1. LETTER OF INTENT

Dear Grant Review Committee:

I am writing to express my intent to apply for the Geoff Ogram Memorial Research Grant with our project titled "*Improving Equity in Lung Cancer Screening: Adaptation and Validation of Risk Prediction Models for Indigenous Peoples in Nova Scotia.*"

Lung cancer is the leading cause of cancer-related death in Canada, and Nova Scotia faces some of the highest rates nationwide. These challenges are even more pronounced within Indigenous populations, who experience disproportionately higher incidence and mortality from lung cancer. Current screening eligibility criteria risk overlooking Indigenous peoples at elevated risk, particularly younger individuals, thereby perpetuating inequities in access to early detection and potentially life-saving care.

What makes this project distinct is the team behind it. I, Dr. Alison Wallace, a thoracic surgeon and lung cancer researcher, have dedicated my career to improving outcomes for patients facing this devastating disease, both through my clinical practice and through building research programs that shape screening and treatment. For this project, I have assembled an exceptional team: Aaron Prosper, a Mi'kmaw healthcare professional and medical student, whose leadership in Indigenous health policy and commitment to equity will ensure authentic engagement and cultural relevance; and Professor Martin Tammemägi, a world-renowned expert in lung cancer predictive modelling and the developer of the PLCOm2012 model that underpins screening programs across Canada. Together, our team combines clinical expertise, Indigenous leadership, and methodological innovation to advance a more equitable approach to lung cancer care.

This work will not only generate evidence to adapt and validate risk prediction models for Indigenous peoples in Nova Scotia, but also create a pathway for provincial and national policy change in lung cancer screening. It aligns directly with the goals of the Geoff Ogram Memorial Research Grant by addressing inequities in cancer outcomes and advancing patient-centered, evidence-based care. This work is not only research, it is reconciliation in action. By responding directly to the Truth and Reconciliation Commission's Call to Action #19, we are advancing measurable efforts to close health outcome gaps between Indigenous and non-Indigenous peoples. Fittingly, we submit this grant on Truth and Reconciliation Day, a reminder that the responsibility to act for change is shared by us all.

Sincerely,

Dr. Alison Wallace

ALISON WALLACE MD PHD FRCSC
Associate Professor, Department of Surgery, Division of Thoracic Surgery
Cross Appointed to Department of Pathology, Dalhousie University
Thoracic Surgeon, Queen Elizabeth II Health Sciences Centre
7-010 Victoria Building, Victoria General Hospital
1276 South Park Street, Halifax, NS B3H 2Y9
T: 902 473 7174

2. SUMMARY OF PROPOSED RESEARCH

Title: Improving Equity in Lung Cancer Screening: Adaptation and Validation of Risk Prediction Models for Indigenous Peoples in Nova Scotia

Background and Rationale: Lung cancer remains the leading cause of cancer-related mortality in Canada, and Nova Scotia faces among the highest rates of incidence and mortality nationwide.[1] Concerningly, most patients in Nova Scotia present with late-stage disease (Stage IV), contributing to poor outcomes.[1] These challenges are further magnified within Indigenous populations, who experience disproportionately higher rates of lung cancer incidence and mortality compared to the general population.[2,3]

Current lung cancer screening eligibility criteria in several Canadian provincial programs, including British Columbia, Saskatchewan, Ontario, Quebec and Nova Scotia, use the PLCOm2012 lung cancer risk prediction model estimates to determine eligibility for lung cancer screening.[4] In many programs, including the Nova Scotia Health Lung Screening Program, the age range is restricted to individuals 55 to 74 years and the version of the PLCOm2012 used excludes the *race* term which has a level increasing risk for Indigenous peoples.[5] This eligibility criteria is likely to under-select high-risk Indigenous people in Nova Scotia for lung cancer screening for two reasons. Indigenous individuals under the age of 55 can be at high enough elevated risk to potentially benefit from lung cancer screening. In addition, the original PLCOm2012 model demonstrated that Indigenous individuals can be at elevated risk independent of all other predictors in the model. This indicates that their excess lung cancer risk should be accounted for in risk assessment. The PLCOm2012noRace fails to do so and is expected to under-estimate Indigenous peoples' risk and lead to inequitable access to potentially life-saving early detection. More sophisticated risk prediction models have been developed internationally to refine screening eligibility, yet few have been validated or adapted for Indigenous populations.

