

**ONTARIO
PROVINCIAL OFFENCES COURT**

BETWEEN:

KIMBERLY NEUDORF

Applicant (Defendant)

-and-

**HIS MAJESTY THE KING IN RIGHT
OF THE PROVINCE OF ONTARIO**

Respondent

**AFFIDAVIT OF JOEL KETTNER
SWORN JANUARY 10, 2023**

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Barrister & Solicitor

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**AFFIDAVIT OF JOEL KETTNER
SWORN ON JANUARY 10, 2023**

I, JOEL KETTNER, of the City of Winnipeg, in the Province of Manitoba, **MAKE OATH AND SAY AS FOLLOWS:**

1. I am a public health specialist (certified in 1991), an epidemiologist, and former Chief Medical Officer of Health of Manitoba (1999-2012).
2. I am currently an associate professor. Since 1990, I have been a geographic full-time member of the Department of Community Health Sciences at the College of Medicine, University of Manitoba. I have Canadian Royal College Fellowship certifications in Public Health and Preventive Medicine as well as General Surgery. I obtained my Master of Science in Epidemiology from the London School of Hygiene and Tropical Medicine at the University of London in the United Kingdom.

3. During my time as Manitoba's Chief Medical Officer of Health, I led the Province's public health responses to several outbreaks including the SARS Coronavirus-1 and the H1N1 pandemic influenza.
4. Following the SARS-1 outbreak, I was part of the Canadian delegation to the World Health Organization ("WHO") special meeting in Geneva to develop the fourth edition of the International Health Regulation which introduced the concept, definition, and expectations of countries during a public health emergency of international concern.
5. I played a leading role at the WHO Pan American Health Organization special H1N1 meeting in Washington, D.C. In addition to the plenary presentation describing Manitoba's experience with the first wave of H1N1, I led a working group of guidance for the prevention and treatment of H1N1 in low resourced parts of the world. At that same meeting, I collaborated as an author of the first comprehensive review article of H1N1 influenza published in the New England Journal of Medicine.
6. Following my tenure as Chief Medical Officer of Health of Manitoba, I have undertaken several relevant roles and responsibilities including that of scientific director of the Public Health Agency of Canada's National Collaborating Centre for Infectious Diseases, medical director of the International Centre for Infectious Diseases in Winnipeg, board director of the Canadian Public Health Association, and president of the Public Health Physicians of Canada.
7. Specific relevant roles at the University of Manitoba have included director of the Medical College undergraduate program in Community Health Sciences and director of the Master in Public Health program. I continue to teach public health and epidemiology at the

undergraduate, graduate, and post-graduate levels. During this current COVID-19 pandemic, I have been active in organizing learning events and providing expert opinion and dialogue in a variety of consultative, academic, legal and public settings.

8. A copy of my curriculum vitae is attached hereto and marked as **Exhibit “A”**.
9. The Applicant’s counsel contacted me about providing expert testimony and to prepare a report as an expert witness to provide my professional opinion on the following questions:
 - 1) What relevant information was provided by the Ontario Ministry or Public Health Ontario with respect to the effectiveness of restrictions in place between October 24, 2020, and November 7, 2020, regarding outside gatherings to reduce transmission of COVID-19 infections?
 - 2) In your opinion, with respect to the government of Ontario and its public health officials, what information should have been used and what issues should have been considered to explain and justify restrictions of outside gatherings?
 - 3) Based on what you have been able to find, with respect to the Ontario government and its public health officials, what information was used, what issues were considered, and how were they used to explain and justify the restrictions of outdoor gatherings?
 - 4) Based on information you have been able to find in official publications and postings, what were the estimated rates of transmission of COVID-19 in outdoor gatherings available to and/or used by the Ontario government to justify the restrictions of outdoor gatherings?
10. I agreed to provide an expert report with my professional opinion on these matters. A copy of my expert report as described above is attached hereto and marked as **Exhibit “B”**.

11. I acknowledge that in preparing this report and providing expert evidence, the Applicant’s counsel explained that my role is to assist the court to determine the matters in issue. I further acknowledge that it is my duty to provide evidence that is fair, objective and non-partisan and to provide an opinion only on matters that are within my area of expertise. This duty prevails over any obligation that I may owe to any party on whose behalf I am engaged.

12. I make this affidavit *bona fide*.

SWORN REMOTELY BEFORE ME by)
 videoconferencing technology by Joel Kettner,)
 in the Province of Ontario, this 10th day of)
 January, 2023, in accordance with O. Reg)
 431/20 Administering Oath or Declaration)
 Remotely.)
)
)
)
)
)



Rosy Rumpal

A Commissioner etc.,



JOEL KETTNER

Rosy Rumpal
 Barrister & Solicitor
 The Lean Lawyer Law Office
 Suite 101, 116 - 50 Lacoste Blvd.
 Brampton, ON L6P 3Z8
 c: 416.575.4423
 e: rosy@rosyslaw.ca

Counsel for the Applicant

This is **Exhibit "A"** referred to in the Affidavit
of Joel Kettner sworn before me
virtually this 10th day of January, 2023.

A handwritten signature in black ink, appearing to be 'J. Kettner', written over a horizontal line.

Barrister & Solicitor in the
Province of Ontario

CURRICULUM VITAE

**Joel David Kettner
MSc MD FRCSC FRCPC**

January 10, 2023

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PERSONAL AND PROFESSIONAL INFORMATION, CONTACT INFORMATION

Home Address: 2101 – 300 Assiniboine
Winnipeg, Manitoba R3C 0T1
Canada

Work Phone Number: (204) 789-3277 (UM)

Mobile Phone (204) 805-5551

Work Emails: joel.kettner@umanitoba.ca

jdkettner@me.com

UM Address: University of Manitoba
Dept. of Community Health
Sciences
College of Medicine, Faculty of Health Sciences
University of Manitoba
S108C-750 Bannatyne Avenue
Winnipeg MB
R3E 0W3
(204) 789-3277

Personal History

Date of Birth: June 23, 1951

Place of Birth: Minneapolis, Minnesota, U.S.A.
(Canadian citizen born abroad)

Citizenship: Canadian

Marital Status: Married, six children, eight grandchildren

Places of Residence

1951 – 1955 Minneapolis, Minnesota, U.S.A.

1955 – 1967	Winnipeg, Manitoba, Canada
1967 – 1968	London, England, United Kingdom
1968 – 1985	Winnipeg, Manitoba, Canada
1985 – 1988	London, England, United Kingdom
1988 – present	Winnipeg, Manitoba, Canada

PRESENT EMPLOYMENT

University of Manitoba

Associate Professor, Departments of Community Health Sciences and Surgery (since 1990);
Associate Director, Public Health clerkship rotation, undergraduate medical education program;
Professor, public health and epidemiology, undergraduate, graduate, and post-graduate programs;
Professor, graduate course “Problem-solving in Public Health”.
Postgraduate Medical Education CanMEDS intrinsic roles lead;
Co-chair, Postgraduate Medical Education Truth and Reconciliation Action Plan Committee

University of Winnipeg

Adjunct professor, Dept of Indigenous Studies

Self-Employment

Independent consultant

Consultant to several organizations with respect to COVID-19 (see court affidavits and expert reports, page 31.

Consultant, Advisory Circle, Health Transformation Project, Southern Chiefs Organization, Manitoba.

Member, College of Physicians and Surgeons of Manitoba Truth and Reconciliation Advisory Circle.

Vaccinator, First Nations Communities COVID-19 vaccine project.

Chair, College of Physicians and Surgeons of Manitoba Inquiry Panel, Lockwood case.

EDUCATION and TRAINING

Pre-University

1968 – 1969 St. John's High School, Winnipeg, Canada
1967 – 1968 Woodhouse Grammar School, London, England
1964 – 1967 St. John's High School, Winnipeg, Canada

University – Undergraduate

1972 – 1976 Faculty of Medicine, University of Manitoba,
Dean A. Naimark
Winnipeg, Canada

1969 – 1971 “Pre-med” Arts & Science”
University of Manitoba, Winnipeg, Canada

University – Graduate and Post – Graduate

2000 Medical Assistance in Dying
Addictions medicine, opiate agonist therapy

1989 – 1990 Family Medicine Weekly clinics,
(6 months) Family Medicine Centre,
University of Manitoba
Winnipeg, Canada

1988 – 1990 Community Medicine (now Public Health and Preventive Medicine)
Residency,
Dept. of Community Health
Sciences, Faculty of Medicine
University of Manitoba
Winnipeg, Canada

1987 – 1988 Clinical Research Fellow, Imperial
Cancer Research Fund
Colorectal Cancer Unit, St.
Mark's Hospital, London, England

1986 – 1987 Clinical Research Fellow, Hepato-
biliary Surgical Unit, Dept. of Surgery,
University of London
Royal Postgraduate Medical School
and Hammersmith Hospital,
London, England

- 1985 – 1986 Master of Science, Epidemiology,
Faculty of Medicine, University of
London, England, London School
of Hygiene and Tropical Medicine
- 1985 Post – fellowship, Gastrointestinal
Endoscopy, Gastrointestinal Surgery and
Gastroenterology (Health Sciences Centre and
St. Boniface General Hospital, Winnipeg
Canada)
- 1979 – 1984 General Surgery Residency, Dept.
Faculty of Medicine, University of
Manitoba (Health Sciences Centre
and St. Boniface General Hospital),
Winnipeg, Canada
- 1977 Extended Internship, Intensive
Care (voluntary), Health Sciences
Centre and St. Boniface General
Hospital, Winnipeg, Canada
- 1976 – 1977 Rotating Internship, University of
Manitoba, Faculty of Medicine
(Manitoba Affiliated Teaching
Hospitals – Health Sciences Centre
and St. Boniface General Hospital,
Winnipeg, Canada)

UNIVERSITY DEGREES AND CERTIFICATES

- 1991 Specialist Certification, Community Medicine (now Public Health and Preventive Medicine), Royal College of Physicians of Canada (FRCPC)
- 1985 Master of Science in Epidemiology, London School of Hygiene and Tropical Medicine, Faculty of Medicine, University of London, England, (MSc) (MSc Thesis – Epidemiology for Surgeons)
- 1984 Specialist Certification, General Surgery, Royal College Surgeons of Canada (FRCSC)
- 1976 Doctor of Medicine (MD), University of Manitoba, Winnipeg, Canada
- 1976 Licentiate, Medical Council of Canada (LMCC)

