

Canadian Hyperbaric Oxygen Research 2020 to 2025

A descriptive review of the Canadian HBOT research landscape, 2020 to 2025.

Scope: **Canadian-led research** Open-access studies: **35** Updated **June 2026** Reviewed **quarterly**

A descriptive review for clinicians and researchers. This review describes the open-access, Canadian-led hyperbaric oxygen therapy (HBOT) research published from 2020 through 2025, drawing on the 35 freely available studies in the Canada Hyperbarics database for which a first or last author was based in Canada. It is organised by year and summarises the indications studied, the study designs used, and where Canadian groups have concentrated their work. The aim is to map the shape of the Canadian evidence base, not to weigh it. Where a specific count appears, it reflects the open-access subset described here rather than the full national literature.

Read this first: this is a review of research volume and type, not of efficacy. Describing how many Canadian studies addressed an indication, or what designs were used, says nothing about whether HBOT works for that indication. A condition with several Canadian case reports is not better supported than one with a single trial; it may simply be easier to publish a case report. More studies do not mean more effective. Many of the studies below are case reports, retrospective cohorts, safety analyses, and methods papers rather than randomised efficacy trials. HBOT has demonstrated benefit only for the conditions Health Canada recognises, and several indications described here (for example stroke, cerebral palsy, and neuropathic pain) remain investigational. Nothing in this bibliometric summary should be read as endorsing HBOT for an unproven use.

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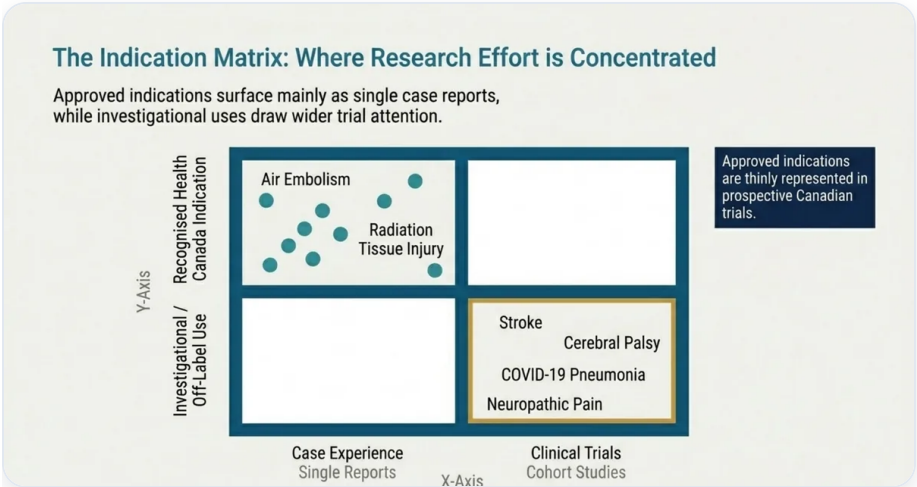
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2025

The 2025 open-access output leans toward methods and safety rather than efficacy testing. Yoo and colleagues published a cross-sectional study of the quality of reporting in hyperbaric medicine clinical trials, continuing a Canadian thread of research-on-research. Park and colleagues reported a retrospective cohort on the safety of HBOT in non-emergent patients with a history of seizures, and Spiegel and colleagues compared adjunctive HBOT with intratympanic steroids in sudden sensorineural hearing loss in a retrospective study. The year also included a case report by Vallélian and colleagues on highly concentrated hydrogen peroxide poisoning with portal venous gas treated with HBOT. The mix is characteristic of the wider Canadian set: observational designs, safety questions, and single-case experience predominate over prospective efficacy trials.

