

Implementing saline gargle sample collection for COVID-19 testing

British Columbia was one of the first jurisdictions in the world to implement a saline rinse-gargle (“saline gargle”) collection method for COVID-19 testing. In September 2020, collection centres across BC started offering saline gargle as an alternative to nasopharyngeal (NP) swab for school-aged children and youth. By the time this article is published, saline gargle may be available to additional populations.

Why is an alternative to NP swabs needed?

As COVID-19 swept across the world in March and April, global supply chains faltered. During a pandemic, testing is critical, yet NP swabs had few suppliers and significant worldwide demand. This resulted in a global shortage of NP swabs, including in BC. The ability to test hinged on the ability to obtain NP swabs.

At the same time, tree planters from across Canada were heading to remote communities to start the planting season. This led to significant concerns regarding the spread of COVID-19 to these remote communities if symptomatic tree planters had to leave camp to seek health care services for COVID-19 testing. The ideal solution would be to allow planters to collect a specimen at their camp without a health care practitioner. NP swabs did not meet this collection criterion.

Why saline gargle?

Saliva was the most common swab-independent alternative at the time; however, some patients struggle to provide an adequate volume, and

saliva is a difficult specimen type for laboratories to handle. Also, the mucoid nature of saliva was not ideal for the laboratory and required additional processing steps for the sample to be polymerase chain reaction (PCR) ready.

However, in available literature, there were limited and vague reports of using mouthwash samples for testing other viruses. Over extensive literature reviews, brainstorming, and discussions, saline gargle evolved to be a highly possible swab-independent option. Laboratory testing of PCR performance, stability, and appropriateness of the saline gargle was evaluated. Saline gargle performed well compared to the standard nasopharyngeal swab and viral transport media system.

Following the analytical validation of the sample type, a clinical validation was led by BC Children’s Hospital, which required volunteers to provide matched NP swabs, saline gargle, and saliva specimens for parallel testing. The clinical validation demonstrated that interpretation of nucleic acid test results were equivalent for the NP swab and saline gargle, while saliva was shown to have lower clinical sensitivity, particularly for pediatric patients.

As part of the clinical validation findings, participants ranked saline gargle collection as the preferred collection method, adding to the rationale for selecting it as a testing option.

A collaborative province-wide cross-validation study involving all COVID-19 testing laboratories across the province confirmed that saline gargle specimens were compatible with all COVID-19 nucleic acid-based testing platforms present in BC.

Saline gargle implementation for back-to-school

Completion of the clinical validation coincided with back-to-school planning in August, which was timely because returning to in-person schooling meant an increased number

of children would require COVID-19 tests. Testing by collecting an NP swab can be traumatic for children, parents, and health care workers, but using the less-invasive saline gargle helps to lessen barriers to testing.

Provincial Laboratory Medicine Services recommended the adoption of saline gargle for school-aged

children and youth across BC, and provincial implementation started on 17 September, 1 week after children returned to the classroom.

A multidisciplinary group of health care professionals spearheaded the implementation. Representatives from laboratories, BC Children’s Hospital, BCCDC, public health, COVID collection centres, and PHSA Supply Chain played critical roles in ensuring a successful launch. The group created written collection instructions and an accompanying collection video, updated guidance documents, trained front-line staff, and sourced supplies.

Testing tip

Prior to saline gargle testing, it’s critical to practise how to gargle at home with a solution of salt and water. This is especially important for young children who, initially, often immediately spat out the saline solution because of its saltiness. This required either waiting 2 hours

Saline gargle performed well compared to the standard nasopharyngeal swab and viral transport media system.

This article is the opinion of the BC Centre for Disease Control and has not been peer reviewed by the BCMJ Editorial Board.

before trying the saline gargle again or using an NP swab as the alternative.

Lessons learned

Testing continues to be key to addressing the COVID-19 pandemic, and saline gargle improves testing accessibility. This popular collection method, with high user acceptance, addresses an important aspect of the pandemic response as reluctance toward the NP swab is a barrier to testing.

The ability to increase testing among school-aged children and youth helped lessen the chance of a school-based outbreak in the first month after school started. While COVID-19 continues to circulate in the community and school-based outbreaks will occur, expanding saline gargle and increasing laboratory capacity will help BC manage the pandemic.