FELLOWSHIPS, ACADEMIC PRIZES, DISTINCTIONS AND AWARDS

2021/2022	Postgraduate medical education (PGME) Faculty and Staff Award for Professionalism, Advocacy and Social Accountability
2021	Co-chair of the PGME Truth and Reconciliation Action Plan Committee which received recognition from the PGME accreditors of the Royal College of Physicians and Surgeons of Canada and the College of Family Physicians of Canada as a leading practice and innovation.
2021/2022	Best teacher nominations for innovation, inspiration, mentorship, and small group settings in Med 1 and inspiration and small group settings for Med 2.
1991-2020	Nominated for best teacher of the year by undergraduate medical students in most years; most recently for small group teaching, inspiration, innovation, and mentorship by first and second year medical students.
2016	Long Service Award in Recognition and Appreciation of Twenty-five Years of Loyal Service, University of Manitoba.
2012-2014	McArthur Foundation Fellowship (two years), Masters Development Practice program, University of Winnipeg
2012	Nominated for Manitoba Civil Service Excellence Team Award – CPPHO Report on the Health of Manitobans report-team (leader).
2010	Winner of Manitoba Civil Service Excellence Team Award - Manitoba Health Pandemic H1N1 Influenza Incident Command Team (Medical lead)
1987 – 1988	University of Manitoba Faculty Fund Fellowship for studies in the clinical epidemiology of colorectal cancer.
1987 – 1988	Visiting Clinical Research Fellowship, Imperial Cancer Research Fund, UK, to study clinical epidemiology and Screening of colorectal cancer at the ICRF Colorectal Cancer Unit, St. Mark's Hospital, London, England
1985 – 1987	J.H.F. Knight Fellowship (University of London, England) to study epidemiology and screening for colorectal cancer
1985 – 1987	R.S. McLaughlin Foundation Fellowship (University of Manitoba) to study epidemiology and surgery at the

University of London, England

1983

Davis and Geck Award for Best Surgical Resident
of the Year

1982

Second Prize for paper presented at the American
College of Surgeons (Manitoba Chapter), Manitoba

1969 – 1971

Dean's Honour List, both years of Pre-Medicine,
Faculty of Science, University of Manitoba

MEDICAL WORK EXPERIENCE (concurrent with university employment)

Current	See "Present Employment"
2020-2021	Physician, Medical Assistance in Dying program, Manitoba.
2017	Consultant to Manitoba Keewatinowi Okimakanak, Inc. re northern health clinical transformation
2012-2017	Medical director, International Centre for Infectious Diseases
2012-2015	Director, Master of Public Health program, University of Manitoba
2012-2015	Scientific director, National Collaborating Centre for Infectious Diseases, International Centre for Infectious Diseases.
2012-2014	University of Winnipeg Visiting Professor and Senior Fellow Masters in Development Practice Program, Indigenous Faculty of Graduate Studies
2008-2012	Chief Provincial Public Health Officer of Manitoba
1999 – 2008	Chief Medical Officer of Health Province of Manitoba
1999	Medical Officer of Health Winnipeg Community Health Authority
1995 – 1999	Medical Officer of Health Winnipeg Region, Manitoba
1995 - 1999	Part-time general medical practice and travel clinics, Winnipeg City Clinic, 385 River Avenue, Winnipeg
1995 – 2010	Casual employment as emergency room physician, urgent care physician, and surgical assistant, Seven Oaks General Hospital Concordia General Hospital, Misericordia General Hospital, Grace Hospital, Victoria Hospital
1991 – 1995	Medical Officer of Health Thompson, Norman and Interlake Regions, Manitoba Health
1990	Attending surgeon, Surgical Intensive Care Unit, Health

Sciences Centre

- 1986 – 1988
Locum tenens as senior registrar
in Surgery, Hammersmith and
St. Mark's Hospitals,
London, England
- 1984 – 1985
Surgical Assistant, Cardiac,
Surgery Unit, Health Sciences
Centre, Winnipeg, Canada
- 1977 – 1979
Full-time emergency room physician,
St. Boniface General Hospital,
Winnipeg, Canada

SELECTED CONTINUING PROFESSIONAL DEVELOPMENT

Current	Weekly Dept of Community Health Sciences Colloquia, on-line sessions, webinars, and conferences on topics including medical education, Community of Practice equity, diversion, and inclusion, Indigenous health and anti-Indigenous racism, and COVID-19.
2022	Pacific Rim Indigenous Doctors Conference, Vancouver, July 10 – 15, 2022. (Co-presenter, UM PGME TRAP program)
2022	Public Health 2022, Canadian Public Health Association annual conference, on-line, June 14 – 16, 2022.
2022	Public Health Physicians of Canada annual Continuing Professional Development Day, on-line, June 11, 2022.
2019	Family medicine sessions and teaching development sessions at the University Office of Continuing Professional Development and the Office of Educational and Faculty Development. Annual Scientific Assembly, Manitoba College of Family Physicians, Canadian Conference of Medical Education, Niagara Falls. Canadian Public Health Association annual conference, Ottawa Public Health Physicians of Canada annual Continuing Professional Development Symposium, Ottawa.
2018	Canadian Conference Medical Education, Halifax. Canadian Public Health Association annual meeting, Montreal. Public Health Physicians of Canada annual meeting, Montreal. Weekly Colloquia, Department of Community Health Sciences. CPD sessions, Office of Educational and Faculty Development. Preparation for CAPE (clinical assessment and professional enhancement for re-entry to clinical practice).
2017	Canadian Conference Medical Education, Winnipeg. Canadian Public Health Association annual meeting. Public Health Physicians of Canada annual meeting. Weekly Colloquia, Department of Community Health Sciences.
2015-2016	Canadian Conference Medical Education, Montreal. Canadian Public Health Association Annual Meeting, Toronto. Choosing Wisely symposium, Public Health Physicians of Canada, Toronto. Association of Medical Microbiology and Infectious Diseases Annual Meeting, Vancouver. Annual BIO Conference, San Francisco. Weekly Colloquia, Department of Community Health Sciences and Weekly Medical Microbiology Case Presentations.

Peer Mentoring session for instructors of Indigenous health course.

- 2014 Faculty Development Workshop - Community Health Sciences June 12, 2014
- 2012 Medical Education Workshops, University of Manitoba
Learning Styles in the Classroom Feb 16/12
Teaching Clinical Reasoning April 10/12
Teaching Critical Thinking May 22/12
- 2007 Queen's University Executive Leadership Course
- 1994-1995 Observation and supervised experience in Emergency Medicine, Seven Oaks Hospital, Winnipeg Canada (organized by Dr. Kopelow, Department of Continuing Medical Education)
- 1993 Clinician's Assessment and Enhancement Program, Department of Continuing Medical Education, Faculty of Medicine, University of Manitoba, Winnipeg, Canada

PROFESSIONAL MEMBERSHIPS, ORGANIZATIONS AND LICENSES

2013 – 2016	President, Public Health Physicians of Canada.
2012 – 2018	Member, Board of Directors, Canadian Association of Medical Education Foundation, currently liaison member to the Canadian Medical Education Journal.
2012 – 2015	Executive member, Clinical Teachers Association of Manitoba
2012 – 2014	Member, Board of Directors, Canadian Public Health Association of Canada
1999 – present	Member, Public Health Physicians of Canada, previously National Specialty Society of Community Medicine
1993 - 2020	Member, College of Family Physicians of Canada
2000 – present	Member, Canadian Association of Medical Education
1991 – present	Fellow of the Royal College of Physicians of Canada (Community Medicine – now Public Health and Preventive Medicine)
1990 – present	Member of the Canadian Association of Teachers of Community Health
1988 – present	Member of the Canadian Public Health Association and the Manitoba Public Health Association
1984 – present	Fellow of the Royal College of Surgeons of Canada (General Surgery)
1976 – present	Licentiate of the College of Physicians and Surgeons of Manitoba, Current license, General Practice, with Specialty privileges in General Surgery and Community Medicine
1976 – present	Licentiate of the Medical Council of Canada
1976 – present	Member of the Canadian Medical Association (Manitoba Division)
1976 – present	Member of the Canadian Medical Protective Association

UNIVERSITY AND OTHER ACADEMIC ACTIVITIES

2020 - present	Faculty appointee, Undergraduate Medical Education Financial Award Committee
2020 – present	Member, PGME Continuous Quality Improvement Committee, PGME Accreditation working group, PGME Mental Wellness Working Group, PGME curriculum committee.
2018 - 2020	Member, Postgraduate Medical Education Assessments Committee, Professional Curriculum Committee, Education Advisory Committee, Accreditation Working Group, and Competency-based Medical Education Committee.
2019 – present	Co-chair, Post-graduate Medical Education Truth and Reconciliation Action Plan Working Group
2017 - present	Post-graduate medical education CanMEDs intrinsic roles subject advisor
2015 - present	Associate director, Public Health part of Family Medicine/Public Health Clerkship.
1991- present	Member (and previous chair), Dept of Community Health Sciences Undergraduate Committee
2013- 2017	Member, Healthy Campus Advisory Committee, University of Winnipeg.
2012-2015	Director, Master of Public Health program, University of Manitoba
2012-2014	Visiting professor and senior fellow, University of Winnipeg, Masters in Development Practice program, Faculty of Graduate Studies
2012	Promoted to associate professor, University of Manitoba
2012-2015	Elected to University of Manitoba Senate by the Faculty Council of Medicine
2011-2012	Co-chair Curriculum Renewal Task Group on Health systems, Public Health, and Environmental and Occupational Health and member of the Curriculum Renewal Steering Committee, Faculty of Medicine, University of Manitoba

2007-2012	Founding member of the first national Public Health Educators Network, and participant author of its first national on-line learning resource for medical students (The Primer);
1995, 2006, 2010	Member, Search Committees for Head of the Department Community Health Sciences, Department of Community Health Sciences, Faculty of Medicine, University of Manitoba
1992-1994	MSc thesis advisor for Anita Kozyrskyj: Validation of an Electronic Prescription Database in Manitoba: An Opportunity to Evaluate Pharmacist Participation in Drug Utilization Review.
1994 – 1996	Member, Med I and II Curriculum Reform Committee –Core Concepts Block, Faculty of Medicine, University of Manitoba
1994 - 1995	Member, Search Committee for new tenure-track position, Department of Community Health Sciences, Faculty of Medicine, University of Manitoba
1991 – 2011	Member, Executive Committee, Department Community Health Sciences, Faculty of Medicine, University of Manitoba
1991 – 2015	Member, Committee of Evaluation, Faculty of Medicine, University of Manitoba
1991 – 2015	Member, Clerkship Curriculum Committee, Faculty of Medicine, University of Manitoba
1991 – 2011	Director, Undergraduate Program, Department of Community Health Sciences, Faculty of Medicine, University of Manitoba (special teaching responsibilities include Course Director, Line and major clerkship-Family Medicine Community Medicine, graduate course teaching, thesis supervision and teaching and supervision of community medicine residents).

Undergraduate courses taught at University of Manitoba

2015 - present	Small group teaching in the population and public health pre-clerkship and clerkship programs and the Indigenous health longitudinal course, totaling more than 100 hours per year.
1991- 2014	<p>Average of more than 50 hours per year in undergraduate teaching, including 2-5 lectures and 2-3 tutorials in Population Health and Medicine, including Introduction to Health and Medicine (first lecture to first year medical students), Natural History of Disease and Levels of Prevention, Measurements of Health and Disease, Determinants of Health, Social Responsibility of Physicians;</p> <p>Public Health part of the Family Medicine/Public Health clerkship rotation (8 rotations per year), including orientation, community health status assessment, a “hot” current topic, followed after the rotation by a debrief;</p> <p>Annual summary presentation of Population and public health (invited consistently by 4th year students) as part of the LMCC QE Part I exam review.</p>

Graduate and Postgraduate courses taught at University of Manitoba

2004 – present	Graduate teaching (MPH, MSc and PhD level): Problem Solving in Public Health (formerly Current Topics in Community Medicine 93.7510)
2016 - present	Invited regular speaker on Population Health and Health Care Organization to surgical residents as part of their Principles of Surgery training program.
2019	Invited speaker, Clinical Investigators Program: Health advocacy and health advocacy research.
1991- 2015	Annual guest teaching of “Principles of Prevention” in Epidemiology I and “Risk Communication” in Epidemiology II
1995-2008	Designer, supervisor, and lecturer in a recurring series of learning sessions in Epidemiology, Statistics, and Critical Appraisal in the PGME Core curriculum for all residents at the Faculty of Medicine;

Graduate Student Supervision

2015-2016	Supervised practicum of MPH student at International Centre for Infectious Diseases and National Collaborating Centre for Infectious Diseases
1994 - 2015	Supervisor for PGME students in Public Health and Preventive Medicine (average one - two per year for one to four month rotations)
2012-2015	Advisor to 13 MPH students, including field placement supervision.
1992-1994	MSc thesis advisor for Anita Kozyrskyj: Validation of an Electronic Prescription Database in Manitoba: An Opportunity to Evaluate Pharmacist Participation in Drug Utilization Review.