Professor Martin Tammemägi is a cancer epidemiologist and recognized leader in predictive modelling for lung cancer screening. He developed the widely validated and used PLCOm2012 model. Furthermore, he has developed Bayesian versions of the risk prediction models tailored to Indigenous populations in Australia and New Zealand (manuscript in preparation). In addition, Professor Tammemägi has developed Bayesian versions of PLCO2025_Indigenous_Atlantic model for men and women in the Atlantic provinces, based on Atlantic provincial incidence rates and relative risks, Indigenous versus Other, based on data provided in the report of Mazereeuw and colleagues.[6] These models represent an important step forward in addressing equity gaps in screening, but their applicability to Indigenous peoples in Nova Scotia remains unknown.

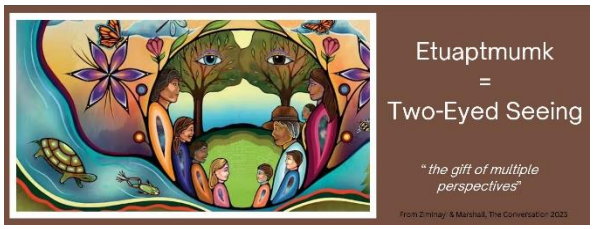
Objectives: The goal of this project is to evaluate and adapt risk prediction models for lung cancer screening to better reflect the risk profile of Indigenous peoples in Nova Scotia.

Specific objectives are to:

1. Compare the performance of the PLCO2025_Indigenous_Atlantic model versus the current Nova Scotia lung cancer screening eligibility criteria.
2. Identify potential gaps in sensitivity and specificity of existing model (PLCOm2012noRace) and the PLCO2025_Indigenous_Atlantic model when applied to Indigenous populations in Nova Scotia.
3. Engage with Indigenous communities to ensure culturally grounded perspectives guide the interpretation, adaptation, and application of these models.

Approach: This project will be led by Aaron Prosper, a Mi'kmaw healthcare professional and first-year medical student at Dalhousie University, under the supervision of Dr. Alison Wallace, a thoracic surgeon and lung cancer researcher, who through her clinical practice and research program is driving change in lung cancer outcomes in Nova Scotia and beyond. They are joined by Professor Martin Tammemägi, who will provide expertise in predictive modelling and interpretation of results. Prior to medical school, Aaron Prosper served in several roles advancing Indigenous health within Nova Scotia's health system. From 2019 to 2021, Aaron led a CPAC-funded project creating the province's first ever Nova Scotia Mi'kmaw Nation Cancer Care Strategy, a program which is now housed with the Mi'kmaw-led health organization, Tajikeimik. From 2021 to 2023, Aaron served as the first ever Indigenous Health Consultant with Nova Scotia Health where he led the creation of the province's new Mi'kmaw-Indigenous Patient Navigator Program. Lastly, from 2023 to 2025, Aaron served as Manager for Intergovernmental Relations with the Department of Health and Wellness, Government of Nova Scotia, supporting the province in the development of its health governance agreements with the Mi'kmaq of Nova Scotia. He is dedicated to advancing equity in lung cancer screening and care and will ensure that authentic Indigenous perspectives and community engagement are embedded throughout the study. Guided by the principle of *Etuaptmumk* (Two-Eyed Seeing), which brings together Indigenous and Western ways of knowing, the team integrates Indigenous leadership, clinical expertise, and methodological strength to advance equitable, evidence-based approaches to lung cancer care.

We will compare the application of the currently used model, PLCOm2012noRace, criteria with the PLCO2025_Indigenous_Atlantic models to simulated cohorts representing Indigenous populations in Nova Scotia. Performance metrics, including discrimination (AUC), Brier score, calibration, and net reclassification index will be compared. Sensitivities and specificities for detecting lung cancer will be compared between the two modelling approaches in Indigenous groups. We expect that the PLCO2025_Indigenous_Atlantic models, given their nature and age-free application will detect earlier age Indigenous cancers and be more sensitive overall. In the absence of available individual level prospective data including sizeable numbers of individuals, synthetic data may be utilized.[7]



In parallel, and consistent with Indigenous research methodologies, consultations will be conducted with Indigenous stakeholders to contextualize findings, discuss cultural considerations, and co-develop recommendations for adapting or integrating prediction models into the Nova Scotia lung cancer screening program. This will ensure that the project is responsive to community priorities, and that implementation respects Mi'kmaw knowledge, values, and self-determination.[8,9] Beyond institutional REB approvals, this project will also seek approval through the Mi'kmaw Ethics Watch (MEW). MEW is an independent, Mi'kmaw-led, ethics review board which provides input to researchers to ensure that research involving Mi'kmaw communities in Nova Scotia is respectful of Mi'kmaw research protocols and community self-determination.[10]

