# Research and Knowledge Translation Newsletter

northern health
*the northern way of caring*

## A CONVERSATION WITH ANDREW DEONARINE, MEDICAL LEAD INFORMATICS

By: Dr. Andrew Deonarine, Medical Lead Informatics and
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**1. CAN YOU SHARE WITH US SOME HIGHLIGHTS ABOUT YOUR EXPERIENCES AND ACADEMIC BACKGROUND THAT YOU BRING TO THE NORTH?**

I am originally from Winnipeg, I grew up in western Canada and from an early age, I had a big interest in medicine, computers, and basic sciences and how all these fields intersect. I began my academic career at the University of Western Ontario (now Western University), pursuing a Bachelor's and MSc programs in Biochemistry and Computer Sciences, then went to Medical School at the University of Toronto (UoT) and engaged in research in Bioinformatics looking at protein structure and how to identify different molecular candidates as treatments for different conditions. During my time at UoT, I engaged in several research projects such as building my own Electronically Medical System, a Medical Translation Software system —a program that a physician can speak into, and the software translates into several languages to support refugees services, and did a summer research program at the University of Cambridge focusing on Bioinformatics.

After Medicine School, I went to UBC for my residence in Public Health and Preventive Medicine, and that specialty involved leveraging Computer Science and Informatics together with clinical practice while working with public health information systems, and doing relevant epidemiological analysis. During the residency, I got into the clinical investigator program and did a PhD in Bioinformatics at the University of Cambridge based on my previous summer research program.

After my PhD in Cambridge I came back to Canada and finished my residency work at UBC. That time was a taste of medicine throughout British Columbia, not only in lower mainland, but also in various places both urban and rural across the province. Subsequently, I had the opportunity to do a fellowship

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in Clinical Informatics at Harvard Medical School for two and a half years as a Friedman scholar. At Harvard, I got board certified in Clinical Informatics and did relevant work in Machine Learning, Clinical Informatics, and Spatial Epidemiology,  —that is putting data onto maps to visualize it and do spatial modeling. That came very handy while Covid-19 pandemics for use by Massachusetts and the Boston Public Health Commission, which resulted in two publications. Some of this work was spun out into a start-up company where I worked before joining Northern Health.

It is very exciting to bring to the North all those tools that I have developed throughout the years, particularly with respect to using spatial epidemiology and the analysis of satellite imagery to understand how the built environment, —for example, natural parks, space apartments, traffic, and where people reside, affects their risk for Covid-19 and other chronic diseases. Therefore, I am hoping to bring many of these skills to Canada and use them to improve our healthcare system.

## 2. WHAT IS THE ROLE OF A MEDICAL LEAD INFORMATICS? HOW CAN CLINICAL INFORMATICS BE LEVERAGED TO ADDRESS CURRENT HEALTH CHALLENGES?

The Medical Lead for Informatics role is like a (CMIO) Chief Medical Informatics Officer Role, and there are several pillars that Chief Medical Informatics officer addresses in a healthcare organization. First, the improvement of primary care through the implementation of digital solutions —that can include everything from better integration of data to implementing new or updated medical record systems; for example, I am now taking part in a big transformational project called SaferCare that will eventually open the door to using Artificial Intelligence (AI), machine learning, and statistical learning to improve decision support in primary care.

Another big pillar is Public Health. It deals with the ways information systems are used effectively to improve how we administer public health programs, allocate resources,

and address public health challenges like the pandemic. For instance, the use of the most up-to-date machine learning models around forecasting pandemics, or Public Health demands due to climate change or environmental disasters, or weather-related events such as heat waves and the cases of heat stroke that might result from that.

Another important pillar would be around Standards. Canada generally tries to synchronize some of our standards with the United States. On this matter, there is ongoing work in Boston and beyond to continue the development of information and data protection standards, —I have had the opportunity to work with faculty at Harvard who are advancing several regulations which include working advancing EMR interoperability federally through US regulations. I am hoping to bring those new standards and experiences to Canada since it could impact not just Northern Health, but the province and the country. In the future, we won't just be exchanging information within health organizations and between hospitals, but throughout the province; for example, when the patients have to go to lower mainland for a treatment or across Canada. —It would be great if we could eventually have a pan-national medical record. With this technology, the patient doesn't have to worry about if their medical results will be sent back to BC to ensure that there's continuity of care. To



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achieve this, standards are going to be key, and someone in my role would be advocating for those types of standards and interoperability, while also ensuring that patient privacy is also respected.