Current Research Activities

2013 – present	Health mentor, Grand Challenges Phase 1 Grant (total \$100,000) "Improving Maternal and Child Health at the Root through Village Level Biotechnologies" with International Institute of Sustainable Development (co-PI) and CTx Green (P.I.)
Work in progress	<p>A logical and quantitative surveillance framework for classifying possible, suspect, probable, and confirmed cases</p> <p>A framework for the settings approach to public health problem-solving</p> <p>A new approach to obtaining informed consent</p> <p>Aliteration frameworks for problem-solving in public health</p>

SELECTED NON-UNIVERSITY SERVICES, PROVINCIAL COMMITTEES AND OTHER RELEVANT ACTIVITIES

2021 – 2022/present	Chair, Inquiry Panel , College of Physicians and Surgeons of Manitoba, case of Dr. Lockman.
2021 – present	Member Manitoba College of Physicians and Surgeons, Truth and Reconciliation Advisory Circle
2012 – present	Member, Manitoba Provincial Vaccine Advisory Committee
2015-2016	Member, planning committee, <i>Conference to develop a federal framework on Lyme disease, Ottawa, May 15-17, 2016</i>
1994 – 2018	Examiner, Medical Council of Canada Part II Qualifying Exam
2014 - 2016	Member, Winnipeg Harvest Health and Hunger Committee
2015 - 2016	Member, Advisory committee to the Public Interest Law Committee research study on guaranteed annual income.
2003 – 2015	Statistics Canada Canadian Health Measures Survey Expert Advisory Committee
2013-2015	Member, Public Health Infrastructure Task Group to develop a blueprint for a federated surveillance system in Canada
2006 – 2012	Member of the Advisory Committee, National Collaborating Centre for Infectious Disease
2003 – 2007	Healthy Living Issue Group of the Population Health Promotion Expert Group, Canadian Public Health Network responsible for leading the writing of the Pan-Canadian Healthy Living Strategy,
2006 – 2011	Federal Provincial Territorial Roles & Responsibilities in Pandemic Preparedness and Response Task Group, Public Health Network Council
2006	Member of the selection committee for scientific director, National Collaborating Centre for Infectious Disease
2006 – 2008	Medical Advisory Committee, Health Science Centre, Winnipeg, Manitoba, representing Department of Community Health Sciences
2002 – 2009	Emergency Preparedness Expert Group, Canadian Public Health Network

2002 – 2006	Manitoba member, Federal Provincial Territorial Deputy Ministers of Health Advisory Committee Population Health and Health Security
2004	Member of the Canadian delegation to the World Health Organization special meeting in Geneva November 1-12, 2004 to develop the fourth edition (2005) of the International Health Regulation introducing the concept, definition, and expectations of countries during a Public Health Emergency of International Concern (PHEIC).
2002 – 2003	Co-chair, Health Disparities Task Group, Federal Provincial Territorial Deputy Ministers of Health Advisory Committee Population Health and Health Security
2000-2001	Chair, Province of Manitoba Drinking Water Advisory Committee and sole accountable author of Report on Bacterial Safety of Drinking Water In Manitoba
1999 – 2002	Chair, Federal Provincial Territorial Deputy Ministers of Health Advisory Committee on Population Health
1999 – 2012	Council of Chief Medical Officers of Health of Canada (CCMOH)
1995 – 1999	Co-chair, Project Team, Community Health Status Assessments, Epidemiology Unit, Manitoba Health
1995	Participant, Federal-Provincial Working Group/Workshop for present the Prevention of Neural Tube Defects, Manitoba Health and Health Canada, Ottawa
1995	Member, Provincial Committee on Hepatitis A, B and C amongst Winnipeg street-evolved youth
1995 – 1999	Member, core committee to review the Public Health Act of Manitoba
1995	Member, Advisory Committee to the Baby Alert Program
1994 – 1995	Member, Steering Committee for Psychiatric Day Hospital and Community Services in Mental Health for Winnipeg, Manitoba Health
1994 – 1999	Member of the Manitoba Health Communicable Disease Control Surveillance Review Committee and Chairman, Subcommittee on Analysis and Dissemination of Results.
1994 – 1999	Member of the Winnipeg Air Quality Index Committee

1993 – 1995	Member, Provincial Cancer Control Committee and Chair of Subcommittee on Secondary Prevention of Cancer, Manitoba Health
1993-1994	Member, Working Group for Psychogeriatric Services in Winnipeg, Manitoba Health
1993-1994	Member, Committee to Define Core Services for Rural Health Associations, Manitoba Health***author of report.
1993-1994	Member, Provincial Surgery Committee, Manitoba Health
1993	Participant, national workshop and consensus conference on the training of community medicine specialists, Toronto
1991 – 1995	Member, National Population Health Survey Provincial Advisory Committee, Manitoba Health
1989	Member, Provincial Task Force on Breast Cancer Screening in Manitoba, Manitoba Health
1986-1988	Member, Public Health Alliance of Britain
1985-1988	Member, International Physicians for the Prevention of Nuclear War
1977-1985	President, Progressive Medical Association, Winnipeg
1974-1976	Founding member of “The Community Medicine Group” medical students concerned about social and public health issues
1974-1976	Founding co-editor (with Dr. Brian Postl) of “The Meditoban”, first medical school student newspaper
1974-1976	Founding board member, NorWest Health Co-op, Winnipeg

PUBLISHED BOOKS

Northover, John M.A., Kettner, Joel D. and Mr. Barry Paraskeva PhD, FRCS. Your Guide to Bowel Cancer (Royal Society of Medicine). A Hodder Arnold Publication, 2007

Northover, John M.A. and Kettner, Joel D. Bowel Cancer: The Facts. New York, Oxford University Press, 1992

SIGNIFICANT REPORTS

Chief Provincial Public Health Officers' "Report on the Health Status of Manitobans 2010: Priorities for Prevention – Everyone, Every Place, Every Day" (published November, 2011)

PEER-REVIEWED PUBLISHED PAPERS

- SM Moghadas, M Haworth-Brockman, H Isfeld-Kiely, J Kettner. Improving public health policy through infection transmission modelling: Guidelines for creating a Community of Practice. *Can J Infect Dis Med Microbiol* 2015;26(X):1-5.
- Mahmud S, Hammond G, Elliott L, Hilderman T, Kurbis C, Caetano P, Van Caesele P, Kettner J, Dawood M. Effectiveness of the pandemic H1N1 influenza vaccines against laboratory-confirmed H1N1 infections: population-based case-control study. **Vaccine**. 2011 Oct 19;29(45):7975-81. Epub 2011 Aug 30.
- Writing Committee of the WHO Consultation on Clinical Aspects of Pandemic (H1N1) 2009 Influenza, Bautista E, Chotpitayasunondh T, Gao Z, Harper SA, Shaw M, Uyeki TM, Zaki SR, Hayden FG, Hui DS, Kettner JD, Kumar A, Lim M, Shindo N, Penn C, Nicholson KG. Clinical aspects of pandemic 2009 influenza A (H1N1) virus infection. Review. **N Engl J Med**. 2010 May 6;362(18):1708-19.
- Zarychanski R, Stuart TL, Kumar A, Doucette S, Elliott L, Kettner J, Plummer F. Correlates of severe disease in patients with 2009 pandemic influenza (H1N1) virus infection. **CMAJ**. 2010 Feb 23; 182(3): 257-64. Epub 2010 Jan 21, 2010
- Verne J, Kettner J, Mant D *et al*. Self-administered faecal occult blood tests do not increase compliance with screening for colorectal cancer: results of a randomized controlled trial. **Eur J Cancer Prev** 1993; Jul: 301-305
- Yassi A, Kettner J, Hammond, G *et al*. Effectiveness and costs-benefit of an Influenza Vaccine Program for Healthcare Workers. **Can J In Dis** 1991: 101-108;
- Kettner, JD, Whatrup C, Verne JE *et al*. Is there a preference for different ways of performing faecal occult blood tests? **Int J. Colorectal Dis** 1990; May:82-86;

PUBLISHED ABSTRACTS

Kettner JD, Whatrup C, Miller K. A comparative study of three patient approach methods for faecal occult b1000 testing in a North London general practice. *Coloproctology*. 1988;10:129

Kettner JD, Whatrup C, Young K. A within-person comparison of efficacy and individual preference for two methods of faecal occult blood detection. *Coloproctology* 1988;10:123

Kettner JD, Whatrup C, Miller K *et al*. Evaluation of new faecal occult blood test-a comparison of individual preference and efficacy using Early Detector and Haemoccult. *Theoretical Surgery* 1987;2:82

Kettner JD, Whatrup C, Miller K *et al*. A randomized trail of invitation methods for occult blood screening. *Theoretical Surgery* 1987;2:81-82

Kettner J, Paetkau D, Slykerman L *et al*. Effect of treatment on cardiac performance when right ventricular afterload is gradually increased in dogs. *Critical Care Medicine* 1983; II;3:217

Paetkau D, Kettner J, Girling L, Slykerman L, Prewitt RM. What is the appropriate therapy to maintain cardiac output as pulmonary vascular resistance increases? *Anacsthesiology*, 57;3:A-56, September, 1982

PUBLISHED LETTERS (medical journals)

Kettner, J. Quebec's Public Health Cuts *Canadian Journal of Public Health* 2015;106:3 March/April.

Scholefield JH, Kettner, JD, Northover JMA. Papillomavirus infection and progress to abnormal cervical smears. *Lancet*, 1988;i:1405;

Scholefield JH, Kettner, JD, Northover JMA. Problems with anal cancer demographics. *Diseases of the Colon and Rectum*; 1988:31:10:831;

Kettner JD, Mant D, Northover JMA. Ethics of preventive medicine. *Lancet*; 1988;ii:44-45;

Kettner Joel and Northover, JM. Screening for colorectal cancer, *Lancet* 1986;i:562-563;

Kettner Joel and Northover, JM. Occult-blood screening, *Lancet* 1986;ii:110;

NON-PEER REVIEWED PUBLICATIONS

Kettner, JD and Neufeld, J.: *The Settings Approach in Public Health: Thinking about Schools in Infectious Disease Prevention and Control, Purple Paper*, Public Health Agency of Canada National Collaborating Centre for Infectious Diseases, April, 2014.

