

# WHAT CAN AI DO FOR POPULATION HEALTH?

## Exploring the Role of AI in Population Health Risk Assessment

### Symposium Report

**November 14, 2018**

# ACKNOWLEDGEMENTS

Funding support for the symposium was provided by the Canadian Institute for Health Research Planning and Dissemination Grant (201711PD4-397847), Connaught Global Challenge Award, Vector Institute for Artificial Intelligence, and University of Toronto Research and Innovation. The organizers would also like to acknowledge the support provided by the volunteers that helped facilitate the symposium day (Catherine Bornbaum, Emma Buajitti, Eric De Prophetis, Stacey Fisher, Daniel Fridman, Meghan O'Neill, Tristan Watson, and Jessica Wong).

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This Symposium was the final of a three-part series of CIHR-funded collaborative interdisciplinary workshops entitled, "Collaboration on Artificial Intelligence for the Public's Health." Summary reports on the previous two workshops from this series are available elsewhere:

- Ethics and AI for Good Health  
Jennifer Gibson, Director, Joint Centre for Bioethics, University of Toronto
- Planning for Syndemics: Synergies in Data Science for Epidemic Infectious disease control in Canada  
Natasha Crowcroft, Director, Chief, Applied Immunization Research and Evaluation, Public Health Ontario

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## **Population Health Analytics Laboratory**

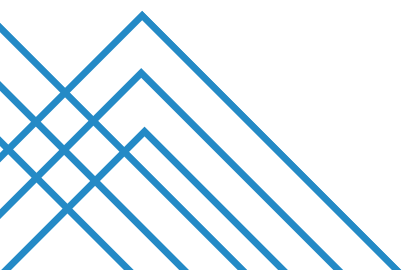
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# SYMPOSIUM OVERVIEW

Using predictive risk algorithms at the population level has proven instrumental to public health for estimating risk distribution in the population, quantifying population-level disease burden, and informing prevention strategies and population-based health decision-making. Predictive algorithms designed for population health applications can potentially be enhanced by applications of artificial intelligence (AI) techniques, such as reinforcement learning, machine learning, and neural networks. This Population Health and AI Symposium sought to explore the role of AI and machine learning in the context of population risk prediction and decision-making.

The Symposium was hosted by the Population Health Analytics Lab at the Dalla Lana School of Public Health, University of Toronto, and the Ottawa Hospital Research Institute, in collaboration with the Vector Institute for Artificial Intelligence on November 14th, 2018. This Symposium was the final of a three-part series of CIHR-funded collaborative interdisciplinary workshops entitled, “Collaboration on Artificial Intelligence for the Public’s Health.”

## SYMPOSIUM OBJECTIVES

The objectives of the Symposium were to: (1) Bring together experts in population risk prediction and AI methods to discuss methodological issues and applications; (2) Inform the debate on the implications of AI for predictive analytics in population health; and, (3) Identify the core elements of a population/public health-AI training program to build capacity in Canada.

## PARTICIPANTS

The Symposium was attended by close to 200 participants with diverse expertise and roles, including academics, institutional leaders and managers, research staff, and trainees. Participants represented a range of institutions and disciplines, including:

- **Academic Institutions:** McGill University, McMaster University, University of Toronto, University of Guelph, University of Ottawa, University of Western Ontario, University of Waterloo, Leiden University Medical Centre (Netherlands), University of Auckland (New Zealand)
  - o Applied Health Sciences, Biostatistics, Computer Science; Data Science; Ethics; Epidemiology; Health Policy; Medicine; Population Medicine; Public Health Sciences; Systems Design Engineering
- **Public Institutions:** Canadian Institutes of Health Research, Cancer Care Ontario, ICES, Ontario Ministry of Health and Long-Term Care, Public Health Ontario, Statistics Canada, Toronto Central LHIN, Toronto Public Health, Waterloo Wellington LHIN, Vector Institute for Artificial Intelligence

- **Research Hospitals:** Center for Addiction and Mental Health, Ottawa Hospital Research Institute, SickKids Hospital, St. Joseph's Health Centre, St. Michael's Hospital, Sunnybrook Health Sciences Centre, Trillium Health Partners, Women's College Hospital
- **Industry:** Accenture, Associated Medical Services, IBM Canada, Layer 6 AI, OntarioMD, Phelps Group, TD Bank Group

## APPROACH

To set the stage and motivate discussions and deliberations for the day, the symposium was introduced with an opening address and panel presentations from the perspectives of computer scientists, statisticians, and population and public health researchers who provoked ideas on the value, challenges and opportunities in applying AI to population health risk prediction.