Another pillar I just wanted to comment on briefly is Research and implementing the most advanced and up-to-date techniques possible. I am really excited about research, having my PhD in Bioinformatics, Masters in Epidemiology, and a Masters in Biochemistry. During my fellowship I completed some research in machine learning and AI while analyzing satellite imagery to improve public health and primary care.

> " A big part of my career has involved research and I'm excited to continue doing this work and contribute to Northern Health. "

One of the things that I have been working on in conjunction with researchers at Stanford University is to investigate how primary care can be improved through the integration of new climate-change related technology into electronic medical record systems.—We are investigating what sort of tools will be needed to help physicians forecast or predict when the next weather-related event might occur, and also help to allocate resources to meet climate-change related demands; for example, in the emergency room, on the internal medicine wards, or in the family medicine clinic.

These are some ideas and examples of the key aspects of my role that I am pursuing and hoping to bring, together with my expertise and experience to Northern Health.

### 3. IN YOUR VIEW, IN WHAT WAYS ARE THE NORTH AND NH UNIQUELY POSITIONED TO DEVELOP A NEW LEVEL OF SERVICES THROUGH TECHNOLOGY-ENABLED APPLICATIONS?

I think there are ample opportunities. When I was doing some of this work down in Boston around analyzing satellite imagery and trying to get environment based risk scores for COVID infection transmission in Massachusetts, we were using small bits of satellite data just around Boston and we were also doing it for New York. —So one thing that is exciting about coming to Northern Health is you have this vast swath of territory that's the size of France, that's a lot of terrain, lots of heterogeneity around the environment, the weather, the people's experiences, and different communities. It's almost like administering public health for an entire country because you have this huge region that you have to deal with; and interestingly, the culture is different across Northern Health as well. Uniquely, there are different languages for different First Nations groups; there are also small rural communities, and then you have some urban places like Prince George, which is a bigger city. There are a lot of interesting challenges and opportunities here in the north. Therefore, addressing those challenges will require a spectrum of different technologies. So, if we're providing care for some patients in remote communities, you will end up using some sort of virtual administration of care. Whether that's telehealth or wearable devices that can monitor patients and then transmit data back to some sort of central location is going to be key to not only maintaining the standard of care, but also improving it going forward. There is a lot of interesting work that is also being done around improving a decision support in rural communities. What that means is we're looking at rolling out a big EMR called

PowerChart across NH and it will allow physicians to basically do a lot of documentation and put all their information about a patient in an electronic database. And this opens up a lot of opportunities because now we can build advanced decision support tools into our Electronic Medical Record system, —and the record system is going to do a lot of checks around patient vitals, their lab work, previous diagnosis and assess that the patients at risk for any conditions that a physician might not normally pick up on.

Another thing we're hoping to do at the primary care level is bring together a lot of different disparate datasets in Canada, and integrate them to help primary care physicians and public health make better decisions about community and primary care. We're planning to incorporate technologies like machine learning algorithms, artificial neural networks, and new environmental data from different sources like Environment Canada to achieve this. Eventually the results of these new analyses will be provided to public health professionals to guide program implementation, and will also

be integrated right into the electronic medical record system to guide primary care. This will allow physicians and other healthcare providers to get another community-focused lens on patient health and help prevent admissions to hospital before they happen. With these new integrated data and tools, we can actually reduce the number of asthma and COPD (congestive obstructive pulmonary disease) exacerbation cases that present to the emergency room.

> " This saves patients' lives and improves their quality of care while reducing costs to the healthcare system. "

I think there is a lot of opportunity to bring together those kinds of data sets to really improve health operations across the organization. There will be important advances such as virtual care, remote care, telehealth decision support using AI, and the bringing together public data sets to inform public health and primary care.