PRESENTATIONS, WEBINARS AND OTHER SCHOLARLY AND EDUCATIONAL ACTIVITIES

- 2022 Invited speaker, International webinar, Schools For Resilience, Equity, Safety, and Health: *Covid & Schools: A Post-Mortem & Development of a Framework (Multi-Intervention Program) To Prevent/Manage Infectious Disease Outbreaks*, May 14, 2022.
- 2021 Presentation to Southern Chiefs Organization summit meeting. Public Health and Primary Health Care in a Transformed Indigenous Health System. November 26, 2021.
- 2021 Invited speaker, Carleton Breakfast Club. COVID-19 - Questions and Answers. June 25, 2021.
- 2016 Planning consultant and facilitator, NCCID-York University Workshop on Mathematical Modelling in Public Health Infectious Diseases, York University, Toronto, October 3-4, 2016
- 2016 Guest (as Infectious Diseases Public Health specialist) on This Hour Has 22 Minutes, CBC Television.
- 2016 Member of scientific planning committee, Lyme Disease symposium, May 15-17, 2016, Ottawa.
- 2016 Facilitator, national workshop, “Starting from Square One: An Equity Model of Burden of Disease”, Public Health Agency of Canada National Collaborating Centre of Infectious Diseases, Winnipeg, May 11, 2016.

Public Health 2016 (annual conference of the Canadian Public Health Association)

- Member, Conference Scientific Planning Committee
- Welcoming remarks on behalf of the Public Health Physicians of Canada at the opening ceremony
- Organized and participated in a panel discussion on “Public Health Inspectors, Public Health Nurses, and Public Health Physicians As Leaders: A Candid Conversation about Collaboration and Change ”

Moderator, and member of the scientific planning committee, International Centre for Infectious Diseases National Grand Rounds:

- February 18, 2016: *Zika virus - What to Know, What to Do*, University of Manitoba, in collaboration with the Dept of Community Health Sciences Bold Ideas Colloquium Series.

Moderator, and member of the scientific planning committee, International Centre for Infectious Diseases International Webinars:

- December 1, 2016: *Difficult-to-treat Gram Negative Pathogens*
- November 8, 2016: *The Burden and Preventability of Non-respiratory Complications of Influenza in Older Adults*
- October 27, 2016: *Antibacterial Resistance in Gram-Negatives: Prevalence, risk factors, and impact of inappropriate therapy*
- October 13, 2016: *Pneumococcal Immunization for Older Adults.*
- August 17, 2016: *Pneumococcal conjugate vaccines for infants: What have we learned since their introduction?*
- June 22, 2016: *HPV Immunization Programs: What is the advantage of including males?*
- February 25, 2016: *Vaccine Hesitancy: What is it, Why is it, What to do about it?*
- January 13, 2016: *Mind your T's and Q's - What do we know about today's influenza vaccine options?* (moderator) and speaker: *Today's Menu of Vaccine Choices – the Basics and the New Ingredients*

- 2017 Radio interview re: legal age of marijuana purchase and use in Manitoba.
- 2015-2016 Radio, Television, and Media interviews on subjects including Ebola, ZikaVirus, Malathion, Influenza.
- 2015-2016 Designer, moderator, and speaker of ICID National Grand Rounds (Influenza vaccine for under 2 year olds, Influenza vaccine choices for seniors, Zika virus) and webinars (e.g. HPV vaccine, new vaccine options including quadrivalent, pneumococcal disease)
- 2015-2016 Co-chair (International Centre for Infectious Diseases/National Foundation for Infectious Diseases) of scientific planning committee and chair of international advisory committee for an accredited on-line learning module produced by MDBriefcase on *Seasonal Influenza in Older Adults: Immunization Challenges and Options for Vaccination Strategies*

2015:

Moderator, and member of the scientific planning committee, International Centre for Infectious Diseases National Grand Rounds:

- December 17, 2015: *Influenza Vaccines for Adults Over 65: Evaluating the Evidence*, University of Manitoba Medical College
- October 27, 2015: *Flu Vaccines for Little Kids – What's New, What's True*, University of Toronto

Moderator, and member of the scientific planning committee, International Centre for Infectious Diseases International Webinars:

- May 6, 2015: *Males and HPV: Burden of Disease and Prevention through Immunization*

November 25, 2015: Invited speaker, Public Health Physicians of Canada Residents' national educational webinar series: *Life After Residency*.

Lyme Disease Best Brains Exchange in Ottawa, June, 2015.

Chaired panel discussion at annual meeting of CHVI RD Alliance Coordinating Office at Canadian Association of HIV Research annual meeting, Toronto, 2015.

DCHS Colloquium presentation on the NCCID program: with Ms. Margaret Haworth Brockman: Ebola Virus Disease and other Challenges and Opportunities for the NCCID

Activities at Public Health 2015 (annual conference of the Canadian Public Health Association)

- Welcoming remarks on behalf of the Public Health Physicians of Canada at the opening ceremony
- Organized and chaired a panel discussion on "The ebola outbreak: What have we learned that we didn't know before?"
- Facilitated a workshop on Burden of Illness in Infectious Diseases

Association of Medical Microbiology and Infectious Diseases annual conference, Charlottetown, May, 2015.

- Poster presentation: AMR, Public Health, and Knowledge Translation: A Forward Approach

- 2014 Reviewer of research proposals for CIHR SPOR projects, Institutes of Population and Public Health and Health Services Delivery.
- 2013-2014 Member, scientific planning committee, Consensus Conference on Antimicrobial Resistant Organisms, University of and Institute of Health Economics, June 18-20, 2014
- 2014 Invited speaker, Consensus Conference on Antimicrobial Resistant Organisms, University of Alberta Institute of Health Economics, June 18-20, 2014: "What is surveillance? What is screening? How are they related?"
- 2014 Series of four public lectures at the University of Winnipeg on Public Health in the 21st Century:
- *Public Health Unpacked: What is it? Who needs it?*
- *Priorities for Prevention in Manitoba: our Provincial Profile*
- *Public Health ahead: What are the Possibilities? How can we prevent the threats that we do not see or know?*
- *Power, Process, and Public Policy: The Peculiar Ethics and Politics of Public Health and its relationship to Sustainable Development.*

- 2013-2014 National webinars for Public Health and Preventive Medicine residents and public health physicians hosted by the National Collaborating Centres for Public Health.
Topic:
- “Treatment as Prevention” with Drs. A. Ronald and J. Montaner
- “ Knowledge Translation for Emerging Diseases”
- 2013 Options (VIII) for the Control of Influenza, September 5-9, Capetown, South Africa
- Paper: Rapid Knowledge Translation during the 2009 influenza pandemic
- Poster: A project to translate and exchange knowledge towards more effective, efficient and equitable public health and primary care strategies for influenza and influenza-like illness (ILI) in Canada. JD Kettner , E Cheuk
- 2013 Innovation in Medicine and Health Care, University of Piraeus, Piraeus, Greece
- Paper: Knowledge Translation for Emerging Infectious Diseases: Challenges and Opportunities
- 2013 University of Winnipeg Summer Institute Course: Hosted a morning session and presented a lecture on "Principles of prevention of infectious and chronic diseases"
- 2014 Series of four public lectures on public health, University of Winnipeg.
- 2012 Surgery Grand Rounds: “A Surgeon’s Career in Public Health – the Long and the Short of It”
- 2003-2011 Annual lecture (most years) at “Bug Day” including SARS, “Little Bugs in the Big Picture”, H1N1, and tuberculosis.
- 2010 National Collaborating Centre for Public Health, Making Connections, Opening Ceremony and plenary, keynote speaker, and co-presenter with Dr. Pat Martens on partnerships between government and university in public health policy setting, Summer Institute of the National Collaborating Centres of Canada
- 2010 The Manitoba College of Family Physicians, 52 Annual Scientific Assembly, key note speaker: H1N1 De-Brief
- 2010 Doctors Manitoba, Western Conference of Provincial/Territorial Medical Association, “*How to Survive a Pandemic –What have we learned?*”
- 2010 International College of Dentists Annual meeting, Winnipeg. *Public Health and the H1N1 Pandemic Influenza*
- 2009 Continuing Medical Education, Mini Medical School, University of Manitoba 2009;
- 2009 Presented on H1N1 for disadvantaged populations and led a practice guidelines consensus session at the Pan-American Health Organization of the World Health

Organization consultation conference in October 14-16, 2009 in Washington, D.C.,

- 2008 Mini-university lecture on what on public health and evidence for the news
- 2007-2013 Annual lecture on *Issues and Trends in Public Health* at Red River Community College Issues and Trends in Health course taught by Jim Hayes as part of the Health management course for employees in regional health authorities
- 2007 Plenary speaker and panel discussant: Ethical issues in the practice of public health. The First Canadian Roundtable on Public Health: Exploring the Foundations, Montreal, Quebec.

2000-2022 Department of Community Health Sciences Colloquia:

- 2020: COVID-19 – Is the Prevention Worse than the Disease?
- February 5, 2020: Organizer and moderator of Coronavirus – an Open Forum, livestreamed, University of Manitoba Faculty of Health Sciences.
- 2018: Seeking Bold Ideas to Strengthen Inter-College Collaboration in Primary Care and Public Health
- 2017: Trumpism: Another Global Public Health Threat Originating in the USA?
- 2015: Colloquium presentation on the status and future of the National Collaborating Centre for Infectious Diseases
- 2014: Hosted colloquium and joint learning session with students and staff of the University of Winnipeg MDP program and University of the North Midwifery program: Dr. Janet Smylie and Sara Wolfe: “Indigenous Knowledge Work as a tool for Community Driven Health Services Development”
- 2013: Co-presented with Dr. Julie Pelletier (University of Winnipeg) on “Two Masters Programs – Two Universities – One Vision?”
- CPPHO Report on the Health Status of Manitobans ... Priorities for Prevention: Everyone, Every Place, Every Day – 2011
- The New Public Health Act “Does it meet the Public’s Needs of Today and Tomorrow?” – 2009
- Reorganization of Public Health in Manitoba: Challenges and Opportunities –2008
- Healthy Living Strategy: New-Old or Old-New? –2003
- Walkerton Water – Could it happen here? - 2000

- 1993 The role of the urban medical officer of health. Cadham Provincial Laboratory Seminar
- 1990 “Screening” for an awful disease. Community Health Sciences, Colloquium, Faculty of Medicine, University of Manitoba
- 1990 Epidemiology in Orthopedic Surgery, Orthopedic Grand Rounds, Health Sciences Centre
- 1989 Surgical Epidemiology, Western Association of Clinical Surgeons
- 1989 Screening for colorectal cancer, Concordia General Hospital Medical Rounds
- 1989 Screening for colorectal cancer, Surgery Grand Rounds, Health Sciences Centre
- 1987 Epidemiology of hepatic metastases, Annual course in advance hepatobiliary and pancreatic surgery, Royal Postgraduate Medical School, Hammersmith Hospital, London, England
- 1987 Obstructive jaundice, Surgery for GPs annual course. Royal Postgraduate Medical School. Hammersmith Hospital, London England
- 1987 Epidemiological aspects of hepatobiliary malignancies. Workshop in Research Methods in Surgery, Royal Postgraduate in Medical School, Hammersmith Hospital, London, England