A series of interactive panel debates followed with leading experts and decision-makers in population health, computer science and industry:

- the first panel explored **what AI can do for population health** and decision-making;
- the second panel focused on **how AI will benefit population risk prediction** by debating methodological considerations in developing and applying machine learning algorithms for population health; and,
- the third panel shared and discussed perspectives on **building capacity for a population and public health-AI training program**

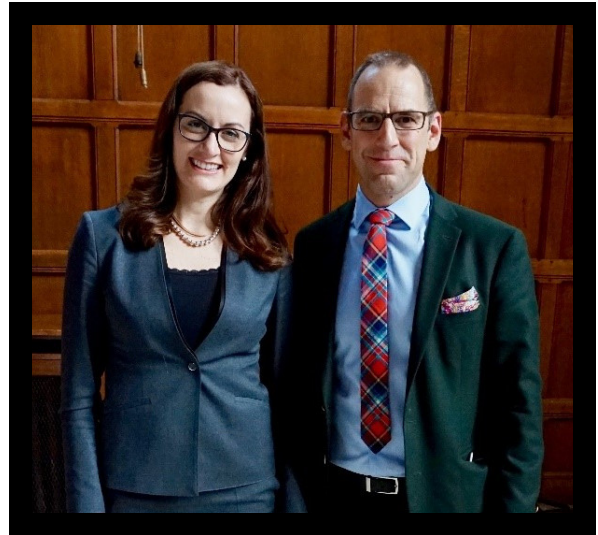
Symposium participants in the audience were invited to contribute their questions and insights throughout panel sessions, as well as electronically by using the twitter handle @PopHealthAnalytic and #PopHealthAI.

The Symposium agenda can be found in Appendix 1.

# SYMPOSIUM PROCEEDINGS

## OPENING REMARKS

- **Laura Rosella**, *Associate Professor and Canada Research Chair in Population Health Analytics, Dalla Lana School of Public Health, University of Toronto; Adjunct Scientist, ICES, Faculty Affiliate, Vector Institute for Artificial Intelligence*
- **Douglas Manuel**, *Senior Scientist, Ottawa Hospital Research Institute and ICES; Professor, Department of Family Medicine, University of Ottawa*



*Symposium co-chairs Laura Rosella and Douglas Manuel*

Symposium attendees were welcomed by co-chairs Laura Rosella and Douglas Manuel who introduced the objectives of the symposium and emphasized the focus of the discussions aimed at exploring the role of AI for population and public health risk assessment and decision-making. Acknowledging the breadth of expertise in the room, the co-chairs underscored the need for collaboration across various disciplines in order to advance methods for population health risk prediction and build new tools that will support health decision-making.

**Adalsteinn Brown**, *Dean of the University of Toronto, Dalla Lana School of Public Health*, provided introductory remarks postulating that public health will benefit by understanding how to apply AI to act on public health issues, to do health promotion, and to address the social determinants of health. The Dalla Lana School of Public Health is focused on driving innovations in public health through fostering innovative research, meaningful collaborations, and unparalleled training opportunities. The three-part collaborative series focused on Artificial Intelligence for the Public's Health demonstrates the breadth of interest in this area at the School, and the high level of engagement with partnering institutions, including the Vector Institute for Artificial Intelligence, ICES, and the Ontario Ministry of Health and Long-Term Care.