2024

This was the most productive open-access year in the set. Safety and pre-treatment work-up featured strongly: Brenna and colleagues examined the role of routine cardiac investigations before HBOT, and Schiavo and colleagues reported a retrospective cohort on the safety of HBOT in patients with heart failure. Efficacy-oriented work appeared in conditions that remain investigational rather than approved: Harrison and colleagues reported a randomised controlled trial of HBOT after established stroke, and Marois and colleagues compared different doses of hyperbaric treatment against conventional therapies in children with cerebral palsy. Case-based work included Khan and colleagues on HBOT during pregnancy for critical anaemia secondary to sickle cell disease, and Yu and colleagues on a radiation-induced chest-wall ulcer. Methods and reporting research continued through van Ierssel and colleagues (reporting completeness in concussion intervention trials), Khan and colleagues (database searching to identify HBOT randomised trials), and a diving-medicine review by Blake and colleagues.



FIGURE

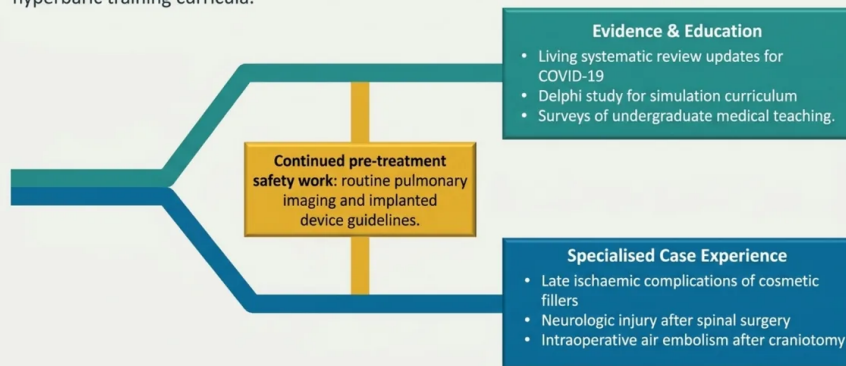
Across the 2020 to 2025 open-access Canadian set, research effort sorts along two lines: whether an indication is recognised by Health Canada, and whether it is studied through single case reports or through trials and cohort studies. Recognised indications such as air embolism and radiation tissue injury surface mainly as case reports, while investigational uses such as stroke, cerebral palsy, COVID-19 pneumonia and neuropathic pain draw most of the trial and cohort attention. The recognised indications are thinly represented in prospective Canadian trials. This describes where Canadian groups have directed research, not how effective any treatment is.

2023

The 2023 set is weighted toward case reports, narrow clinical questions, and education. Schiavo and colleagues produced a clinical guideline review on implanted neurological devices in patients undergoing HBOT, and Brenna and colleagues contributed both a case report on neurological injury after complex spinal surgery and a longitudinal observational study of pulmonary function following HBOT. Malhotra and colleagues reported intraoperative air embolism after craniotomy treated with HBOT, one of several Canadian air-embolism reports across this period. Talbot and colleagues surveyed hyperbaric medicine teaching in Canadian undergraduate medical curricula, and Ponzano and colleagues published a scoping review touching on spinal cord injury. Air embolism is a recognised Health Canada indication; much of the rest of this year's work addresses peri-treatment safety and training rather than efficacy.

2022–2023: Specialised Cases, Education, and Guidelines

Output balances narrow clinical case experience with broader efforts to formalise hyperbaric training curricula.



FIGURE

Across 2022 and 2023 the open-access Canadian work split between broader evidence-and-education efforts and narrow clinical case experience. The evidence-and-education strand included living systematic review updates for COVID-19 pneumonia, a Delphi study toward a hyperbaric simulation curriculum, and a survey of undergraduate medical teaching. Pre-treatment safety work continued with routine pulmonary imaging and implanted-device guidance. The case experience covered late ischaemic complications of cosmetic filler, neurological injury after spinal surgery, and intraoperative air embolism after craniotomy. This reflects the focus of Canadian research, not the effectiveness of any treatment.

2022

In 2022 the open-access output combined evidence synthesis with case experience. Boet and colleagues published a living systematic review update on HBOT for COVID-19 pneumonia, an investigational use that drew sustained Canadian attention during the pandemic, alongside a Delphi study toward an international hyperbaric medicine simulation curriculum. Brenna and colleagues reviewed the role of routine pulmonary imaging before HBOT, extending the group's pre-treatment safety work. Case and mechanistic reports rounded out the year: Jalilian and colleagues described HBOT for a late ischaemic complication of cosmetic hyaluronic acid filler, and Richardson examined oxygen and radiation-induced cataract in a basic-science context. The systematic-review and safety strands are the most visible Canadian contributions this year.