## 4. SHARE WITH US SOME DETAILS AND FINDINGS OF YOUR NEWEST PUBLICATION THAT EXPLORES THE WORK THAT CLINICAL INFORMATICS PROFESSIONALS CAN PLAY TO ADDRESS CLIMATE CHANGE AND OTHER ENVIRONMENTAL CHALLENGES?

Yes, we recently worked on a paper called "Climate Change and Health Informatics Pilot Survey of Perspectives Across the Field" published in the Journal of the American Medical Informatics Association (https://academic.oup.com/jamia) It was a team effort with prominent collaborators from Stanford University, University of California San Francisco (UCSF), including members of the public. What we ended up doing was surveying CMIO's, physicians, and health professionals across USA and other jurisdictions about what are the future needs and challenges that are going to be relevant for informatics professionals over the next few years around climate change. To do this, we asked questions about what sort of tools informatics professionals will need in order to address the needs of, for instance, vulnerable populations or vulnerable communities. What sort of tools do they want to see incorporated into information systems? We also asked about tools related to the challenges of climate change would be helpful; e.g. how can we

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address extreme heat events? Are there going to be significant changes in certain types of pollution? What sorts of natural disasters will result in health challenges locally? One of the things we also focused on was education; for instance, what type of training will physicians need to address the challenges presented by climate change? It was interesting to note that physicians recognized the need for training while highlighting the inadequacy of current educational content.

> " For many participants, this is the first time they were asked to think about the issue of climate change and informatics. "

When we presented them with different tools in the survey, they had no idea some of these tools existed and the survey itself ended up being a bit of an educational tool for a lot of CMIO's. This was a pilot survey, and we are hoping to build on the results and add some more questions in future iterations. Some of the feedback we got pertained to staying engaged with climate change informatics, and how to get alerts and real-time information about climate change issues. For instance, one professional might be in a flood-prone area, and another physician is in an area that's prone to extreme heat events, and real-time alerts

and forecasts can help with management. Some other views expressed included: "I'd really like to get some forecasting tools and risk tools that can help me stratify my patients and take care of them better, or forecast the operational resources that we're going to have over the next seasons".

It was interesting to capture the emerging issues and concerns in the field of climate change informatics, and also to identify opportunities for collaboration in the United States and Canada (particularly in the urban and rural contexts), specifically concerning the needs to build out capacity, awareness, and education.

In the North, we are acutely aware that we are dealing with a whole group of small communities spread across a vast geography. Therefore, how we respond to climate change is going to be different from the bigger urban centres, which will have more resources available. Part of what we're hoping to do with some of our future surveys is to stratify rural versus urban and get an understanding of what the different needs and challenges are in those two different settings, and discover the similarities and differences.



I'm also actively researching methods of creating highly similar pairs of communities using machine learning methods. This could be used to pair rural communities with more urban centers to improve responses to climate change. For example, these communities can do some joint planning, pool their resources around developing response plans or public health programs, and just keep each other aware of different climate change events and evolving concerns.

For future surveys, we are hoping to go beyond the educational piece and assessment of infrastructure professionals needs, and move towards forming the foundation for building networks of collaboration. I am really hoping some of our future work will facilitate the creation of collaborations and provide some direction for where we put our resources to address climate change.

> " I'd really like to get some forecasting tools and risk tools that can help me stratify my patients and take care of them better. "