Outcomes and Future Directions: This research will directly address a critical equity gap in lung cancer screening in Nova Scotia by evaluating whether current eligibility criteria adequately identify Indigenous individuals at risk. In doing so, it also responds to the Truth and Reconciliation Commission (TRC) of Canada: Call to Action #19, which urges measurable efforts to close health outcome gaps between Indigenous and non-Indigenous communities through better access to appropriate and equitable health services.[11]

The anticipated outcomes include:

1. The first comparative analysis of Indigenous- and Atlantic-specific Bayesian lung cancer risk prediction models against the current Nova Scotia screening approach.
2. Evidence-based recommendations to inform provincial screening guidelines, with potential to expand eligibility criteria and improve early detection and detection sensitivity among Indigenous peoples.
3. Strengthened partnerships between Indigenous communities, clinicians, and researchers to support culturally safe and community-driven approaches to cancer screening.

Looking forward, this project will lay the foundation for larger validation studies, national collaborations on Indigenous-specific screening strategies, and the integration of bespoke risk prediction models into provincial and federal health policy. Ultimately, the knowledge generated will contribute to sustainable efforts to reduce disparities in lung cancer screening and outcomes, and to advance the TRC's mandate for equity in health care across Canada.

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3. IMPACT STATEMENT

This project directly addresses one of the most pressing equity challenges in cancer care in Nova Scotia: the underrepresentation of Indigenous peoples in lung cancer screening programs. By rigorously comparing existing eligibility criteria with Indigenous-specific Bayesian risk prediction models, this research will provide actionable evidence to refine screening strategies. The impact will be threefold:

1. **Clinical impact:** Findings will improve the accuracy and sensitivity of screening eligibility for Indigenous populations, increasing the likelihood of detecting lung cancer at earlier, more treatable stages. This has the potential to directly reduce mortality rates and improve quality of life.
2. **Policy impact:** Evidence generated will inform revisions to provincial and potentially national lung cancer screening guidelines, supporting equitable access to life-saving early detection. The project also provides a scalable framework that could be adapted by other provinces and territories with Indigenous populations.
3. **Community impact:** Through authentic engagement with Indigenous communities, the project strengthens trust, builds research capacity, and ensures culturally safe implementation. Embedding Indigenous perspectives into the design and interpretation of findings respects self-determination and fosters sustainable, community-driven improvements in health outcomes.

Ultimately, this research will contribute to reducing health disparities, guiding the integration of equity-focused predictive models into lung cancer screening, and setting a precedent for future cancer prevention strategies across Canada.

4. PUBLIC, NON-SCIENTIFIC SUMMARY

Lung cancer is the leading cause of cancer death in Canada, and Nova Scotia has some of the highest rates in the country. Indigenous peoples in Nova Scotia are even more affected, facing higher chances of developing and dying from lung cancer. Early detection through screening saves lives, but current screening rules may miss many Indigenous individuals at risk.

This project will look at whether new screening tools, designed with Indigenous populations in mind, can do a better job of identifying who should be screened. We will compare these new tools with the screening selection rules currently used in Nova Scotia and work with Indigenous communities to ensure the approach is culturally respectful and meaningful.

Our goal is to make lung cancer screening fairer and more effective. By improving how we decide who is eligible for screening, we can catch lung cancer earlier, give people more treatment options, and save lives. This project will also build stronger partnerships between Indigenous communities, healthcare providers, and researchers to support ongoing improvements in cancer care.

5. BUDGET

CATEGORY	BUDGET ITEM	YEAR 1	TOTAL
Personnel	Research Assistant (0.25 FTE x 1 year)	$12,500	
	Tammemägi Epidemiology Consulting	$12,500	
			$25,000

BUDGET JUSTIFICATION

1. **Rowan Murphy BSc MSc, Research Coordinator (0.25 FTE for 1 year = $12,500)**

A part-time research assistant will be engaged to support the day-to-day operations of the project. Responsibilities will include coordinating data collection and management, assisting with statistical analyses, supporting community consultation activities, preparing project documentation, and contributing to knowledge dissemination. The role of the research assistant is critical to ensuring timely progress, accuracy of analyses, and effective communication between the research team and Indigenous community partners.

2. **Epidemiology Consulting – Dr. Martin Tammemägi ($12,500)**

Professor Tammemägi is a world leader in the development and application of lung cancer risk prediction models. His consulting support is essential to guide the technical aspects of this project, including fine tuning the PLCO2025_Indigenous_Atlantic models and the comparison with the current Nova Scotia screening model eligibility rules. He will be involved in helping prepare synthetic data which might be used to in part evaluate and compare models. His expertise will ensure methodological rigor, validity of results, and alignment with international best practices in lung cancer risk modelling.