2021

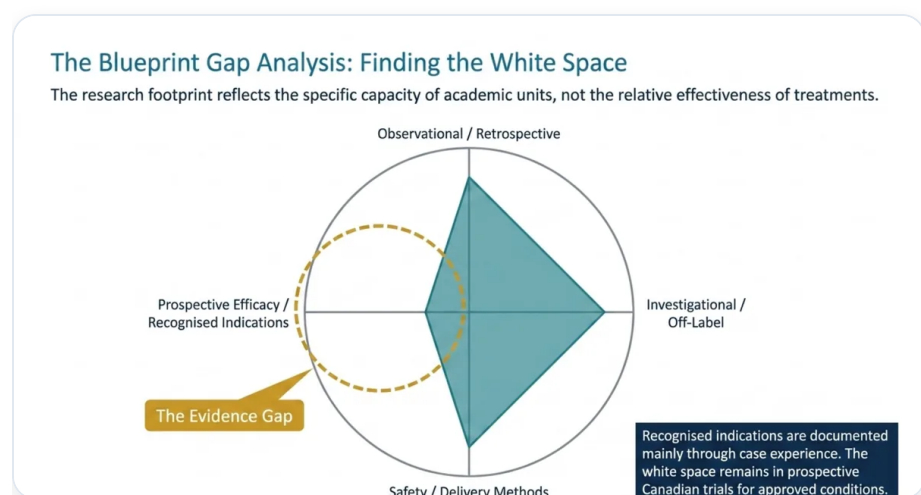
The 2021 set is the second largest and is dominated by retrospective safety analyses and case reports. Schiavo and colleagues contributed a narrative review on the mechanistic rationale and clinical efficacy of HBOT in chronic neuropathic pain, an investigational indication, and Boet and colleagues published a systematic review of HBOT for COVID-19 pneumonia. Cardiac and haemodynamic safety featured through Vincent and colleagues, who studied HBOT in patients with reduced left ventricular ejection fraction. Other entries were case-based or modelling work: Helmeczi and colleagues on penile calciphylaxis, Hadjadj and colleagues on an air embolism during a cardiac procedure, Nepon and colleagues on radiation-induced tissue damage, and Dulai and Jairath on a microsimulation model of HBOT for ulcerative colitis flares. Several of these address recognised indications (air embolism, radiation tissue injury), while others are investigational.

2020

The earliest year in this review centres on retrospective safety work and surgical or neurological applications. Schiavo and colleagues reported a retrospective study of blood pressure changes during HBOT and, separately, a feasibility study pairing HBOT with focused rehabilitation for upper-limb motor function after stroke. Boet and colleagues published a systematic review asking whether preventive HBOT can improve surgical outcomes, and Aldrees and Micieli described radiation-induced optic neuropathy. As with later years, the designs are predominantly observational, exploratory, or synthesis papers rather than definitive efficacy trials.

What the Canadian evidence base looks like

Read across the six years, several patterns stand out, all bibliometric rather than evaluative. First, the open-access Canadian output is concentrated in observational and descriptive designs: retrospective cohorts, case reports, and narrative or systematic reviews far outnumber randomised controlled trials. Second, a substantial share of the work is about HBOT delivery and safety rather than about treating a disease, covering pre-treatment cardiac and pulmonary work-up, blood-pressure and seizure safety, implanted devices, and trial-reporting quality. Third, much of the disease-directed research addresses investigational or off-label uses (stroke, cerebral palsy, neuropathic pain, COVID-19 pneumonia, ulcerative colitis) rather than the approved Health Canada indications, and where approved indications appear they tend to surface as single case reports (air embolism, radiation tissue injury) rather than as Canadian-led efficacy trials.



