature and duration of the laundering process with and without activated oxygen bleach (AOB)-containing detergent on the hygienic effectiveness of laundering.

Methods and results: Cotton test swatches were contaminated with *Staphylococcus aureus*, *Enterococcus hirae*, *Pseudomonas aeruginosa*, *Candida albicans* and *Trichophyton mentagrophytes* and were washed in a household washing machine using temperatures between 20 and 60°C and different wash cycle times. The logarithmic microbial reduction factor and cross-contamination (i.e. transfer from contaminated to sterile swatches) were used to indicate the hygienic effectiveness of the washing process. For all tested micro-organisms, the temperature needed for decontamination depended on washing time and detergent type. Hygiene effectiveness of laundering was enhanced by inclusion of AOB even at lowest temperatures, except for *C. albicans*, which was virtually unaffected by AOB. The use of AOB-containing detergents as well as high washing temperatures reduced cross-contamination to sterile swatches included in the load.

Conclusions: Depending on the type of organism, longer wash cycle times or the use of AOB-containing detergents can be used to enhance the hygiene effectiveness of laundering.

Significance and impact of the study: The study demonstrates that it is possible to compensate for the loss of hygiene effectiveness of laundering at lower temperatures using detergents with activated oxygen bleach or by extending the wash cycle time.

Keywords: activated oxygen bleach; domestic laundry; laundry hygiene; wash cycle time; washing process; washing temperature.

© 2014 The Society for Applied Microbiology.



> [Infect Control Hosp Epidemiol](#). 2011 Nov;32(11):1103-8. doi: 10.1086/662183. Epub 2011 Sep 20.

Effectiveness of low-temperature domestic laundry on the decontamination of healthcare workers' uniforms

N Lakdawala ¹, J Pham, M Shah, J Holton

Affiliations + expand

PMID: 22011538 DOI: [10.1086/662183](#)

Abstract

Objective: Most professionals in the healthcare environment wear uniforms. For the purpose of this study, we concentrated on nurses' uniforms. In the United Kingdom, many nurses are expected to launder their uniforms at home by using a domestic washing machine that frequently has low-temperature wash cycles. We have investigated whether the use of low-temperature wash cycles results in a microbiologically acceptable product to wear on the wards.

Methods: We have assessed the bioburden on uniforms before and after laundry and the effectiveness of low-temperature wash cycles and ironing on removal of methicillin-resistant *Staphylococcus aureus* (MRSA) and *Acinetobacter baumannii*. We did not assess the role of tumble drying.

Results: We demonstrate contamination of uniforms by gram-negative bacteria after wash, the removal of MRSA at low-temperature wash cycles in the presence of detergent, and the eradication of gram-negative bacteria after ironing.

Conclusions: Our conclusions are that laundry in a domestic situation at 60°C (140°F) for 10 minutes is sufficient to decontaminate hospital uniforms and reduces the bacterial load by more than 7-log reduction, that items left in the pockets are decontaminated to the same extent, that the addition of either a biological detergent or a nonbiological detergent is beneficial in removing MRSA from experimentally contaminated swatches, and that uniforms become recontaminated with low numbers of principally gram-negative bacteria after laundry but that these are effectively removed by ironing.

Review > [Infect Control Hosp Epidemiol](#). 2015 Sep;36(9):1073-88. doi: 10.1017/ice.2015.135.

Epub 2015 Jun 18.

Healthcare Laundry and Textiles in the United States: Review and Commentary on Contemporary Infection Prevention Issues

Lynne M Sehulster ¹

Affiliations + expand

PMID: 26082994 DOI: [10.1017/ice.2015.135](#)