## OPENING ADDRESS

**Vivek Goel**, *Vice President, Research and Innovation, University of Toronto; Professor, Institute of Health Policy, Management and Evaluation, University of Toronto*

Dr. Goel provided a poignant reflection on the history of data analytics in public health. He postulated that public health has traditionally taken a slow pace to new technology and emphasized that we are moving into a different era where technology and analytic methods are easier to use and where big data and increased computational power are enabling machine learning. Dr. Goel suggested that in this new era we may need to think differently about how we apply and assess machine learning tools in population health than we do in clinical settings. He remarked that new insights may become available by applying new methods and commented on the transformative potential of AI in public health in areas such as predictive analytics, visual recognition for satellite imagery, supply chain logistics for vaccine programs, intelligent agents for health promotion and outbreak investigations, among others.

## SETTING THE STAGE

**Peter Austin**, *Senior Scientist at ICES and Professor of Health Policy, Management and Evaluation at University of Toronto* presented his research on **predicting cardiovascular mortality using ensemble-based machine learning vs. logistic regression**. In his research, Dr. Austin examined the relative predictive performance of competing models in both derivation and external populations. Dr. Austin shared his experience applying specific machine learning models (i.e., bagged regression trees, random forests, and boosted regression trees) as prediction applications for cardiovascular outcomes. He stressed that a model's temporal transportability and predictive accuracy in external populations are important for enabling informed health decision-making.

**Daniel Lizotte**, *Assistant Professor in the Department of Computer Science and Department of Epidemiology & Biostatistics at the University of Western Ontario*, demonstrated applications of **AI tools to support population health stakeholders**. Dr. Lizotte demonstrated how AI methods can leverage “messy” data from social media platforms for population health applications. He presented his research using embedding methods that reduce social media text to vectors to predict individuals who are at high-risk for opiate overdose. His research illustrates how AI methods can help tell the stories of marginalized populations. Dr. Lizotte postulated that further work is needed to enable public health stakeholders to make use of these methods.

**Thérèse Stukel**, Senior Scientist at ICES and Professor of Health Policy, Management and Evaluation at University of Toronto presented her research **predicting high need, high cost users of the health care system**. In her study demonstrating modelling methods with machine learning methods for predicting the top 5% of health care users. Dr. Stukel emphasized the importance of considering calibration when assessing the performance of predictive models for health outcomes, regardless of the modelling approach being taken.

**Jason Morgenstern**, *Public Health and Preventive Medicine Resident at McMaster University* summarized from his scoping review the current state of the literature on **machine learning applications in population health**. Dr. Morgenstern commented on the increased uptake of publications in the last 5-years, and shared preliminary findings showing that the majority of research in this area has used diverse data types that were primarily structured, applied supervised tasks, and most commonly used neural networks and random forest methods. Dr. Morgenstern highlighted that many did not report external validation or calibration of models, and that discussions on limitations, such as risk of measurement error, were limited. Dr. Morgenstern concluded that many areas in population health remain to be explored with machine learning methods, including the incorporation of social determinants of health.

# PANEL: WHAT CAN AI DO FOR POPULATION HEALTH AND DECISION-MAKING?

- **Audrey Durand**, *Postdoctoral Fellow, Reasoning and Learning Lab (RLLAB), School of Computer Science, McGill University*
- **Rodney Jackson**, *Professor of Epidemiology, Section of Epidemiology & Biostatistics, School of Population Health, University of Auckland, New Zealand*
- **Thérèse Stukel**, *Senior Scientist at ICES and Professor of Health Policy, Management and Evaluation at University of Toronto*
- **Zenita Hirji**, *Senior Manager, Health & Public Service, Accenture*

**Moderator:** Douglas Manuel, *Ottawa Hospital Research Institute*



*From left to right, Thérèse Stukel, Zenita Hirji, Audrey Durand, and Rodney Jackson*

Several themes emerged from the viewpoints of the expert panel who considered the **key issues and opportunities** in applying AI and machine learning in population health risk prediction and decision-making:

### *Use of complex data for risk prediction*

Panelists reflected on the opportunity for AI methods to enhance risk prediction by enabling new uses of data. It was noted that conventional methods have a hard time extracting features from imaging data, voice data, and free-text data. AI methods, such as natural language processing and reinforcement learning, were identified as promising approaches to enable risk prediction using complex ‘messy data’ on the social determinants of health, including environmental data on smog pollutants, satellite images of the built environment, among others. In addition, the potential to use natural language processing of medical records could automate the process of coding and formatting data needed to build large datasets for prediction research.