FIGURE

Read across the six years, the Canadian open-access footprint extends furthest along observational and retrospective designs, investigational and off-label uses, and safety and delivery methods. The shorter axis is prospective efficacy research on recognised indications, where the evidence gap sits. This footprint reflects the interests and capacity of a small number of academic hyperbaric units, not the relative effectiveness of any treatment. A reader should not infer, from how much or how recently a topic has been studied, anything about whether hyperbaric oxygen helps that condition.

The gaps follow from this. Several recognised indications are thinly represented or absent in the Canadian open-access set, and the approved indications that do appear are documented mainly through case experience rather than prospective Canadian trials. The relatively high count of safety and methods papers reflects the interests and capacity of a small number of academic hyperbaric units, not the relative effectiveness of any treatment. A reader should not infer, from the volume or recency of studies on a given topic, anything about whether HBOT helps that condition. This map shows where Canadian groups have chosen to look, and with what tools, and nothing more.

How to use the research list below

The list that follows contains every Canadian-led HBOT study in the Canada Hyperbarics database that was published in 2020 or later and has a freely available full-text version, each linked directly to that full text. "Canadian-led" means a first or last author based in Canada. Paywalled and abstract-only studies are excluded, as are retracted studies. This is a reference list, not a set of summaries, and inclusion does not imply that a study supports HBOT for the condition it examines; many describe investigational uses, safety questions, or single cases. Read each study in full and weigh its design before drawing any clinical conclusion. Counts and the open-access set refresh each quarter.

Open-access research, 2020 to present

35 studies with a free full-text version, grouped by year, newest first. Each title links to the full text. Retracted and paywalled studies are excluded; the set refreshes quarterly.

2025

1. Yoo Y et al.. Quality of reporting in hyperbaric medicine clinical trials: a cross-sectional study. *Diving Hyperb Med*.
2. Spiegel JL et al.. Adjunctive Hyperbaric Oxygen Therapy or Intratympanic Steroids in Sudden Sensorineural Hearing Loss?. *The Laryngoscope*.
3. Vallélian M et al.. Two cases of highly concentrated hydrogen peroxide poisoning with portal venous gas treated using hyperbaric oxygen therapy. *BMJ Case Rep*.
4. Park S et al.. Safety of hyperbaric oxygen therapy in non-emergent patients with a history of seizures: A retrospective cohort study. *PLoS One*.

2024

1. Brenna C et al.. The role of routine cardiac investigations before hyperbaric oxygen treatment. *Diving Hyperb Med*.
2. Yu E et al.. Photodynamic Therapy Healing a Refractory Radiation-Induced Ulcer on the Chest Wall Postmastectomy Radiotherapy for Breast Cancer: A Case Report and Literature Overview. *Cureus*.
3. Blake D et al.. Divers treated in Townsville, Australia: worse symptoms lead to poorer outcomes. *Diving Hyperb Med*.
4. Khan S et al.. Hyperbaric Oxygen Therapy during Pregnancy for Critical Anemia Secondary to Sickle Cell Disease with Post-Transfusion Hyperhemolysis: A Case Report. *Hematology reports*.
5. Marois P et al.. Using the gross motor function measure evolution ratio to compare different dosage of hyperbaric treatment with conventional therapies in children with cerebral palsy - could it end the controversy?. *Frontiers in neurology*.
6. Schiavo S et al.. Safety of hyperbaric oxygen therapy in patients with heart failure: A retrospective cohort study. *PLoS one*.
7. Harrison DW et al.. Hyperbaric Oxygen Post Established Stroke. *Cureus*.
8. van Ierssel JJ et al.. How completely are randomized controlled trials of non-pharmacological interventions following concussion reported? A systematic review. *Journal of sport and health science*.
9. Khan H et al.. Efficacy of searching in biomedical databases beyond MEDLINE in identifying randomised controlled trials on hyperbaric oxygen treatment. *Diving and hyperbaric medicine*.