Multiple jurisdictions, in Canada and abroad, have taken the work performed in BC to facilitate the adoption of the saline gargle method in their region. ■

—Meghan McLennan, BSc, MLT
Project Manager, Provincial Laboratory
Medicine Services

—David Goldfarb, MD, FRCPC
Medical Microbiologist and Pediatric
Infectious Disease Physician, Associate Head,
Department of Pathology and Laboratory
Medicine, BC Children's & Women's Hospitals

—Michael Donoghue
Senior Project Manager, UBC Centre for
Disease Control

—Linda Hoang, MD, DTM&H, FRCPC
Medical Microbiologist and Associate
Director, BCCDC Public Health Laboratory

Continued from page 383

lens through which to examine such cases. Through a careful discussion with the patient, the physician should ascertain the patient's views on each component of good in order to rank them and determine what the overarching good is for the patient. The physician should also reflect on their own definition of the overarching good and determine the extent to which they are willing to fulfill the patient's request. If the patient's interpretations of the overarching good conflict with the surgeon's, the parties should pursue options that minimize the clash of beliefs and determine a course that is acceptable to all. By approaching the decision-making process with empathy, clear communication, and meticulous planning, and using surgical techniques to decrease bleeding, it is possible to achieve a successful surgical outcome. ■

Competing interests

None declared.

References

1. Beauchamp TL, Childress JF. Principles of biomedical ethics. 5th ed. New York: Oxford University Press; 2001.
2. Pellegrino ED, Thomasma DC. For the patient's good: The restoration of beneficence in health care. New York: Oxford University Press; 1988.
3. Trzcinski R, Kujawski R, Mik M, et al. Surgery in Jehovah's Witnesses – our experience. *Prz Gastroenterol* 2015;10:33-40.
4. Dixon JL, Smalley MG. Jehovah's Witnesses: The surgical/ethical challenge. *JAMA* 1981;246:2471-2472.
5. Chua R, Tham KF. Will "no blood" kill Jehovah Witnesses? *Singapore Med J* 2006;47:994-1001.
6. McCormick TR. Ethical issues inherent to Jehovah's Witnesses. *Perioper Nurs Clin* 2008;3:253-258.
7. Hassan N, Halanski M, Wincek J, et al. Blood management in pediatric spinal deformity surgery: Review of a 2-year experience. *Transfusion* 2011;51:2133-2141.
8. Yu X, Xiao H, Wang R, Huang Y. Prediction of massive blood loss in scoliosis surgery from preoperative variables. *Spine* 2013;38:350-355.
9. Chau A, Wu J, Ansermino M, et al. A Jehovah's Witness child with hemophilia B and factor IX inhibitors undergoing scoliosis surgery. *Can J Anesth* 2008;55:47-51.
10. Gohel MS, Bulbulia RA, Slim FJ, et al. How to approach major surgery where patients refuse blood transfusion (including Jehovah's Witnesses). *Ann R Coll Surg Engl* 2005;87:3-14.
11. Adzick NS, deLorimier AA, Harrison MR, et al. Major childhood tumor resection using normovolemic hemodilution anesthesia and hetastarch. *J Pediatr Surg* 1985;20:372-375.
12. Hahn RG. Adverse effects of crystalloid and colloid fluids. *Anaesthesiol Intensive Ther* 2017;49:303-308.
13. Walters BAJ, Wyck DB Van. Benchmarking iron dextran sensitivity: Reactions requiring resuscitative medication in incident and prevalent patients. *Nephrol Dial Transpl* 2005;20:1438-1442.
14. Ahlering TE, Henderson JB, Skinner DG. Controlled hypotensive anesthesia to reduce blood loss in radical cystectomy for bladder cancer. *J Urol* 1983; 129:953-954.
15. Sollevi A. Hypotensive anesthesia and blood loss. *Acta Anaesthesiol Scand Suppl* 1988;89:39-43.
16. Jones JW, McCullough LB, Richman BW. A surgeon's obligations to a Jehovah's Witness child. *Surgery* 2003;133:110-111.
17. Brezina PR, Moskop JC. Urgent medical decision making regarding a Jehovah's Witness minor: A case report and discussion. *N C Med J* 2007;68:312-316.
18. Naunheim KS, Bridges CR, Sade RM. Should a Jehovah's Witness patient who faces imminent exsanguination be transfused? *Ann Thorac Surg* 2011; 92:1559-1564.



BC Medical Journal

@BCMedicalJrnl

Follow

The BC Medical Journal provides continuing medical education through scientific research, review articles, and updates on contemporary clinical practice. #MedEd



President's Comment: **Systemic #bias:** Breaking down barriers and improving our #healthcare processes. Over the past several months, the unrest across the globe has pushed us to look deep within ourselves.

Read the article: bcmj.org/presidents-comment/systemic-bias-breaking-down-barriers-and-improving-our-health-care-processes



Follow us on Twitter for regular updates

