

Pre-surgical Nasal Decolonization of *Staphylococcus aureus*: Recommendation

Final Recommendation

Ontario Health, based on guidance from the Ontario Health Technology Advisory Committee, recommends publicly funding nasal decolonization with mupirocin combined with chlorhexidine body wash for adults before surgical procedures with a high risk of *Staphylococcus aureus*-related surgical site infection or where clinically indicated.

Rationale for the Recommendation

The Ontario Health Technology Advisory Committee has reviewed the findings of the health technology assessment¹ and made the above recommendation after considering the clinical, economic, and patient preferences and values evidence.

The committee acknowledged that the clinical evidence supports that nasal decolonization with mupirocin combined with whole-body decolonization with chlorhexidine body wash reduces surgical site infection among adults who are *Staphylococcus aureus* (*S. aureus*) carriers and where *S. aureus* is likely the cause of the infection. The committee also acknowledged that nasal decolonization alone (nasal mupirocin without chlorhexidine body wash) provides little to no benefit in preventing surgical site infection.

The economic evidence assessed the cost-effectiveness of two approaches to nasal decolonization treatment: treating patients who are *S. aureus* carriers (targeted treatment) or treating patients regardless of their *S. aureus* status (universal treatment). Whereas a targeted treatment approach may increase the overall cost to the health care system because of the additional laboratory cost to test for carrier status, a universal treatment approach may be cost saving; however, there is uncertainty about the associated antimicrobial resistance with this approach. Committee members also considered the preferences and values of people who have had a surgical site infection and/or received treatment with nasal decolonization and chlorhexidine body wash. Participants reported that a surgical site infection had a negative impact on their quality of life and that they valued treatments to prevent infection. Participants also shared that in some cases, nasal mupirocin was publicly funded and chlorhexidine body wash was provided by the hospital, whereas in other instances, they needed to pay out of pocket for these treatments.

After considering the evidence, the committee decided in favour of publicly funding nasal decolonization with mupirocin combined with chlorhexidine body wash; however, they did not recommend one treatment approach over the other with respect to universal or targeted decolonization or with respect to restricting the recommendation to specific surgeries. The

committee felt the selection of patients for nasal decolonization ought to be decided at the hospital level after considering the type of surgery, the hospital's prevalence rates of *S. aureus*-related surgical site infection and antimicrobial resistance, and individual patient risk factors. With respect to antimicrobial resistance, the committee acknowledged the need for surveillance given the uncertainty about whether resistance increases with nasal decolonization treatment.

Finally, the committee reflected upon the variability in access to publicly funded nasal mupirocin and chlorhexidine body wash that was reported by patients. Because evidence supports that the use of nasal mupirocin combined with chlorhexidine body wash reduces the occurrence of surgical site infection, publicly funding both treatments is necessary to achieve equitable outcomes.

Decision Determinants for Pre-surgical Nasal Decolonization of *Staphylococcus aureus*

Overall Clinical Benefit

Effectiveness

How effective is the health technology/intervention likely to be (taking into account any variability)?

Nasal decolonization combined with antiseptic body wash lowers the incidence of *S. aureus*-related surgical site infections in pre-surgical patients who are *S. aureus* carriers (GRADE: High).

Nasal decolonization alone may result in little to no difference in overall surgical site infections and *S. aureus*-related surgical site infections in pre-surgical patients, regardless of their *S. aureus* carrier status (GRADE: Moderate to Very low).

Safety

How safe is the health technology/intervention likely to be?

No significant antimicrobial resistance was identified in the body of evidence reviewed.

Burden of Illness

What is the likely size of the burden of illness pertaining to this health technology/intervention?

Surgical site infections are associated with increased morbidity, mortality, hospital length of stay, and health care use.

Need

How large is the need for this health technology/intervention?

Of the 1.3 million surgeries performed in Canada yearly, 26,000 to 65,000 patients acquire a surgical site infection. The prevalence of surgical site infections may vary across regions. As such, the need for a decolonization approach to surgical site infection prevention ought to be balanced with the prevalence of surgical site infections for individual hospitals.

Patient Preferences and Privacy

Patient Preferences and Values

Do patients have specific preferences, values, or needs related to the health condition, health technology/intervention, or life impact that are relevant to this assessment?