Abstract

Healthcare professionals have questions about the infection prevention effectiveness of contemporary laundry processes for healthcare textiles (HCTs). Current industrial laundry processes achieve microbial reductions via physical, chemical, and thermal actions, all of which result in producing hygienically clean HCTs. European researchers have demonstrated that oxidative laundry additives have sufficient potency to meet US Environmental Protection Agency benchmarks for sanitizers and disinfectants. Outbreaks of infectious diseases associated with laundered HCTs are extremely rare; only 12 such outbreaks have been reported worldwide in the past 43 years. Root cause analyses have identified inadvertent exposure of clean HCTs to environmental contamination (including but not limited to exposure to dust in storage areas) or a process failure during laundering. To date, patient-to-patient transmission of infection has not been associated with hygienically clean HCTs laundered in accordance with industry process standards. Occupationally acquired infection involved mishandling of soiled HCTs and failure to use personal protective equipment properly. Laboratory studies of antimicrobial treatments for HCTs demonstrate a wide range of activity from 1 to 7 log₁₀ reduction of pathogens under various experimental conditions. Clinical studies are needed to evaluate potential use of these treatments for infection prevention. Microbiological testing of clean HCTs for certification purposes is now available in the United States. Key features (eg, microbial sampling strategy, numbers of textiles sampled) and justification of the testing are discussed.



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To rub or to scrub?

- Scrubbing with iodine these detergents strips skin oils, compromises skin integrity, and (if a brush is used) often causes microabrasions, thereby increasing the risk of subsequent colonization by pathogens
- Conventional surgical scrub has the disadvantages of skin damage and allergic skin reaction
- Time consuming to use them
- Skin irritation or dermatitis happened less frequently with an alcohol-based hand rub in a small series of case studies

Review > [Surg Infect \(Larchmt\)](#). 2019 Feb/Mar;20(2):129-134. doi: 10.1089/sur.2018.302.

Epub 2019 Jan 18.

Operating Room Hand Preparation: To Scrub or to Rub?

Donald E Fry ¹ ²

Affiliations + expand

PMID: 30657416 DOI: [10.1089/sur.2018.302](#)

Abstract

Background: The alcohol rub has been proposed as an alternative to the traditional surgical scrub in preparing the hands for surgical procedures. Few reviews have examined critically the evidence that favors or discredits the use of the alcohol rub instead of the traditional scrub.

Methods: A review of available published literature was undertaken to define the evidence for the best methods for hand preparation before surgical procedures. The focus of this literature review was to compare the bacteriologic and clinical outcomes of conventional surgical scrubbing of the hands compared with alcohol rubs.

Results: The bacteriologic studies of the hands after the conventional scrub versus the alcohol rub demonstrated consistently comparable or superior reductions in bacterial presence on the hand with the alcohol rub. Only four clinical studies were identified that compared the scrub versus the rub in the frequency of surgical site infections. No difference in surgical site infections were identified.

Conclusions: The alcohol rub appears to have comparable results to the surgical scrub and is a reasonable alternative in preparation of the hands for surgical procedures.



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Particular actions

- Theatre:

- Scrubbing for surgery

- Use of alcohol skin scrub rather than traditional 5 minutes skin scrub
 - Could not find a study proving otherwise or raising doubts of the conclusions of these articles below

- Comparison of an alcohol-based hand rub and water-based chlorhexidine gluconate scrub technique for hand antisepsis prior to elective surgery in horses. *Can Vet J.* 2016 Feb;57(2):164-8. PMID: 26834268;
- To Scrub or to Rub? *Surg Infect (Larchmt).* 2019 Feb/Mar;20(2):129-134. doi: 10.1089/sur.2018.302. Epub 2019 Jan 18. PMID: 30657416.
- Comparative antimicrobial efficacy of alcohol-based hand rub and conventional surgical scrub in a medical center. Shen et al. *J Microbiology, Immunology and infection* 2015



Particular actions

- Anaesthesia:
 - Low flow anaesthesia
 - Circle breathing system with patients over 5-10kg
 - Circle system aim to reduce fresh gas flow to 1L/min after initial stabilisation
 - Sevoflourane has lower carbon footprint than Iso
 - Discourage using Nitrous Oxide and Desflurane: potent greenhouse
 - Reusable patient warming blankets (bair hugger)



Particular actions

- Anaesthesia:




BJA Education, 15 (4): 173–179 (2015)
doi:10.1093/bjae/abp023
Advance Access Publication Date: 29 October 2014

Atmospheric science, anaesthesia, and the environment

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Key points

- The inhalational anaesthetic agents sevoflurane, isoflurane and desflurane have global warming potentials 2–3 orders of magnitude higher than CO₂.
- Nitrous oxide contributes significantly to global warming and ozone depletion.
- 5% of the carbon footprint (CO₂e) of the NHS is attributable to exhaled anaesthetic agents.
- Most medical nitrous oxide liberation originates from Entonox use, including maternity use.
- Reducing the environmental impact of anaesthesia, can be achieved through behaviour change.