- 1987 The surgical epidemiology of cholangiocarcinomas. UK Chapter of the World Congress of Hepato-biliary Surgeons, Cardiff, Wales
- 1987 Community Screening – Early Diagnosis and Prevention of Colorectal Cancer – a meeting for general practitioners, St. Mark’s Hospital, London, England
- 1987 Mass Screening for colorectal cancer. Common Gastrointestinal Problems – Course for general practitioners, St. Bartholomew’s Hospital Medical College, London, England.
- 1986 Mass Population Screening for Colorectal Cancer. Symposium on Screening, Carmarthen General District Hospital Carmarthen, Wales

Prior to career as medical officer of health 1990-2012:

- 1990 “Community Health Status Assessment – A model for Aboriginal Communities”. Poster presentation, circumpolar health Conference, Whitehorse, Yukon;
- 1987-1988 The following two papers were presented by me at the Surgical Efficiency and Economy World Conference, Lund, Sweden, August, 1987 and at the 2nd Beennial Congress of the European Council of Coloproctology Advances in Coloproctology, Geneva, Switzerland, 1988:
- “ A randomized trail of invitation methods for occult blood screening”
- “Evaluation of new faecal occult blood test- a comparison of individual preference and efficacy using Early Detector™ and Haemoccult™”
- 1982-1983 “Effect of treatment on cardiac performance when right ventricular afterload is gradually increased in dogs” (Authors: Kettner Joel, Paetkau Don, Slykerman M, Girling L and Prewitt R. Departments of Surgery, Anaesthesia and medicine, University of Manitoba.
- This paper was presented by me at the following meetings:
- ❖ American College of Surgeons, Manitoba Chapter, Winnipeg, 1982 (awarded 2nd prize);
 - ❖ Critical Care Society Meeting, New Orleans, USA, 1983;
 - ❖ American Society of Anaesthesiologists, Las Vegas, USA 1982;
 - ❖ Canada Anaesthetists Society Meeting, Vancouver, 1983

CONTRACTED AND OTHER REPORTS

Southern Chiefs Organization Health Transformation: Public Health and Primary Health Care – Report and Recommendations (scientific, policy, and legal review), 2022.

Manitoba Health Provincial Health Indicators, member of Working Group. 1999.

<https://www.gov.mb.ca/health/documents/ind-all.pdf>

Kettner, Joel D. Community Health Status Assessment, Waterhen First nation; 1993 (for Waterhen First Nation, Manitoba)

Kettner, Joel D. and Postl, B Community Health Status Assessment: a tool to understand and improve the health of Aboriginal communities: 1991 (Northern Health Research Unit for Medical Services Branch, Health Canada)

Kettner, Joel D. Community Health Status Assessment, Cross Lake, Manitoba; 1989 (for Medical Services Branch, Health Canada)

INVITED REVIEWS

2017- 2022: Canadian Journal of Public Health

2018-2022: Canadian Journal of Medical Education

2021: Association of Medical Microbiologists and Infectious Disease Specialists of Canada

2021: University of Manitoba Medical Students Journal

SELECTED MEDIA, COVID 19

Winnipeg Free Press panel, Dec 10, 2020

<https://www.youtube.com/watch?v=9I52CWsUGTE>

Toronto Caribbean interview, November 26, 2020

https://www.youtube.com/watch?v=cpjk53umB_0&feature=emb_title

CBC West of Centre panel discussion

Circuit Breakers and Personal Freedom, November 12, 2020.

<https://www.cbc.ca/listen/cbc-podcasts/407-west-of-centre/episode/15808413-circuit-breakers-and-personal-freedom>

Open letter to first ministers, July 29, 2020

<https://healthydebate.ca/opinions/an-open-letter-to-pm-covid19>

Opinion piece CBC Manitoba, July 25, 2020

A new normal, or new abnormal? Change in direction needed on COVID-19 response
<https://www.cbc.ca/news/canada/manitoba/joel-kettner-opinion-covid-19-response-1.5654062>

Letter to the editor, Winnipeg Free Press, June, 27, 2020

<https://www.winnipegfreepress.com/search/?keywords=clergy+kettner&searchSubmitted=y&sortBy=-startDate>

Cross-country Check-up, March 15, 2020.

<https://www.cbc.ca/listen/live-radio/1-13-cross-country-checkup/clip/15765826-march-15-2020-is-enough-done-slow-covid-19>

Invited interviews and expert advice between March 15, 2020 till August 15, 2021:

- **CTV local news**
- **Global TV local news**
- **CBC TV local news**
- **CJOB local radio**
- **Winnipeg Free Press**
- **Shaw local television, Victoria, BC**

COURT AFFIDAVITS AND EXPERT REPORTS (available from courts or by request to joel.kettner@umanitoba.ca)

Supreme Court of Yukon 20-AP002
Mercer vs Government of Yukon
Affidavit filed January 28, 2021

Supreme Court of British Columbia S 210209
Beaudoin vs Government of British Columbia and the Provincial Health Officer
Affidavit filed February 12, 2021

Supreme Court of Manitoba CI 20-01-29284
Gateway Bible Baptist Church et al vs Government of Manitoba
Affidavit filed April 1, 2021

Ontario Superior Court of Justice CV-20-00652216-000
Adamson Barbeque et al vs Ontario (Attorney General)
Affidavit filed April 14, 2021
Reply affidavit filed May 17, 2021

Ontario Superior Court of Justice CV-21-00013361-0000
Wellandport United Reformed Church vs Ontario (Attorney General)
Affidavit filed May 4, 2021.

Ontario Superior Court of Justice Court File No. CV-21-666
The Corporation of the City of Barrie vs Tyler Nicholson
Affidavit filed November 16, 2021

Supreme Court of British Columbia S210831
Canadian Society for the Advancement of Science in Public Policy
And Dr. Bonnie Henry in her capacity as provincial health officer for the province of British
Columbia
Affidavit file October 20, 2021

Court of Queen's Bench of Alberta
Wetaskiwin
Plaintiffs: Dr. Blaine Achen, Dr. Gert Grobler, Dr. Nadr Jomha and Dr. Tyler May
Defendant: Alberta Health Services
Affidavit filed December 9, 2021

No. S-210831
Vancouver Registry
Canadian Society for The Advancement Of Science In Public Policy
Plaintiff and: Her Majesty The Queen In Right Of The Province Of British
Columbia and Dr. Bonnie Henry in her capacity as Provincial Health Officer for the Province of British
Columbia
Affidavit January 10, 2022

Ontario Superior Court of Justice Court File No.: CV-21-00670360-0000
Sarah Harjee et al and Her Majesty the Queen in Right of Ontario
Affidavit filed January 21, 2022

Federal Court of Canada
Rickard and Harrison vs Her Majesty the Queen as represented by the Attorney General of Canada
and Transport Canada
Affidavit filed March 11, 2022

Ontario Superior Court of Justice Court File No.: CV-21-00670360-0000
Sarah Harjee et al and Her Majesty the Queen in Right of Ontario
Affidavit filed April 7, 2022

Ontario Superior Court of Justice File No.: CV-22-00682682-0000
Randy Hillier and His Majesty the King in Right of the Province of Ontario
Affidavits confirmed on September 7, 2022 and December 15, 2022

This is **Exhibit “B”** referred to in the Affidavit
of Joel Kettner sworn before me
virtually this 10th day of January, 2023.

A handwritten signature in black ink, appearing to be 'J. Kettner', written over a horizontal line.

Barrister & Solicitor in the
Province of Ontario

Expert Report of Joel Kettner

Kimberly Neudorf and
His Majesty the King in Right of the Province of Ontario

January 10, 2023

Summary of Conclusions

1. What relevant information was provided by the Ontario Ministry or Public Health Ontario with respect to the effectiveness of restrictions in place between October 24, 2020 and November 7, 2020 regarding outside gatherings to reduce transmission of COVID-19 infections?
 - I was unable to find any relevant evidence or information regarding the effectiveness of restrictions of outside gatherings to reduce transmission of COVID-19 infections.
2. In your opinion, with respect to the government of Ontario and public health officials, what information should have been used and what issues should have been considered, to explain and justify restrictions of outside gatherings?
 - There should have been an estimate of the number and rate of direct and indirect transmissions causally associated with outdoor gatherings.
 - There should have been an estimate of the number and rate of severe outcomes (hospitalizations and deaths) attributable to transmissions causally associated with outdoor gatherings.
 - There should have been a quantitative estimate of the effectiveness of restrictions of outdoor gatherings to reduce transmissions and severe outcomes.
 - In consideration of the above, there should have been an analysis and estimate of the number and rate of transmissions causally associated with alternative activities of people in comparison to attendance at an outdoor gathering.

- There should have been a description of the potential harms of the restriction policy including an estimate of the increased transmission resulting from participation in other activities.
3. Based on what you have been able to find, with respect to the Ontario government and public health officials, what information was used, what issues were considered, and how were they used to explain and justify the restrictions of outdoor gatherings?
- Other than general concerns and descriptions of increasing reported COVID-19 cases, hospitalizations, and anticipated pressure on hospital capacity to justify the interventions, I was unable to find an explanation or justification specifically regarding restrictions of outdoor gatherings.
4. Based on information you have been able to find in official publications and postings, what were the estimated rates of transmission of public outdoor gatherings available to and/or used by the Ontario government to justify the restrictions of outdoor gatherings?
- I was unable to find any specific information on the number or rates of transmissions associated with outdoor gatherings.
 - There were no reports of outbreaks (e.g. one or more cases) associated with outdoor gatherings before, during, or after the restrictions.
5. In your opinion, did the Government of Ontario provide sufficient data, information, evidence, analysis, and rationale to explain and justify the necessity and appropriateness of the restrictions of outdoor gatherings?
- I have been unable to find sufficient data, information, evidence, analysis, and rationale to explain and justify the necessity and appropriateness of the restrictions of outdoor gatherings.

The Questions and answers

Relevant context and definition

Before answering these questions, I will provide some context in the way of concepts and definitions relating to transmission of COVID-19 infections.

COVID-19 and SARS-CoV-2

COVID-19 is the name of the disease. SARS-Coronavirus 2 is the virus that causes the disease. The terms are not synonymous.

Transmission of COVID-19

Transmission of COVID-19 is the event in which one person that is not infected by the SARS-CoV-2 virus becomes infected during close contact with a person that is has COVID-19 and is infectious.

Not all exposures result in transmission.

There are several factors associated with the probability of a significant exposure to viruses during a contact event. These include closeness of the contact, duration of the contact, and environmental factors. Environmental barriers include masks, shields, and other physical barriers such as screens. Other environmental factors relate to dispersion and dilution of viruses by indoor ventilation or outdoor space, wind, and ultraviolet radiation from the sun.

There are also factors associated with the probability of transmission. These include the volume (load) of virus in the infectious person, the load of virus propelled by talking, coughing, or sneezing, and the resilience of the exposed person to defend against getting infected. These include general health status, immune competence, natural immunity from previous infection, or vaccine-mediated immunity.

Effectiveness of interventions to reduce transmission of COVID-19 infections.

Interventions to reduce transmission events can be classified as follows.

- Reducing the probability of infectiousness in either of the contacts;
- Avoiding close contact exposures;
- Reducing the probability of transmission from a close contact event.