### *Learning from data*

Panelists highlighted that the common goal is to learn from data, and that the focus should be on matching the proper machine learning method to the data. Well designed studies and specific research questions are fundamental to using big data and AI. The potential for AI to help us learn from the “messy data” in electronic medical records and other health administrative data, was identified as a key opportunity, including the potential to identify new predictors and disease clusters.

### *Develop better risk prediction tools for decision-makers*

Panelists underscored the importance of implementation of risk prediction equations in practice. The potential for AI to support decision-makers by improving the ease of use of risk prediction tools and improving risk communication for more informed decision-making were highlighted as key opportunities. Panelists highlighted the potential to leverage AI to build new and advanced types of tools for decision-making, such as ‘chat-bots’.

### *Collaboration as a way forward*

There was overarching agreement that collaboration between stakeholders from diverse disciplines and sectors will be critical for achieving a common language and building an overarching framework that will guide AI applications in population health risk prediction. Use cases of machine learning applications in population health domains are urgently needed to demonstrate value to decision-makers and build enthusiasm to support uptake.

# PANEL: HOW WILL AI BENEFIT POPULATION RISK PREDICTION?

- **Robert Platt**, *Professor, Department of Epidemiology, Biostatistics, and Occupational Health, McGill University*
- **Anna Goldenberg**, *Faculty Member, Vector Institute for Artificial Intelligence; Scientist, Genetics and Genome Biology Lab, SickKids Research Institute; Assistant Professor, Department of Computer Science, University of Toronto*
- **Ewout Steyerberg**, *Professor, Clinical Biostatistics and Medical Decision Making, Leiden University Medical Center, Netherlands*
- **Peter Austin**, *Senior Scientist at ICES and Professor of Health Policy, Management and Evaluation at University of Toronto*

**Moderator:** Laura Rosella, *University of Toronto*



From left to right, Anna Goldenberg, Ewout Steyerberg, Laura Rosella, Peter Austin, and Robert Platt

Grounded in experiences in using statistical and machine learning approaches in different domains, the expert panel reflected on **methodological considerations** from their respective fields that could contribute to integrating AI into population health risk prediction. Several themes emerged from the discussion:

### ***Fit for purpose***

Panelists agreed that successful applications of machine learning methods to population health research questions will require that the methods fit the data and fit the study design. The importance of choosing the right tool for the task was emphasized. Panelists acknowledged that study design, model assumptions and threats to validity, such as issues around confounding, are a knowledge gap for computer science and epidemiology trainees; enhancing training in this area will be necessary to bridge these disciplines and support applications of machine learning methods to population health data.

### ***Transparency and rigour***

Panelists highlighted that rigorous methods and transparency is key for developing trust in machine learning models. Panelists agreed that a framework for the reporting of machine learning models can facilitate rigorous and transparent work. It was noted that existing reporting standards are to be expanded to include guidance for reporting of machine learning models. Panelists noted that transparency can be enhanced by making the algorithm available to allow reproducibility and reporting model performance metrics, including both discrimination and calibration.

### ***Transportability of models in different settings***

Panelists noted that to support appropriate implementation of machine learning models in practice, decision makers will need to be aware of whether predictions from algorithms are valid in their settings. In population health contexts, the reporting of performance metrics on model calibration is particularly important for informing whether a model is valid in a specific setting or population. Panelists iterated that the underlying goal in this work should be to develop valid machine learning algorithms that will facilitate better decision making for population health problems.