Table 2 The atmospheric characteristics of inhalation anaesthetic ethers. Data from references^{4 5}

	Isoflurane	Sevoflurane	Desflurane
Tropospheric lifetime (yr)	3.2	1.1	14
IR absorption peak (μm)	8.5	8	8.1
IR absorption range (μm)	7.5–9.5	7–10	7.5–9.5
Radiative efficiency (W m ⁻² ppb ⁻¹)	0.453	0.351	0.469
GWP ₁₀₀	510	130	2540
CO ₂ e of a vaporized bottle of the agent=mass×GWP	190 kg per 250 ml	49 kg per 250 ml	886 kg per 240 ml

Particular actions

- Anaesthesia:
 - One hour of **2% sevoflurane** emits CDE similar to that driving **6,5km**
 - One hour of **1,2% isoflurane** emits CDE similar to that driving **14km**
 - One hour of **60% nitrous oxide** emits CDE similar to that driving **95km**
 - One hour of **6% desflurane** emits CDE similar to that driving **320km**

Can J Anesth/J Can Anesth (2019) 66:838–839
<https://doi.org/10.1007/s12630-019-01348-1>

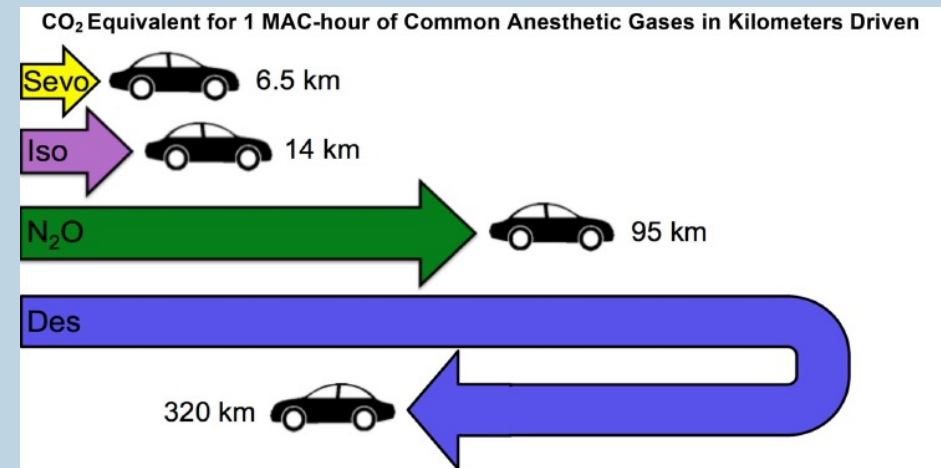


IMAGES IN ANESTHESIA

A long way to go: minimizing the carbon footprint from anesthetic gases

Mary Hanna, MD, BHSc · Gregory L. Bryson, MD, FRCPC, MSc

Received: 7 March 2019 / Accepted: 7 March 2019 / Published online: 15 March 2019
© Canadian Anesthesiologists' Society 2019



Particular actions

- Sterilisation room:
 - Use of metal sterilisation boxes for surgical kits
 - When buying new: consider use of metallic boxes rather than plastic to store the instruments in



Particular actions

- Theatre:
 - Washable cloth theatre hats and gowns
 - Useful articles that might help us to make decisions on our day to day practice:



IMPLEMENTATION MODULE:

Moving (Back) to Reusables in the OR

Figure 2: Surgeons' Preference for Disposable and Reusable OR Supplies¹³

	Superior	Good	Fair	Poor
Gown Comfort				
Disposable	6%	38%	23%	33%
Reusable	86%	10%	4%	0%
Ease of Towel/Gown Use				
Disposable	33%	47%	19%	1%
Reusable	87%	11%	2%	0%
Protective Properties of Gowns				
Disposable	30%	45%	20%	5%
Reusable	96%	6%	2%	0%

Research Paper

A mixed-methods study on end-user perceptions of transitioning to reusable surgical gowns

Ava Yap MD MHS^a, Kaiyi Wang MS^b, Evan Chen MD^c, Caroline Melhado MD^a, Tessim Ahmad MD^c, Patricia O'Sullivan EdD^a, Seema Gandhi MD^{b d}

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<https://doi.org/10.1016/j.sopen.2022.10.003>

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Highlights

- Transitioning from disposable to reusable surgical gowns reduces medical waste.
- Perioperative staff perceptions are ambivalent towards reusable surgical gowns.
- Uncertainty in reusable gowns' environmental impact and effectiveness hinders buy-in.
- Closing end-users' knowledge gaps is imperative before implementing reusable gowns.

Microbacteriology study reusable gowns and drapes

- Reusable fabrics 13,1% positive cultures Vs 15,5% disposable fabrics
- (no statistical difference)
- Rates of wound infection equally

Comparison of nonwoven and woven gown and drape fabric to prevent intraoperative wound contamination and postoperative infection ☆,



[Richard A. Garibaldi MD¹](#) , [Susan Maglio RN¹](#), [Trudy Lerer MS¹](#), [Donald Becker MD¹](#), [Robert Lyons MD¹](#)



GENERAL ARTICLES: REVIEW ARTICLE

A Comparison of Reusable and Disposable Perioperative Textiles Sustainability State-of-the-Art 2012

Overcash, Michael PhD

[Author Information](#)

Anesthesia & Analgesia 114(5):p 1055-1066, May 2012. | DOI: 10.1213/ANE.0b013e31824d9cc3

FREE

SDC

 Metrics

CONCLUSION

Reusable and disposable gowns and drapes meet new standards for medical workers and patient protection, use synthetic lightweight fabrics, and are competitive in price. Reusable surgical textiles offer substantial sustainability benefits over the same disposable product in energy (200%–300%), water (250%–330%), carbon footprint (200%–300%), volatile organics, solid wastes (750%), and instrument recovery. This has now been verified in all 6 available life cycle studies. Other factors including cost, protection, and comfort are reasonably similar. The large environmental sustainability benefits of reusables allow nurses, physicians, and hospitals to make substantial improvements for this industry. It is no longer valid to indicate that reusables are better in some environmental impacts and disposables are better in other environmental impacts. The uniformity of life cycle results from multiple studies over the past decade may reduce the need for future studies of perioperative textiles and shift interest to other reusable OR medical products, such as laryngeal mask airways and suction canisters.

Comparison of nonwoven and woven gown and drape fabric to prevent intraoperative wound contamination and postoperative infection ☆, ☆☆

☆☆

[Richard A. Garibaldi MD¹](#), [Susan Maglio RN¹](#), [Trudy Lerer MS¹](#), [Donald Becker MD¹](#), [Robert Lyons MD¹](#)

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[https://doi.org/10.1016/0002-9610\(86\)90216-3](https://doi.org/10.1016/0002-9610(86)90216-3)

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Abstract

In a prospective, controlled clinical trial, nonwoven, disposable gown and drape fabrics were no better barriers to intraoperative wound contamination or postoperative wound infection than reusable cotton poplin. We observed no difference between the two study groups in either the frequency or level of intraoperative wound contamination as judged by cultures of specimens collected at the time of wound closure. Of procedures in which reusable fabrics were used, 13.1 percent had positive cultures compared with 15.5 percent of those in which disposable fabrics were used (difference not statistically significant). We recovered coagulase-negative Staphylococci from more than 95 percent of contaminated wounds. Rates of postoperative wound infection were virtually identical in the two groups. Our data suggest that either both fabrics were similar in their ability to block bacteria that were shed from skin surfaces from entering the wound, or that bacteria which contaminate the wound in clean surgical procedures are derived from sources other than skin.