People interviewed value nasal decolonization as a tool to prevent surgical site infections, which can have negative impacts on health and quality of life.

Autonomy, Privacy, Confidentiality, and/or Other Relevant Ethical Principles as Applicable

Are there concerns regarding accepted ethical or legal standards related to patient autonomy, privacy, confidentiality, or other ethical principles that are relevant to this assessment?

People interviewed value autonomy to make informed health care decisions and value the principle of safety when undergoing a surgical procedure.

Equity and Patient Care

Equity of Access or Outcomes

Are there disadvantaged populations or populations in need whose access to care or health outcomes might be improved or worsened that are relevant to this assessment?

People interviewed expressed positive and negative considerations for universal and targeted decolonization approaches, and most preferred a universal approach as they felt it was more equitable and potentially easier to standardize. People interviewed also reported variability in access to publicly funded mupirocin and chlorhexidine body wash. Publicly funding both treatments would likely reduce variability and promote equitable outcomes.

Patient Care

Are there challenges in the coordination of care for patients or other system-level aspects of patient care (e.g., timeliness of care, care setting) that might be improved or worsened that are relevant to this assessment?

The pre-surgical trajectory of care would need to be revised to implement nasal decolonization. A targeted approach would require the coordination of screening and decolonization. While a universal approach does not require screening, it necessitates coordination to facilitate decolonization, and it may introduce a risk of antimicrobial resistance.

Cost-effectiveness

Economic Evaluation

How efficient is the health technology/intervention likely to be?

Universal nasal decolonization with mupirocin combined with chlorhexidine body wash dominates (is less costly and more effective than) both targeted decolonization and no decolonization.

Feasibility of Adoption Into Health System

Economic Feasibility

How economically feasible is the health technology/intervention?

Mupirocin is publicly funded for all inpatients and outpatients who are covered under the Ontario Drug Benefit program (those aged 65 years and older or 19 years and younger). It is sometimes provided to outpatients by the hospital. If the patient has to pay out of pocket, the cost is estimated to be \$2.56 per person. Chlorhexidine body wash is not publicly funded but is sometimes provided free of charge by the hospital. If the patient needs to pay out of pocket, the cost is estimated to be \$5.52 per person. Screening via nasal swab and culture or polymerase chain reaction (PCR) for targeted decolonization is currently available at some hospitals. Increased costs might be incurred at the hospital level if a targeted decolonization approach is implemented.

We estimate that the budget impact of publicly funding universal nasal decolonization in Ontario over the next 5 years would range from a cost savings of \$2.98 million in year 1 to a cost savings of \$15.09 million in year 5, for a total cost savings of \$45.08 million. Publicly funding targeted decolonization using the nasal swab and culture screening method would incur an additional cost of \$0.08 million in year 1 and \$0.39 million in year 5, for a total additional cost of \$1.17 million over the next 5 years.

Organizational Feasibility

How organizationally feasible is it to implement the health technology/intervention?

Infrastructure available to help guide the implementation of a nasal decolonization program should be considered at the local level where the program would be adopted. The Ontario Surgical Quality Improvement Network is an example of the organized multidisciplinary expertise that already exists in Ontario to provide input or support with implementation plans (e.g., identifying high-risk surgeries). In addition, a quality standard on surgical site infections is in development, which will provide information on what high-quality care looks like for people of all ages who have a surgical procedure involving an incision.²

References

- (1) Ontario Health. Pre-surgical nasal decolonization of *Staphylococcus aureus*: a health technology assessment. Ont Health Technol Assess Ser [Internet]. 2022 Aug;22(4):1–165. Available from: [hqontario.ca/evidence-to-improve-care/health-technology-assessment/reviews-and-recommendations/pre-surgical-nasal-decolonization-of-staphylococcus-aureus](https://www.hqontario.ca/evidence-to-improve-care/health-technology-assessment/reviews-and-recommendations/pre-surgical-nasal-decolonization-of-staphylococcus-aureus)
- (2) Ontario Health. Surgical site infections: care in all settings. Toronto (ON): Queen's Printer for Ontario. Forthcoming 2023.

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