# PANEL: BUILDING CAPACITY FOR A POPULATION AND PUBLIC HEALTH-AI TRAINING PROGRAM

- **Brenda Brouwer**, *Head, Academic Partnerships, Vector Institute for Artificial Intelligence*
- **Nancy Baxter**, *Associate Dean, Academic Affairs, Dalla Lana School of Public Health; Professor, Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health, University of Toronto*
- **Matt Medland**, *Director, Professional Programs & External Relations; Assistant Professor, Teaching Stream Department of Computer Science, University of Toronto*
- **Claudia Sanmartin**, *Chief and Senior Researcher, Health Services Research, Statistics Canada*

**Moderator:** Alison Paprica, *Vice President, Health Strategy and Partnerships, Vector Institute for Artificial Intelligence*



*From left to right, Matt Medland, Nancy Baxter, Claudia Sanmartin, and Brenda Brouwer*

Several themes emerged from the viewpoints of the expert panel who considered the **key issues and opportunities** in building capacity for a population health-based AI and machine learning training program:

### *Creating the right environment*

Panelists reflected on the need to create the proper environment to allow the use of AI and machine learning methods for population health to flourish. This task requires the development of a common language for similar concepts to ensure individuals from disparate backgrounds have a mutual understanding of the terminology. Furthermore, the application of AI in population health should be purposeful in terms of addressing gaps in other disciplines such as health promotion, rather than just perfecting current risk prediction models.

### *Interdisciplinary training*

Panelists reflected on the need for training programs to teach interdisciplinary skills sets required to work in this space. Computer science programs should integrate both statistics and soft skills (e.g., communication) at the program level. Furthermore, public health education should include opportunities for training in AI methods while the humanities (e.g., health promotion) can be taught to understand the implications of these methods. Adding this interdisciplinary approach to these programs will help build a future workforce that can broadly work together in this space.

### *Beyond academia*

Panelists reflected on the need for additional training opportunities that go beyond traditional academic programs. One example of this is through hack-a-thons, an event that hosts a collection of individuals from a variety of backgrounds to work on complex issues defined by federal agencies. Additionally, workshops and internships are other examples of opportunities that can be used to upskill individuals working in AI and health.

### *Bringing people together*

Panelists reflected on the need to bring together individuals from differing backgrounds, such as those from the humanities and computer sciences, to form interdisciplinary teams. These teams should be brought together purposefully to prevent similar disciplines from clustering together and stifling opportunities to learn from one another. This is where other soft skills such as communication, working in teams and critical thinking can be put into practice. The field of Public Health faces some of the biggest challenges, and these challenges require interdisciplinary approaches.

## CONCLUDING REMARKS AND NEXT STEPS

This symposium brought together experts from diverse disciplines to discuss the role of AI and methodological considerations in population health risk assessment, as well as opportunities for capacity building to support applications of AI in this domain. Through discussions, it was clear that although we are still finding our way, there is much enthusiasm and excitement about the potential impact of AI and machine learning to address complex population health problems. Moving forward, we will need to demonstrate impact by best matching the method to the questions and data, continuing to build strong interdisciplinary teams, and revitalizing training in all related disciplines. Together, we are working towards a common goal—to improve how we learn from data so we can inform better decisions for the health of our population. Our next steps will focus on putting these ideas into practice for research and training.

## **APPENDIX: SYMPOSIUM AGENDA**



# What can AI do for Population Health?

## Exploring the Role of Artificial Intelligence in Population Health Risk Assessment Symposium

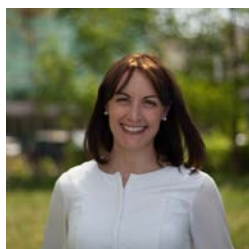
**Wednesday, November 14<sup>th</sup>, 2018**

Hart House, University of Toronto, 7 Hart House Circle, Toronto, Ontario

### Overview:

This symposium is the final of a three-part series of CIHR-funded collaborative interdisciplinary workshops entitled, "Collaboration on Artificial Intelligence (AI) for the Public's Health". This interactive symposium will explore the role of AI methods, including machine learning, in the context of population risk prediction and decision-making. This meeting is hosted by the Population Health Analytics Lab at the Dalla Lana School of Public Health, University of Toronto, and the Ottawa Hospital Research Institute in collaboration with the Vector Institute for Artificial Intelligence.