2023

1. Schiavo S et al.. Clinical Considerations for Implanted Neurological Devices in Patients Undergoing Hyperbaric Oxygen Therapy: A Case Report and Review of Manufacturer Guidelines. *International journal of environmental research and public health*.
2. Brenna CTA et al.. Successful treatment of neurologic injury after complex spinal surgery with hyperbaric oxygen therapy: a case report. *Journal of spine surgery (Hong Kong)*.
3. Brenna CTA et al.. Pulmonary function following hyperbaric oxygen therapy: A longitudinal observational study. *PLoS one*.
4. Malhotra AK et al.. Intraoperative air embolism diagnosis and treatment using hyperbaric oxygen therapy after craniotomy: illustrative case. *Journal of neurosurgery. Case lessons*.
5. Talbot Z et al.. Hyperbaric medicine in Canadian undergraduate medical school curriculum. *Diving and hyperbaric medicine*.
6. Ponzano M et al.. The use of alkaline phosphatase as a bone turnover marker after spinal cord injury: A scoping review of human and animal studies. *J Spinal Cord Med*.

2022

1. Jalilian F et al.. Hyperbaric oxygen therapy for treatment of a late presenting ischaemic complication from hyaluronic acid cosmetic filler injection. *BMJ case reports*.
2. Brenna C et al.. The role of routine pulmonary imaging before hyperbaric oxygen treatment. *Diving Hyperb Med*.
3. Boet S et al.. Efficacy and safety of hyperbaric oxygen treatment to treat COVID-19 pneumonia: a living systematic review update. *Diving Hyperb Med*.
4. Boet S et al.. A Delphi study to identify relevant scenarios as the first step toward an international hyperbaric medicine simulation curriculum. *Diving Hyperb Med*.
5. Richardson RB. The role of oxygen and the Goldilocks range in the development of cataracts induced by space radiation in US astronauts. *Experimental eye research*.

2021

1. Helmeczi W et al.. Isolated Penile Calciphylaxis Diagnosed by Ultrasound Imaging in a New Dialysis Patient: A Case Report. *Canadian journal of kidney health and disease*.
2. Boet S et al.. Efficacy and safety of hyperbaric oxygen treatment in SARS-COV-2 (COVID-19) pneumonia: a systematic review. *Diving and hyperbaric medicine*.
3. Vincent J et al.. Effect of hyperbaric oxygen treatment on patients with reduced left ventricular ejection fraction. *Diving and hyperbaric medicine*.
4. Nepon H et al.. Radiation-Induced Tissue Damage: Clinical Consequences and Current Treatment Options. *Seminars in plastic surgery*.
5. Schiavo S et al.. Mechanistic Rationale and Clinical Efficacy of Hyperbaric Oxygen Therapy in Chronic Neuropathic Pain: An Evidence-Based Narrative Review. *Pain Res Manag*.
6. Hadjadj S et al.. To Take One's Breath Away: Echocardiography-Guided Aspiration of an Air Embolism During a MitraClip Procedure. *CJC open*.
7. Dulai P et al.. A Microsimulation Model to Project the 5-Year Impact of Using Hyperbaric Oxygen Therapy for Ulcerative Colitis Patients Hospitalized for Acute Flares. *Dig Dis Sci*.

2020

1. Schiavo S et al.. Magnitude and Clinical Predictors of Blood Pressure Changes in Patients Undergoing Hyperbaric Oxygen Therapy: A Retrospective Study. *Int J Environ Res Public Health*.
2. Schiavo S et al.. Hyperbaric oxygen and focused rehabilitation program: a feasibility study in improving upper limb motor function after stroke. *Appl Physiol Nutr Metab*.
3. Aldrees S et al.. Catastrophic vision loss from radiation-induced optic neuropathy. *BMJ case reports*.
4. Boet S et al.. Can preventive hyperbaric oxygen therapy optimise surgical outcome?: A systematic review of randomised controlled trials. *Eur J Anaesthesiol*.

Canada Hyperbarics, canadahyperbarics.ca. Reviewed each quarter. A descriptive research summary; not medical advice or a clinical guideline.