These factors are considered when assessing the risk of transmission as part of the management of cases and the follow up of their contacts.

Effectiveness of interventions is defined as their ability to prevent the transmission of infections. Any method to assess the effectiveness of prohibition of outdoor gatherings must begin with an estimate of the number or rate of transmissions associated with attendance at outdoor gatherings. This could have been done using data of the Ontario case and contact management system. Case and contact management data should have been used to determine

potential contacts and settings where transmission occurred. During this process, including the time period before the declaration of the orders, data should have been available to identify outdoor gatherings that may have been a setting for transmission.

If the goal is to reduce transmission of infections, interventions should be prioritized by their effectiveness to achieve that. A person is either in an outdoor or indoor setting. During the orders, some indoor activities were prohibited altogether, but for many settings the number of persons at any one time were restricted, but not eliminated. One could reasonably ask whether outdoor activities could be expected to reduce transmission replacing higher risk indoor activities with lower risk outdoor activities. The data to answer this question should have been available and should have been analyzed and transparently shared with the public.

1. What relevant information was provided by the Ontario Ministry or Public Health Ontario with respect to the effectiveness of restrictions in place on October 24, 2020, regarding outside gatherings to reduce transmission of COVID-19 infections?

As of January 9, 2023, Public Health Ontario has posted 74 reviews of descriptions and analysis of evidence for COVID-19 Public Health Measures (PHM)¹. Five of these had been posted prior to November 7, 2020.

The purpose and scope of these reviews are described as follows:

PHO is reviewing current local, national and international evidence, as well as local epidemiology to assist our partners in planning community public health measures, identifying potential unintended consequences, and considerations for health equity. The Government of Ontario and local public health units are responsible for providing direction on specific public health measures that are implemented at a provincial or local level.

Public health measures can include:

- *personal measures such as self-monitoring, isolation, and quarantine*
- *general recommendations such as hand hygiene, non-medical mask use, physical distancing*
- *community measures such as public messaging and education campaigns*

¹ <https://www.publichealthontario.ca/en/Diseases-and-Conditions/Infectious-Diseases/Respiratory-Diseases/Novel-Coronavirus/Public-Health-Measures>

- *restrictive community measures that limit activities or access to resources, facilities, or institutions, these are often referred to as “lockdown” measures*

I was not able to find in these reviews any data, information, evidence, analyses, or rationale regarding the risks of transmission associated with outdoor public gatherings or the effectiveness of measures to restrict outdoor gatherings with respect to rates of transmission of COVID-19.

On November 20, 2020, Public Health Ontario posted a “*Jurisdictional Scan of Frameworks and Epidemiological indicators to Inform Public Health Measures during COVID-19*”² The content of this scan pre-dates October, 2020.

Although the frameworks include only indicators and thresholds of occurrence, transmission, and severity of COVID-19, there is reference to guidelines of the Public Health Agency of Canada and the World Health Organization, which, together, express the importance of ***science-based and transparent decision-making and data-sharing***, as well as ***the importance of taking into account effectiveness and minimizing unintended consequences***.

It states “*The Public Health Agency of Canada (PHAC) has provided four guiding principles for lifting or implementing PHMs.*³ ***First, decisions should be based on current epidemiology and be science-based and guided by advice from public health officials. Second, jurisdictions should ensure collaboration and coordination in response activities. Third, jurisdictions should be transparent in decision-making and sharing data. Fourth, implementation or relaxation of PHMs should occur in a stepwise manner and be based on the current science.***”

Applying these guidelines to public health decisions regarding outdoor gatherings, it would be expected that estimates of the risk of transmission would be transparently shared and that the evidence and rationale for restrictions would be explained.

For example, what was the rationale for selecting the varying specific size restrictions of outdoor activities?

As referenced in the answer to question 2, a World Health Organization document⁴ stated that the size of outdoor gatherings has not been associated with increased transmission rates. One

² chrome-extension://efaidnbmnnnibpcajpcgiclfndmkaj/https://www.publichealthontario.ca/-/media/Documents/nCoV/he/2020/12/covid-19-jurisdictional-scan-epi-indicators-public-health.pdf?sc_lang=en

³ 1. Government of Canada. Guidance for strategic approach to lifting restrictive public health measures [Internet]. Ottawa, ON: Government of Canada; 2020 [modified 2020 May 30; cited 2020 Nov 13]. Available from: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirusinfection/guidance-documents/lifting-public-health-measures.html>

⁴ <https://apps.who.int/iris/handle/10665/348018>

could reasonably argue that the rate of close contact exposures would be higher in smaller gatherings where longer and closer encounters between individuals would be more likely to occur. From the beginning of entering data on cases, contacts, and potential settings of transmission, descriptions and analysis of the data should have been available to describe and compare the numbers and rates of transmissions associated with the size of outdoor gatherings and their size.

2. In your opinion, with respect to the government of Ontario and public health officials, what information should have been used and what issues should have been considered, to explain and justify restrictions of outside gatherings?

What is the estimated absolute risk, relative risk, and relative proportional impact of outdoor gatherings?

Absolute risk, also referred to as actual risk, is a measure of the frequency or probability of a specific outcome. For example, the absolute risk of transmission during an outdoor event could be measured as the number of transmissions per person per event or per hour.

Relative risk is the comparison of absolute risks, e.g. the comparison of the rate of transmission per hour outdoors with the rate of transmission per hour indoors.

Proportional impact is the proportion of a specific outcome attributed to a specific activity or exposure, e.g. the proportion of all cases or outbreaks attributed to outdoor gatherings.

Public health strategists can assess the risk of an activity by drawing on past knowledge and, on a go forward basis, from current and ongoing surveillance.

Regarding past knowledge, I am not aware of any reasonable theoretical (based on scientific principles) or empirical (based on observations) arguments that counter the prevailing scientific opinion that the risk of transmission of respiratory viruses and bacteria is significantly less in outdoor settings than in indoor settings.

Risk factors for transmission in mass gatherings were described before March, 2020, and have been reinforced since. The World Health Organization published on February 14th 2020, and updated on November 4, 2021, the guidance: *Key planning recommendations for mass gatherings in the context of COVID-19*.⁵ Regarding risks associated with mass gatherings - which were not defined with respect to size or setting - the guidance states:

An analysis of mass gatherings held globally in 2020 and 2021 has indicated that the most important factors associated with increased risk of SARS-CoV-2 transmission in conjunction with such events are:

- *duration: risk grows with the duration of the event, or with the **duration** of stay of attendees at the event, **especially in the case of multiple days**;*
- *location: risk is **higher in indoor venues than in outdoor venues**; and*
- *compliance with precautionary measures: risk is higher when measures are not applied, weakly implemented, or not followed by attendees.*

*The risk of person-to-person transmission of SARS-CoV-2 was **not found to directly correlate with the size of the gathering**.*

The guidance refers to the “*detection and management of event-related COVID-19 cases*”, including “***contact tracing**, i.e. the process of identifying, assessing and managing people who have been exposed to a confirmed or probable COVID-19 case in conjunction with the event, to prevent onward transmission.*”

Regarding the contact tracing referred to in the World Health Organization guidance, and other forms of surveillance, I have been unable to find any Ontario reports of cases or outbreaks attributed to attendance at an outdoor gathering.

Nor have I seen a risk assessment of the estimated number of additional direct or indirect cases or hospitalizations resulting from exposures at outdoor gatherings.

⁵ <https://apps.who.int/iris/handle/10665/348018>

Absolute risk of transmission and illness in outdoor settings and the relative risk of transmission, comparing outdoor settings with indoor settings

Public Health Ontario's "Risk Assessment Approach for COVID-19 Contact Tracing"⁶ states "Outdoor environments are lower risk than indoor environments due to plentiful supply of outdoor air resulting in dispersion and dilution of droplets and aerosols, the presence of natural ultraviolet light, and ability to physically distance" and that "Smaller, confined indoor environments with inadequate ventilation increase the risk of transmission, compared to larger spaces with adequate ventilation, up to 18.7 times in one preprint estimate."

According to Public Health Ontario's Risk Assessment Approach for COVID-19 Contact Tracing, less than 15 minutes duration of face-to-face contact with one person is a low-risk exposure and does not qualify for contact tracing, even in the absence of mask-wearing or two-meter distancing.⁷

Notably, these criteria were developed for indoor environment exposures in which the risk of transmission is much higher than for similar exposures in outdoor settings. I am not aware of adjusted criteria in Ontario for outdoor exposures, but risk assessment guidelines consistently indicate that indoor exposures are more likely to result in transmission than outdoor exposures.

This assessment is consistent with the Canadian Public Health Agency's definition of a high-risk exposure as well as that of the European Centres for Disease Control, namely "contacts who have spent 15 minutes or more in close proximity to (2 meters or less) or in a closed environment with a case".⁸

Furthermore, high-risk exposures between members of the same household or close friends or relatives at an outdoor event should be considered a negligible risk compared to their risk of household transmission. One could argue that participation at an outdoor event lowers their risk of transmission if it replaces indoor or other higher risk exposures and settings. This is because the exposures between household members, close friends, and close relatives are mostly indoors and because exposures during a one- or two-hour rally per week would be expected to constitute a small proportion of their total time together.

Despite observations and surveillance of these outdoor events, no evidence or estimate has been provided of the frequency of encounters which would be classified as high-risk exposures using the standards established by Ontario Public Health.

⁶ <https://www.publichealthontario.ca/-/media/documents/ncov/main/2020/09/covid-19-contact-tracing-risk-assessment.pdf?la=en>

⁷ <https://www.publichealthontario.ca/-/media/documents/ncov/main/2020/09/covid-19-contact-tracing-risk-assessment.pdf?la=en>

⁸ <https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-Contract-tracing-scale-up.pdf>

Perhaps more importantly, I was unable to find information provided on an Ontario website or the Ontario Public Health websites about the number and/or rates of transmission, hospitalizations, or deaths attributable to attendance at an any outdoor gathering. Furthermore, I could find no description of a process to determine the number and rate of transmissions attributable to attendance at an outdoor gathering.

Factors which should be considered in public health decision-making, whether by public health officials or elected representatives, especially when public health measures interfere with autonomy and restrict individual rights and freedoms.

The World Health Organization highlights essential aspects to take into account when developing response frameworks and epidemiological indicators and thresholds.⁹ Firstly, jurisdictions should understand the current level of transmission in the community. Secondly, jurisdictions need to assess health care system capacity (clinical care and public health measures) to respond. Public health measure (PHM) implementation or discontinuation must take into account effectiveness and unintended harmful consequences. Moving from one level to another must occur in a step-wise manner. Epidemiology and current science should inform PHMs at various geographical scales, rather than universally.

As described in the *Public Health Ethics Framework: A guide for use in response to the COVID-19 pandemic in Canada*¹⁰, to comply with the principle of proportionality, “potential benefits should be balanced against risks of harm”.

Identification and considerations of the burden of the hazard, the effectiveness and harms of intervention options, and their impact on autonomy and rights and freedoms are at the core of good and ethical public health practice¹¹. These considerations are also reflected in most provincial public health legislation which are further consistent with the *Canadian Charter of Rights and Freedoms*¹². In Ontario, reference to the *Charter* is contained in the *Emergency Management and Civil Protection Act*.