### Meeting Co-Chairs:



**Dr. Laura Rosella**  
University of Toronto



**Dr. Douglas Manuel**  
University of Ottawa

### Meeting Objectives:

1. Bring together experts in population risk prediction and AI methods to discuss methodological issues and applications
2. Inform the debate on the implications of AI for predictive analytics in population health
3. Identify the core elements of a population/public health-AI training program to build capacity in Canada

# AGENDA

## Wednesday, November 14<sup>th</sup>, 2018

TIME (Room)	DESCRIPTION
<b>7:30am – 8:30am</b>	<b>Registration &amp; Breakfast</b> <i>Great Hall (outside). Breakfast served at 8:00am.</i>
<b>8:30am</b> <i>Great Hall</i>	<b>Brief welcome &amp; opening remarks</b> <ul style="list-style-type: none"> <li>Laura Rosella <i>Associate Professor and Canada Research Chair in Population Health Analytics, Dalla Lana School of Public Health, University of Toronto; Adjunct Scientist, ICES; Faculty Affiliate, Vector Institute</i></li> <li>Douglas Manuel <i>Senior Scientist, Ottawa Hospital Research Institute and ICES; Professor, Department of Family Medicine, University of Ottawa</i></li> </ul> <b>Welcome from the Dean</b> <ul style="list-style-type: none"> <li>Adalsteinn Brown <i>Dean and Professor, Dalla Lana School of Public Health, University of Toronto</i></li> </ul> <b>Opening address</b> <ul style="list-style-type: none"> <li>Vivek Goel <i>Vice President, Research and Innovation, University of Toronto; Professor, Institute of Health Policy, Management and Evaluation, University of Toronto</i></li> </ul>
<b>9:00am</b> <i>Great Hall</i>	<b>Setting the Stage</b> <p>These presentations come from the perspectives of computer scientists, statisticians, and population and public health researchers. By demonstrating examples of how these scholars are working with these methods, including applying different methods to population-level data, comparing different approaches, and summarizing the current state of the literature, they will motivate our discussions and deliberations for the day.</p> <ul style="list-style-type: none"> <li>Peter Austin Ensemble-based machine learning vs. logistic regression for predicting cardiovascular mortality <i>Senior Scientist, ICES; Professor, Institute of Health Policy, Management and Evaluation, University of Toronto</i></li> <li>Daniel Lizotte AI Tools to Support Population Health Stakeholders <i>Assistant Professor, Department of Computer Science and Department of Epidemiology &amp; Biostatistics, University of Western Ontario</i></li> <li>Thérèse Stukel Predicting High Need, High Cost Users: A Comparison of Modern Statistical Methods with Machine Learning Methods <i>Senior Scientist, ICES; Professor, Institute of Health Policy, Management and Evaluation, University of Toronto</i></li> <li>Jason Morgenstern Scoping Out the Machine Learning Applications in Population Health <i>Public Health and Preventive Medicine, McMaster University</i></li> </ul>