Total: $25,000

This budget reflects the minimum required to successfully execute the project's objectives, with all requested funds directly supporting personnel and expertise essential to its success.

Every dollar of this budget is dedicated to direct project activities, with no institutional overhead or administrative costs, ensuring maximum impact and value for money.

6. INVESTIGATORS

Principle Investigator:

ALISON WALLACE MD PHD FRCSC
Associate Professor, Department of Surgery, Division of Thoracic Surgery
Cross Appointed to Department of Pathology, Dalhousie University
Thoracic Surgeon, Queen Elizabeth II Health Sciences Centre
7-010 Victoria Building, Victoria General Hospital
1276 South Park Street, Halifax, NS B3H 2Y9
E: alison.wallace@nshealth.ca

Co-Principle Investigator:

C. MARTIN TAMMEMÄGI DVM MSC PHD
Professor Emeritus (Epidemiology), Brock University, Department of Health Sciences
1812 Sir Isaac Brock Way, St. Catharines, Ontario, Canada L2S 3A1
Tammemägi Epidemiology Consulting
58 Marine Parade Drive, Unit GR09, Toronto, Ontario, Canada M8V 4G1
E: ctammemagi@brocku.ca

Co-Lead = Medical Student and Indigenous Community Member:

AARON PROSPER BSC MAHSR MD(c)
Medical Student, Class of 2029, Dalhousie University
Mi'kmaq from the Eskasoni First Nation
Manager, Intergovernmental Relations, Department of Health and Wellness, Government of Nova Scotia (2023-2025)
Indigenous Health Consultant, Nova Scotia Health (2021-2023)
24 Seascape Ln, Herring Cove, Nova Scotia, Canada B3V 1H2
E: aaron.prosper@dal.ca

7. STATEMENT OF SUPPORT

Dr. Gail Darling, MD, FRCS(C)
Dr. D. Alex Gillis Professor and Head
Department of Surgery - Dalhousie University
Chief of Surgery - Central Zone NSH

September 29, 2025

To the Geoffrey Ogram Memorial Research Grant Committee:

I am delighted to write this letter of support for Dr. Alison Wallace's application for the Geoffrey Ogram Memorial Research Grant for the project entitled, *Improving Equity in Lung Cancer Screening: Adaptation and Validation of Risk Prediction Models for Indigenous Peoples in Nova Scotia.*

I am well acquainted with Dr. Wallace having worked with her daily when she was a thoracic surgery fellow in Toronto. Since then, I have followed her career closely as she has developed into an outstanding thoracic surgeon, clinician-scientist, and academic leader. Dr Wallace leads our lung cancer research program at Dalhousie University and I strongly support her research program. In my role as Professor and Head of Surgery at Dalhousie University, I am proud to support her as she builds a research program that integrates clinical practice, equity, and innovation in lung cancer care.

Dr. Wallace's proposed project addresses a pressing need: improving access to life-saving lung cancer screening for Indigenous peoples in Nova Scotia, who face a disproportionate burden of disease. By adapting and validating Indigenous-specific risk prediction models, this work has the potential to directly influence screening policy and improve survival for a population that has historically been underserved. The project is well-conceived, grounded in meaningful community engagement, and positioned to have significant impact for our Indigenous people but also for lung cancer screening overall.

The Department of Surgery at Dalhousie is invested in Dr. Wallace's success and has provided her with protected research time and resources to ensure her projects are completed with the highest level of rigor and impact. She has already demonstrated her ability to lead high-quality, collaborative research with national and international reach, and this proposal represents the next important step in her program. For this project she has composed an outstanding team, including Professor Martin Tammemägi, a world-renowned leader in lung cancer risk modelling, and Mr. Aaron Prosper, a Mi'kmaw healthcare professional and medical student who will ensure that Indigenous voices and perspectives guide the work. The combination of methodological expertise and community engagement will ensure impactful research.

On a personal note, I would like to highlight that Geoffrey Ogram was a patient of mine. Supporting this application is therefore especially meaningful to me, as Dr. Wallace's project exemplifies the goals of the Geoffrey Ogram Memorial Research Grant: advancing research that improves the quality of life and survival of people with lung cancer.

I strongly support this application and trust you to give it your strong consideration.

Yours Sincerely,

Gail Darling
Gail Darling MD FRCSC

gail.darling@nshealth.ca
1276 South Park Street, Room 838 Victoria
Halifax, NS B3H 2Y9
(902)473-5226 (902)473-3418 fax