⁹ World Health Organization. Considerations for implementing and adjusting public health and social measures in the context of COVID-19: interim guidance [Internet]. Geneva: World Health Organization; 2020 [cited 2020 Nov 13]. Available from: <https://www.who.int/publications/i/item/considerations-in-adjusting-public-health-and-socialmeasures-in-the-context-of-covid-19-interim-guidance>

¹⁰ <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse/ethics-framework-guide-use-response-covid-19-pandemic.html>

¹¹ <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse/ethics-framework-guide-use-response-covid-19-pandemic.html>

¹² <https://www.canada.ca/content/dam/pch/documents/services/download-order-charter-bill/canadian-charter-rights-freedoms-eng.pdf>

1. The *Ontario Emergency Management and Civil Protection Act*¹³ states:

7.0.2 (1) The purpose of making orders under this section is to promote the public good by protecting the health, safety and welfare of the people of Ontario in times of declared emergencies in a manner that is subject to the Canadian Charter of Rights and Freedoms 2006, c. 13, s. 1 (4).

Canadian public health legislation addresses this issue in various ways, but the principles are similar. Like any medical advice – for an individual, a community, or a government - public health leaders are expected to assess the magnitude of the threat and to weigh up the pros and cons of alternative interventions.

Step four of the guidelines section of the *Ontario Hazard and Identification Risk Assessment Program*¹⁴ states that considerations of extraordinary public health interventions require clear descriptions of quantitative estimates of likelihoods (probabilities) of events and the level of severity of the consequences of those events. In other words, a reasonable risk assessment must describe how severe, how likely, and how frequently the threat is expected to occur. This assessment must be done at the following intervals: before the event(s), during the event(s) and after the event(s).

To assess the threat of any potential hazard, epidemiological descriptors should include specific probabilities –in the form of rates, ratios, or proportions – not only crude numbers (numerators without denominators). For effectiveness of interventions, this includes measurements and estimations of quantifiable outcomes, including benefits and harms. These estimates are fundamental to the process of determining whether public health interventions are proportionate to the threat and are therefore reasonably necessary. Early in a pandemic, there may be limited data to predict anticipated benefits and harms, but estimates were made and can be adjusted with new information.

I have not been able to find on an Ontario Public Health website any data, information, or estimated rates of cases and/or severe outcomes associated with outdoor exposures. I also could not find an estimate of the benefits and harms associated with the prohibition of peaceful outdoor gatherings. The absence of such information is inconsistent with the guidelines of the *Ontario Hazard and Identification Risk Assessment Program*¹⁵ as described above. A risk assessment is expected to be quantified, as is an assessment of the benefits and

¹³<https://www.canlii.org/en/on/laws/stat/rso-1990-c-e9/latest/rso-1990-c-e9.html>

¹⁴<https://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/HIRA/Guidelines/main.htm>

¹⁵

<https://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/HIRA/Guidelines/main.htm>

harms of interventions. In the absence of such information or estimates, it is not apparent – or transparent – how public health decisions and interventions have been made.

More specifically, I have been unable to find information on an Ontario government website to estimate or explain the risk of spreading COVID-19 outdoors, or to what degree it may place further strain on hospital and ICU capacity.

Data, information, knowledge, principles, and arguments which should have been included to estimate harmful outcomes associated with outdoor activities and to justify the public health restrictive policies.

Until January 20, 2022¹⁶, the policy of Public Health in Ontario was to interview all cases of COVID-19 to identify close contacts.¹⁷ Close contacts were tested for SARS-CoV-2 and followed up for the occurrence of symptoms. If a contact has a positive test, they then become defined as a case, leading to further contact tracing by public health.

Given the apparent level of concern regarding outdoor events, it would be expected that cases would have been specifically asked about their attendance at or contact with an attendee of these and other outdoor events, especially highly visible and well-publicized events. The ability to identify potential cases and contacts should have been aided by enhanced surveillance – closer follow up of cases and contacts associated with outdoor events - and other efforts made by officials to identify participants. Despite these opportunities to identify cases and contacts, I have been unable to find data, evidence, or estimates of the number or rate of cases or close contacts of COVID-19 associated – directly or indirectly - with attendance at outdoor rallies or other similar events.

3. Based on what you have been able to find, with respect to the Ontario government and public health officials, what information was used, what issues were considered, and how were they used to explain and justify the restrictions of outdoor gatherings?

In my opinion, the information provided above does not show adequately what information was used, what issues were considered, and what rationale and explanations justified the restrictions.

¹⁶ https://covid-19.ontario.ca/exposed?utm_source=mobile-app-organic&utm_medium=referral&utm_campaign=covid-alert-mobile-app-english&utm_content=covidalertapppage-text

¹⁷ https://health.gov.on.ca/en/pro/programs/publichealth/coronavirus/docs/contact_mngmt/management_cases_contacts.pdf

Without estimates of the number and rate of outdoor transmission of infections and their consequences, there is no epidemiological basis to justify the restrictions. The lack of detected and/or reported outdoor transmissions or outbreaks - after identifying and contact-tracing for 5,036 cases by October 4, 2020,¹⁸ - suggests that that transmission in outdoor events had been a negligible contributor to the burden of COVID-19 disease.

4. Based on information you have been able to find in official publications and postings, what were the estimated rates of transmission of outdoor gatherings available to and/or used by the Ontario government to justify the restrictions of outdoor gatherings?

By October 3, 2020, a total of 1,002 outbreaks had been reported in Ontario¹⁹. These occurred in four settings – long-term care homes, retirement homes, hospitals, and congregate living. There was no mentions of outbreaks – or even one case, for that matter – associated with participation in an outdoor gathering - of any size.

Absence of proof is not proof of absence. Transmission in an outdoor setting may not be identified as such. With a comprehensive surveillance and contact-tracing for every case, patterns would be expected to emerge.

As explained in the *Data Caveats and Methods: Case Data*²⁰ of the weekly epidemiology summaries, an outbreak-associated exposure would be given precedence over a close contact with a confirmed case. In other words, if a person reported to a case manager that they had a close contact with a confirmed case and were also in attendance at an event that was under investigation as a potential outbreak, their setting of exposure would be classified as the event, not their exposure to known confirmed case. Therefore, it would be reasonable to expect that this would facilitate detection in outbreak settings and may result in an overestimation of outbreak-associated cases as the source of transmission.

Cases with multiple risk factors were assigned to a single likely acquisition source group which was determined hierarchically in the following order: For cases with an episode date

¹⁸ <https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/covid-19-data-surveillance/covid-19-data-tool?tab=trends>

¹⁹ <https://www.publichealthontario.ca/en/data-and-analysis/infectious-disease/covid-19-data-surveillance/covid-19-data-tool?tab=outbreaks>

²⁰ chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.publichealthontario.ca/-/media/Documents/nCoV/epi/2021/06/covid-19-weekly-epi-summary-report-june-26.pdf?sc_lang=en

*on or after April 1, 2020: Outbreak-associated > close contact of a confirmed case > travel > no known epidemiological link > information missing or unknown.*²¹

5. In your opinion, has the Government of Ontario provided sufficient data, information, evidence, analysis, and rationale to explain and justify the necessity and appropriateness of the restrictions of outdoor gatherings?

Public health interventions, when necessary and appropriate, may justifiably limit personal autonomy or cause unintended harm to an acceptable level. To be consistent with good public health practice and ethics, such interventions must be justified reasonably, clearly, and transparently. This must include an assessment of the severity of the threat, an explanation for the necessity of the interventions, and reasonable estimates of their expected benefits and harms.

As a public health practitioner and teacher, I have found the following list of expectations useful when considering and justifying public health interventions, especially when such interventions restrict rights or cause harms. After each numbered expectation, I have stated my opinion about whether each expectation has been met.

1. The severity of the public health threat should be estimated in absolute and relative terms.

- I was unable to find an estimate of the actual risk or comparative risk of COVID-19 infection transmissions or more severe consequences associated with exposures at public outdoor gatherings.

2. A reasonable strategy should be described with clear rationale and justification, broad goals, and specific, measurable, achievable, and relevant, time-defined objectives.

- General goals and some indicators of the overall public health strategy have been described but I was unable to find specific measurable objectives of the restrictions of outdoor gatherings.

3. The interventions should be expected to significantly contribute to achieving one or more of the goals of the strategy and one or more of the objectives of the strategy.

²¹ [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.publichealthontario.ca/-/media/Documents/nCoV/epi/2021/06/covid-19-weekly-epi-summary-report-june-26.pdf?sc_lang=en](https://www.publichealthontario.ca/-/media/Documents/nCoV/epi/2021/06/covid-19-weekly-epi-summary-report-june-26.pdf?sc_lang=en)

- In the absence of specific measurable objectives of the overall public health strategy, I was not able to identify or evaluate how restrictions of public outdoor gatherings would contribute to achieving the goals of the overall strategy.

4. To describe the anticipated impact of an intervention, the quantifiable effect size should be estimated and monitored throughout the implementation of the intervention.

- I was unable to find any quantified estimates of the effect size on reduced transmissions resulting from restrictions of public outdoor gatherings.

5. The anticipated harms of the intervention should be estimated and monitored.

- I was unable to find any descriptions or estimates of the harms from restrictions of public outdoor gatherings, other than one rapid review on *“Negative impacts of community-based public health measures during a pandemic on children and families”*²² which addressed decreased physical activity resulting from all restrictions, not specifically outdoor gatherings. Specifically, I was unable to find an analysis or estimate of the potential unintended consequence of increasing household and community transmission, by replacing outdoor activity with indoor activity. From a broader perspective, it is important to consider the impact on trust and confidence in governments and public health officials resulting from intrusive measures without adequate evidence and explanation should be a significant concern.²³

6. The balance of benefits and harms should be estimated and monitored. This balance should be assessed in the broadest context of all health problems, health equity, and the determinants of health of the whole population.

- I was unable to find processes or outcomes of estimating and monitoring benefits and harms associated with restrictions of outdoor gatherings.

²² chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.publichealthontario.ca/-/media/Documents/nCoV/cong/2020/06/covid-19-negative-impacts-public-health-pandemic-families.PDF?rev=f4174b744ae645f78fdcf31422934875&sc_lang=en

²³ <https://gh.bmj.com/content/7/5/e008684>

7. Comparisons should be made transparently of alternative strategies and interventions to identify options that optimize the balance of benefits and harms.

- I was unable to find descriptions or analyses of alternative strategies to restricting outdoor gatherings, especially regarding comparison with other activities such as retail shopping.

8. The data, information, analyses, evidence, estimates, and rationale used to justify interventions should be made available to the public in an accessible manner.

- As described above in my responses to the first seven items, I was unable to find the expected data, information, evidence, analysis, and rationale to justify the restrictions. I cannot say whether some or all of these were known or were used to make and evaluate policies. Ethical public health practice requires transparency of the information and rationale used for decision-making.

9. To foster reconsideration of the strategies and all interventions, ongoing reviews of threat and outcomes data should be undertaken and shared transparently with the media and directly with the public.

- As stated above in my responses to the first eight items, I was unable to find such reviews.

10. There should be meaningful and systematic engagement with others to provide input to public health interventions, ensuring that decision-makers are informed of considerations relevant to the effectiveness and equity of the interventions.