<b>10:00am</b>	<b>Break</b>
<b>10:20 am</b> Great Hall	<p><b>Recap from previous “Collaboration on AI for the Public’s Health” workshops</b></p> <p>We will hear the highlights and learnings from the previous two workshops from this series.</p> <ul style="list-style-type: none"> <li>Jennifer Gibson – <i>“Ethics and AI for good health”</i> Director, Joint Centre for Bioethics; Associate Professor, Dalla Lana School of Public Health</li> <li>Natasha Crowcroft – <i>“Planning for Syndemics: Synergies in data science for epidemic infectious disease control in Canada”</i> Chief, Applied Immunization Research and Evaluation, Public Health Ontario; Professor, Laboratory Medicine and Pathobiology, and Dalla Lana School of Public Health, University of Toronto; Adjunct Scientist, ICES</li> </ul>
<b>10:30am</b> Great Hall	<p><b>What can AI do for population health?</b></p> <p><b><i>Drawing the map for where we are going</i></b></p> <p>This interactive session will explore the value and challenges of applying AI and machine learning in population health risk prediction and decision-making. This session will draw from different viewpoints of leading experts and decision-makers to critically assess and debate how AI will advance predictive analytics for population health outcomes. The key issues for debate will include the extent to which AI will support new developments and applications that are not possible with conventional approaches and the benefits and trade-offs in using AI generated algorithms for population health decision-making, among other considerations.</p> <p><b>Panelists:</b></p> <ul style="list-style-type: none"> <li>Audrey Durand Postdoctoral Fellow, Reasoning and Learning Lab (RLLab), School of Computer Science, McGill University</li> <li>Rodney Jackson Professor of Epidemiology, Section of Epidemiology &amp; Biostatistics, School of Population Health, University of Auckland, New Zealand</li> <li>Thérèse Stukel Senior Scientist, ICES; Professor, Institute of Health Policy, Management and Evaluation, University of Toronto</li> <li>Zenita Hirji Senior Manager, Health &amp; Public Service, Accenture</li> </ul> <p><b>Moderator</b></p> <ul style="list-style-type: none"> <li>Douglas Manuel Senior Scientist, Ottawa Hospital Research Institute and ICES; Professor, Department of Family Medicine, University of Ottawa</li> </ul>
<b>11:45 am</b> Great Hall	<b>Lunch &amp; Networking</b>
<b>12:45pm</b> Great Hall	<p><b>How will AI benefit population health risk prediction?</b></p> <p><b><i>Navigating the map - how are we going to get there?</i></b></p> <p>This interactive session will dive deeper into methods and consider how this impacts the field of population health predictive analytics. We will inform the debate by drawing from the perspectives of experts with experiences in using machine learning approaches in different domains. The speakers will reflect on the most important contributions from their respective fields that should be incorporated to move forward in integrating AI into population health risk prediction.</p>

**Panelists:**

- Robert Platt  
*Professor, Department of Epidemiology, Biostatistics, and Occupational Health, McGill University*
- Anna Goldenberg  
*Faculty Member, Vector Institute for Artificial Intelligence; Scientist, Genetics and Genome Biology Lab, SickKids Research Institute; Assistant Professor, Department of Computer Science, University of Toronto*
- Ewout Steyerberg  
*Professor, Clinical Biostatistics and Medical Decision Making, Leiden University Medical Center, Netherlands*
- Peter Austin  
*Senior Scientist, ICES; Professor, Institute of Health Policy, Management and Evaluation, University of Toronto*

**Moderator:**

- Laura Rosella  
*Associate Professor and Canada Research Chair in Population Health Analytics, Dalla Lana School of Public Health, University of Toronto*

**2:00pm****Break****2:15pm***East Common Room***Building capacity for a population and public health-AI training program**

There is a need for a workforce equipped with the foundational knowledge, skills, competencies, access to data and infrastructure necessary to enable use of AI in population health contexts. The speaker will discuss the current state of health data science programs and seek input about the elements that would be relevant for a data science training program that builds capacity for AI competencies in a public health context. Meeting participants will provide feedback about the requirements and opportunities for integrating AI learning experiences into the core training of public health programs.

**Panelists:**

- Brenda Brouwer  
*Head, Academic Partnerships, Vector Institute for Artificial Intelligence*
- Nancy Baxter  
*Associate Dean, Academic Affairs, Dalla Lana School of Public Health; Professor, Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health*
- Matt Medland  
*Director, Professional Programs & External Relations; Assistant Professor, Teaching Stream Department of Computer Science, University of Toronto*
- Claudia Sanmartin  
*Chief and Senior Researcher, Health Services Research, Statistics Canada*

**Moderator:**

- Alison Paprica  
*Vice President, Health Strategy and Partnerships, Vector Institute for Artificial Intelligence*

**3:15pm****Closing Remarks****3:30pm****Adjourn**