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Featured Article

An Environmental Analysis of Reusable and Disposable Surgical Gowns

Eric Vozzola BSChE, Michael Overcash PhD, Evan Griffing PhD

ABSTRACT

Surgical gowns help protect patients from exposure to microorganisms and serve as personal protective equipment for perioperative staff members. Medical textiles, including surgical gowns, are available as reusable and disposable products. Health care facility administrators and leaders who endeavor to use environmentally sustainable practices require current data for decision making. This study analyzed all activities from the extraction of fossil materials from the earth to the end-of-life disposal of reusable and disposable surgical gowns. The researchers included calculations for laundry and wastewater treatment operations and compared the environmental effects of the two surgical gown systems. The study results showed that selection of reusable gowns rather than disposable gowns reduced natural resource energy consumption (64%), greenhouse gas emissions (66%), blue water consumption (83%), and solid waste generation (84%). Perioperative nurses can use this information to assist facility leaders as they make informed decisions related to gown system selection.

Comparison Single Use Vs reusable	Reusable
Energy consumption	↓ 64%
Greenhouse gas emissions	↓ 66%
Water consumption	↓ 83%
Solid waste generation	↓ 84%



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A mixed-methods study on end-user perceptions of transitioning to reusable surgical gowns

Ava Yap MD MHS^a, Kaiyi Wang MS^b, Evan Chen MD^c, Caroline Melhado MD^a, Tessnim Ahmad MD^c, Patricia O'Sullivan EdD^a, Seema Gandhi MD^{b,d}

Table 2. Attending, trainee and OR staff perceptions on transitioning to reusable surgical gowns. **SSI: surgical site infection**

	Surgery or anesthesia attending	OR staff	Surgery or anesthesia trainee	p-Value
<i>Would transition to reusable gowns lead to increase in SSI?</i>				
No	71 (74.0%)	17 (50.0%)	44 (60.3%)	0.058
Unsure	19 (19.8%)	11 (32.4%)	23 (31.5%)	
Yes	6 (6.6%)	6 (17.6%)	6 (8.2%)	
<i>Which gown would you prefer to use, if available?</i>				
Single-use surgical gowns	25 (26.0%)	20 (58.8%)	17 (23.3%)	0.002
No preference	24 (25.0%)	4 (11.8%)	24 (32.9%)	
Reusable surgical gowns	47 (49.0%)	10 (29.4%)	32 (43.8%)	

Table 3. Staff perceptions on reusable gowns stratified by years in practice.

	In practice ≤ 20	In practice > 20	p-Value
<i>Would transition to reusable gowns lead to increase in SSI?</i>			
No	109 (62.6%)	24 (77.4%)	0.306
Unsure	48 (27.6%)	6 (19.4%)	
Yes	17 (9.9%)	1 (3.1%)	
<i>Which gowns do you prefer?</i>			
Disposable surgical gowns	55 (32.0%)	8 (25.0%)	0.460
I do not have a preference	45 (26.2%)	6 (18.8%)	
Reusable surgical gowns	72 (41.9%)	18 (56.3%)	

Table 4. Preference of reusable or disposable gowns between anesthesia and non-anesthesia respondents.

	Anesthesia (N = 72)	Non-anesthesia (N = 133)	p-Value
<i>Which gowns do you preferred</i>			
Disposable surgical gowns	45 (34.1%)	17 (23.9%)	0.326
I do not have a preference	32 (24.2%)	20 (28.2%)	
Reusable surgical gowns	55 (41.7%)	34 (47.9%)	

Ophthalmology

- Minimise single dose eyedrop products whenever possible
- Reduce single use instruments
- Use BSS glass bottle



Principles of Going Greener

- To be able to evaluate the impact of our actions
- Everyone doing a little is better than few doing it perfectly
- The GRC will aim to update these every 2 years in order to keep the scientific recommendations updated