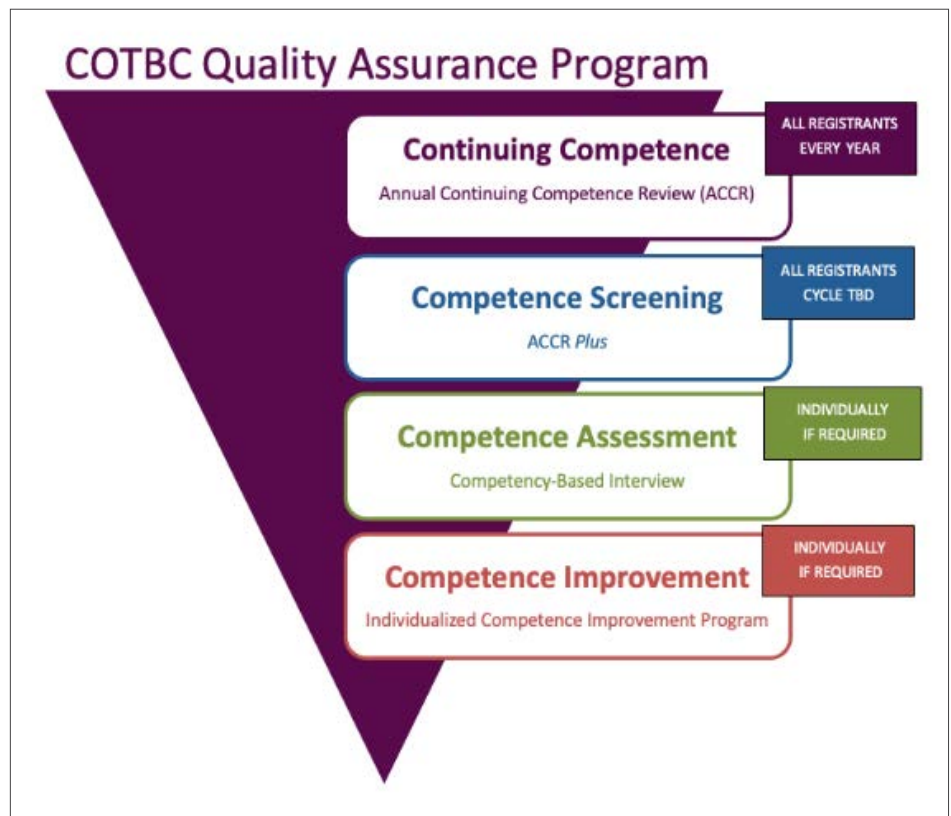# COMPETENCY BASED ASSESSMENT – WHAT'S NEXT? ENTRUSTED PROFESSIONAL ACTIVITIES AND COLLECTIVE COMPETENCIES

By: Susanne Watson, BSc (HK), BHSc (PT), DSc (c)
Regional Practice Lead, Research and KT for Long Term Care (LTC)

Competency is a complex topic with overlapping implications for healthcare education, regulation, entry-level practice readiness, professional and clinical skills performance, advanced practice and specialty training, and healthcare quality and patient safety. Until recently, I never stopped to reflect how readily I accepted competency-based language into my own way of seeing the world of professional practice, a world I have worked in for the past 10 years. As a graduate from McMaster University, I trained within a Health Science Program designed around a 'problem-based' and 'self-directed' learning model, not recognizing it was being challenged by the up and coming trend of 'competency-based' education and training (Bechtel, 1999; ten Cate 2005).

Competency-based education and resulting 'core competency frameworks' have since become the standard across curriculums and practice education models (ten Cate, 2017) within both Canadian and American medical undergraduate and post-graduate programs (Bramley, 2021). The CanMEDS 'competency framework' has become somewhat of a gold standard developed by the

Royal College of Physicians and Surgeons of Canada to identify and describe the abilities physicians require to effectively meet the health care needs of the people they serve (CanMEDS). The framework identifies seven roles that a competent physician would integrate into their skills and abilities to achieve excellent patient care outcomes. These roles include: medical expert; communicator; collaborator; leader; health advocate; scholar; and professional.

Essential competency profiles have also emerged as a mechanism for health professions and regulators to describe the competencies expected from a member of their profession, and to specify entry-to-practice milestones to help delineate the transition from student to practitioner (CAOT 2013, PEAC 2017). These essential competency profiles are typically integrated into many quality assurance programs within provincial regulatory colleges (CPTBC, COTBC).



**COTBC Quality Assurance Program**

**Continuing Competence**
Annual Continuing Competence Review (ACCR)
ALL REGISTRANTS EVERY YEAR

**Competence Screening**
ACCR *Plus*
ALL REGISTRANTS CYCLE TBD

**Competence Assessment**
Competency-Based Interview
INDIVIDUALLY IF REQUIRED

**Competence Improvement**
Individualized Competence Improvement Program
INDIVIDUALLY IF REQUIRED

Within the work and practice environment, organizations have used a variety of competency assessment tools (the Competency Assessment, Planning and Evaluation, or CAPE tool, is widely used in Nursing) in an effort to demonstrate ongoing skill proficiency in many domains of practice (Franklin, 2015). The increasing focus on 'team-based care' and 'inter-professional collaboration' as a means to improve patient safety and quality of care has led to the development of many competency frameworks to help define behavioural expectations within teams (UBC Health).