- I am not aware of a process or occurrences of meaningful and systematic engagement with stakeholders and others affected by or concerned about the restrictions of outdoor gatherings. If there were any, I was not able to find any reports of their processes or outcomes.

Conclusion

Based on my answers to these questions and the information and opinions provided elsewhere in this report, I conclude that I have been unable to find sufficient data, information, evidence, analysis, and rationale to explain and justify the necessity and appropriateness of the restrictions of outdoor gatherings.

Addendum: Comments on the report of Dr. Hodge, affirmed December 13, 2022

My comments about Dr. Hodge's report are based on the following expectations of good scientific and ethical public health practice:

- It is the onus of government and public health officials to explain the reasons for public health measures, especially those that impose restrictions on everyday life activities.
- These explanations should provide transparently sufficient and relevant data, information, evidence, analysis, and rationale to support their policies and interventions.
- Given the need to make decisions with incomplete data and evidence for any public health problem, – especially those that are new or emerging – decision-makers should describe and explain the estimates they have used to assess the magnitude of a threat and to assess the expected benefits and harms of interventions.
- For any specific intervention – whether or not it is part of a larger set of interventions - governments and its public health officials should provide sufficient data, information, evidence, analysis, and rationale to explain and justify the necessity and appropriateness of that intervention.
- To justify a public health intervention for preventing a disease, it is incumbent on governments, public health officials, and their epidemiologists and other experts to estimate quantitatively the severity of the disease threat – i.e. the burden of illness - and the expected benefits and harms of the intervention.

Burden of illness. In epidemiology, the basic science of public health practice, quantitative estimates are used to assess the burden or threat of illness. For example, terms such as “serious” or “potential” threat or “high or higher” rate of transmission or death are qualitative terms open to interpretation and should be quantified. Quantitative descriptions include definitions, measurements, and calculations. Epidemiologists and public health practitioners never have enough information to be certain or precise, but they are expected to make the most accurate reasonable estimates they can, based on scientific principles and empirical observation and evidence.

Interventions. Regarding interventions, qualitative - i.e. non-quantified statements - are also open to interpretation. Questions of effectiveness in public health preventive interventions, similar to clinical treatment, are not binary. For epidemiologists, public health practitioners, or clinicians, it is not simply a matter of “do they work” or “are they effective”? It is the “effect size” that matters.

As explained in this report, I have not seen from Dr. Hodge's report or the Ontario government and their public health officials a quantified estimate of the burden of illness associated with outdoor gatherings nor have I seen a quantified estimate of the benefits and harms of restricting outdoor gatherings. Given the reduced probability of transmission in outdoor settings, these estimates should have included an estimate of the potential harm caused by decreasing lower-risk activities and consequentially increasing alternate higher-risk indoor activities.

Summary of my opinions

Dr. Hodge has not addressed the question of whether the Ontario government and public health officials have provided sufficient data, information, evidence, analysis, and rationale to explain and justify the necessity and appropriateness of the intervention in question, namely restrictions of outdoor gatherings.

Instead, he has provided opinions about facts that he believes justify the policies.

What information should have been used and what issues should have been considered, to explain and justify restriction of outside gatherings? I have listed below the information that I have looked for from the Ontario government and its public health officials. I looked for this information in Dr. Hodge's report.

- There should have been an estimate of the number and rate of direct and indirect transmissions causally associated with outdoor gatherings.
- There should have been an estimate of the number and rate of severe outcomes (hospitalizations and deaths) attributable to transmissions causally associated with outdoor gatherings.
- There should have been a quantitative estimate of the effectiveness of restrictions of outdoor gatherings to reduce transmissions and severe outcomes.
- In consideration of the above, there should have been an analysis and estimate of the number and rate of transmissions causally associated with alternative activities of people in comparison to attendance at an outdoor gathering.
- There should have been a description of the potential harms of the restriction policy including an estimate of the increased transmission resulting from participation in other activities.

In my opinion, like the Ontario government and its public health officials, Dr. Hodge has not provided answers to these questions. Moreover, he has not demonstrated and/or cited relevant and sufficient examples of answers to these questions provided by the Ontario government or its public health officials.

Specific examples from the Dr. Hodge's report

I have selected some examples from Dr. Hodge's report for specific comment.

Paragraph 10

Dr. Hodge observes that his opinions are informed by the realities that public health advice and decisions are made with "imperfect information" and the "challenge of minimizing adverse effects of measures that establish limits on human behaviour." I agree.

Referring to Ontario's plan for an influenza pandemic, he relates the matter of "imperfect information" to the assessment of severity, stating that "the severity may not be known until after an influenza pandemic is over." The relevance of this is not clear to me, given that, the restrictions on outdoor gatherings were imposed in April, 2021 at which time the information on severity had been observed by surveillance for over one year.

There is no elaboration on the "challenge of minimizing adverse effects of measures that establish limits on human behaviour."

Paragraph 11

The precautionary principle applies to any public health decision because certainty is neither an expectation nor a necessity for rational decision-making.

Regardless, the precautionary principle or the lack of certainty should not be used as justification to take action without an explanation of the data, evidence, estimates, and rationale used to make the decision. By October, 2020, there had been at least nine months of international data and information regarding modes of transmission of COVID-19.

Paragraph 12

I am not aware of "the burden model". No reference was provided.

I do not know of any model that “recognizes that it is generally appropriate to implement more restrictive public health measures when an infectious disease imposes a higher burden”. This implies that there is a correlation between the burden of an infectious disease and the need for restrictive public health measures. Such correlations, for example, have not, in my opinion, been observed for tuberculosis, polio or HIV/AIDS.

Other considerations would be expected - in addition to burden of illness - before any specific restrictive measure could be justified. For restrictions of outdoor gatherings, for example, an estimate of the absolute number of cases, outbreaks, and serious outcomes associated with that specific activity must be large enough to justify the need for restrictions. Another consideration is the proportion of outcomes attributable to that specific activity. If not one outbreak out of 1,002 was associated with outdoor gatherings, one must ask why restrictive measures would be targeted at those activities. Given the likelihood that alternative higher-risk activities would be expected to replace the outdoor activities, that proportion is probably an over-estimate.

In other words, using Dr. Hodges “model”, the burden of illness should be estimated for the specific intervention that is under consideration.

Paragraph 13

In this paragraph, Dr. Hodge states his opinion that it was reasonable to limit “gatherings” temporarily during the three waves referred to. His reasons appear to be the “burden model” elements – prevalence, incidence, concerns about hospital and ICU capacity, uncertainty about VOC transmissibility and severity, and the model’s “recognition that it is generally appropriate to implement more restrictive measures”.

Public health decisions are not made “generally” and do not use “burden” alone as a guide to imposing restrictive measures. Dr. Hodge’s opinion is not specific and it is not explained. Is he referring to all gatherings? Which gatherings has he considered causal of the “growing number of new cases”? What is his opinion about the quantified estimated “burden” caused by outdoor gatherings?

Paragraph 21

I agree with Dr. Hodge’s descriptions that the transmission of COVID-19 can occur from people without symptoms. But he does not compare their transmissibility with people that have symptoms. This is important because an infected person without symptoms has a lower probability of transmitting their infection, especially outdoors.

Paragraphs 22-28

I could not find in paragraphs 22 - 28 any information specifically relevant to transmission in outdoor gatherings.

As stated in earlier paragraphs, being indoors has a higher risk of transmission, but he has not provided data or estimates on the size of that difference.

In paragraph 26, Dr. Hodge provides unspecified settings and hypothetical numbers and rates of transmissions to demonstrate the “network” effect from an “outbreak”. I believe that he means indirect or secondary transmissions resulting from transmission in a specific setting. For public health decision-making, the expected analysis is to estimate setting-specific infectiousness prevalence, the setting-specific exposures, and the probability of transmission. Again, there was no information provided specific to outdoor settings.

The example used in paragraph 27 to demonstrate the “outbreak effect” and the “network effect” has not been described or analyzed by Dr. Hodge with respect to transmission in outdoor settings. Although Sturgis activities involve outdoor settings, there are also many indoor events. Without further details than those provided in this paragraph, one cannot draw conclusions about the settings or exposures that were associated with the observed cases in the “outbreak” or the “network”.

Paragraphs 31-40

In paragraphs 31 – 40, Dr. Hodge provides his answers to the question “Why do limits on outdoor gatherings and mobility contribute to reducing COVID-19 transmission and harms from COVID-19?” The relevant question is not why limits on outdoor gatherings reduce transmission of COVID-19. Any activity in which people may be exposed to a respiratory virus has the potential for transmission. The question is not why limits on outdoor gatherings reduce transmission. The question is how much transmission occurs in outdoor gatherings and how much reduction of transmission of COVID-19 would be achieved by limiting outdoor gatherings.

Paragraph 31

Dr. Hodge’s statement that “even a low probability of transmission can generate large number of new infections” is indisputable. Public health decisions should be made based on estimated probabilities, not

what can happen. No estimates are provided to quantify the words “increasing numbers”, “declining probability”, “less risk”, “low probability”, “large number”, “enough people”, and “high number”. There is no estimate of the “expected” rate of secondary infections.

These arguments reflect the type of limited and non-quantified information and explanations which I found on official websites of the Ontario government. They also demonstrate the absence or insufficiency of data, information, evidence, analysis, and rationale to explain and justify the necessity and appropriateness of the restrictions of outdoor gatherings.

Paragraph 33

That the absolute number of transmissions would be expected to increase when the prevalence of infectious persons increases is indisputable. Relative risk is useful to understand causation, but public health decisions are based on absolute risk in the population at risk. For example, if the probability of transmission at a two hour outdoor event is one per 5000, a doubling of the prevalence of infectiousness in the community, all else being equal, would be expected to increase that probability to one per 2,500. For gatherings of 100 people, it would take 25 events to produce an additional case. However, all else is not equal because the probability of transmission is higher for indoor settings. If attendees would have spent their two hours in indoor settings, their presence at an outdoor setting would be expected to decrease the probability of transmission.

Paragraph 35

Dr. Hodge describes higher risk activities that may be associated with outdoor gatherings such as higher risk indoor gatherings and travel. This is an interesting hypothesis which requires analysis and estimation. The analysis would have to compare the frequency and risk of such activities with other events such as work, education, shopping, and other activities. It could use case and contact information that has been collected and entered into a database.

Paragraph 36

This paragraph, without any references, contains opinions that I have not heard or read at anytime in my career in public health.

It seems that Dr. Hodge is arguing that the necessity or effectiveness of specific public health measures such as mobility limitation cannot and should not be assessed. He states that “indulging in such studies of “NPI’s” would arguably be public health malpractice”.

I don't know of any guideline or standard of public health decision-making that implies or states that public health measures should not be assessed. On the contrary, the implementation of measures – especially restrictive measures – can and should be assessed, estimated, and transparently explained to the public. Good and ethical public health practice requires it.

Paragraph 37

It is not clear what point is being made by Dr. Hodge in this paragraph or what evidence has been presented to make it.

It appears that he is drawing our attention to the difference in the cumulative crude death rates and “projected additional deaths” between Ontario and other countries that had less stringent temporary limits than Ontario.

He has not provided a description or analysis of the specific measures or “limits” used in each country, an operational definition of “stringent” or an estimate of the impact on mortality of these “temporary limits”.