> **❝ Finally, there is an urgent call for cultural safety through increased competencies in cultural awareness, humility, and sensitivity of all healthcare practitioners in order to bring our health systems to a place of equity (Garneau, 2021; Liu, 2021).❞**
> Cultural Safety | Indigenous Health (indigenoushealthnh.ca)

Despite this prolific use of essential competency frameworks to guide education and practice, two emerging trends based on a growing body of research highlight that competency-based education and competency profiles still have limitations.

The first is the 'theory to practice' gap between competency statements that define what a practitioner needs to be able to do as a privileged member of that profession and the ability to determine when a learner can be entrusted to perform that activity safely in dynamic service delivery environments (ten Cate, 2017). Olle ten Cate coined the term 'Entrustable Professional Activities' or EPAs, and since 2005 has been developing this concept as a way to bridge the gap between knowing the explicit outcomes as defined in competency frameworks and the observable performance of professional activities in daily clinical practice (ten Cate 2005; ten Cate 2020). In essence, ten Cate operationalized competencies to help educators, preceptors, and supervisors make sound decisions of competency based on recognizable outputs of professional labor and practice (ten Cate, 2005). Although adopted by medical education and post-graduate training, EPAs have only recently caught the attention of other health professions such as pharmacy, physiotherapy, nursing, dental, and respiratory therapy (Alismail, 2020; Bramley, 2021; Chesbro, 2018; Lau, 2019).

The second trend is the acknowledgement that highly competent individuals can form incompetent teams, just as highly competent teams can tolerate an incompetent individual member (Lingard, 2016). Current competency validation processes focus on the individual without real consideration for how those skills are performed within the context of a specific environment, culture, or practice setting (Franqueiro, 2017); nor how the interdependent dynamics of team-based care can also influence patient care outcomes (Lingard, 2017). In other words, effective healthcare requires competent individuals working competently together – it is dependent on both individual and collective competencies. Increasingly, the complexity of team-based care and inter-professional collaboration is being explored to better understand the interdependent factors that contribute to team based competency within the increasingly complex dynamic world that is healthcare today (LaDonna, 2018; Lingard, 2017; Ratnapalan, 2020).

> **❝ Perhaps the 'What's Next' in the evolution of competencies is the development of a coherent framework that can encompass the concepts of 'core professional competencies', 'entrusted professional activities EPAs', 'team-based collective competency', all within the context of culturally safe and competent organizations.❞**

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# THE NH EVALUATION TEAM IN VANCOUVER FOR THE CANADIAN EVALUATION SOCIETY, BC CHAPTER CONFERENCE: REFLECTIONS FROM THE FIELD

By NH Evaluation Team
Daman Kandola (she/her/hers), MSc PhD |  Evaluation Specialist
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Christine Vandenberghe (she/her/hers) |  Evaluation Specialist
Stephanie Lowe (she/her/hers), BA |  Evaluation Coordinator

On Friday Oct 28th, the Northern Health Evaluation team had the unique opportunity to attend the Canadian Evaluation Society (CES) BC conference in Vancouver, BC. As part of our attendance, we presented two pieces. One was titled "Moving towards a learning health system through fostering a culture of research and evaluation: The Northern Health experience" and the other "Research, Evaluation, and Strategic Analytics: Collaborating for health system improvement in northern BC". In our first presentation, co-created and presented by the entire Evaluation team, we shared examples of how our Team has been trialing to build an evaluative culture

and foster learning across the organization. With a focus on systems sustainability, we were able to speak to how our small-but-mighty team promotes a culture of evaluation and capacity building within NH. Throughout the presentation we demonstrated how we use our own 3 R's (Relevant, Responsive, and Reflexive), providing examples of newly developed resources and creative avenues of supporting the organization, such as an NH Evaluation Top 5 Resources series and an Evaluation Community of Practice. In the second presentation, Daman and Christine were joined by Strategic Analytics colleague Fara Kashanchi, where the presenting group shared how

cross-team collaborations have shaped and informed ongoing evaluation and monitoring activities for the NH Virtual Clinic providing primary and substance use care.

As a small team that has limited exposure to working alongside other evaluators, the responses and engagement to our presentations, as well as the learning from the sessions we attended, were validating to the work that we do and approaches that we are taking. The reactions to both presentations highlighted shared experiences of other health authority evaluators including similar directions of practice and overlapping challenges.

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> " Engagement following the presentation has turned to momentum to strengthen relationships and shared practice between evaluators among BC's health author Overall, it was a fantastic opportunity to represent Northern Health and share what our team has been working on. We were also able to share some tools and resources with attendees. It was also an opportunity to connect with our evaluation counterparts working in other health authorities, external evaluation consultants, and evaluators from across the country. "

Throughout the conference, much conversation took place regarding 'divorcing the status quo'. How can we develop our resources and support capacity building within the organization to reflect the shift in practice? How much reach and influence do we, as the NH evaluators, have? Where do we go from here? In the opening keynote speech Marissa Hill, a Metis scholar, author, and renowned speaker stated that in "small incremental change, people are coming together to heal". Evaluation is about deep learning and not solely accountability or monitoring: "this is a responsibility to all our relations". As NH's Evaluation Team, we take this responsibility seriously. Our work impacts people, and the words we say and write have a weight of influence.

Consistent with the theme of the conference of 'empowerment', evaluators were encouraged to empower the programs that we evaluate, as well as the recipients of those programs and services. This can start at the beginning of a project by co-designing evaluations with program leadership/staff, and those with lived/living experience. Conference presenters encouraged participants to start small in their efforts and build their way up. The conference also highlighted empowering ways to collect information such as storytelling (oral/written, digital) and arts based (dance, drawing, poetry) methods.

The second theme of the conference, 'access', is another key movement in the evaluation profession as we aim to make our findings more accessible. This encourages utilization of evaluation findings and recommendations. Efforts to encourage evaluation access, includes presenting information in plain language, visualizing information, and using a variety of reporting formats tailored to diverse audiences.

The conference highlighted the increased attention and value being placed on evaluation.
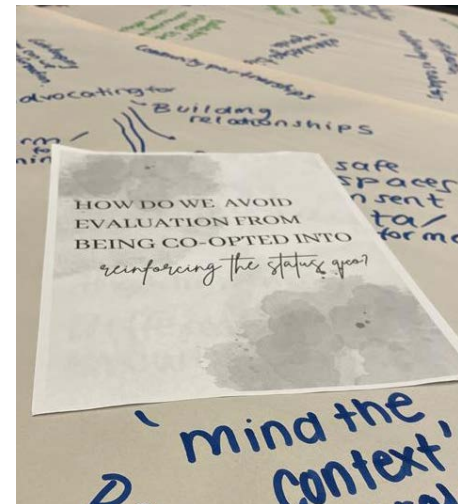
Governments, organizations, programs and teams are increasingly being asked to demonstrate outcomes, show impacts or improvements, and report on progress in more frequent, fulsome, and complex ways. In healthcare, we are also seeing an increased attention paid to the holistic experience of care. This was demonstrated in presentations about incorporating storytelling and narrative experiences into performance dashboards, incorporating co-development and participatory approaches with patients, clients, and communities.

Through recognition of our Evaluators' responsibilities, moving forward in resource development and capacity building within NH is a mindful task. Taking time after the conference to re-examine our approaches and our resource library to ensure they align with the spirit of the conference is a priority for the Evaluation Team. Creating and/or updating resources to supporting the moving away from the status quo will encourage those using these resources to follow suit. This is an example of small, incremental changes which will help support the organization in moving towards a system of inclusivity, equity, and responsiveness.

We encourage those who are interested in expanding their knowledge of evaluation to explore what the Canadian Evaluation Society and its BC Chapter have to offer, or to connect with the Northern Health Evaluation Team at Evaluation@northernhealth.ca.

## REIMAGINING INDIGENOUS EVALUATION

### By Daman Kandola

On Oct 27th I had the opportunity to take part in a pre-conference workshop facilitated by Marissa Hill, a Metis scholar, author, and renowned speaker, on "Reimagining Indigenous Evaluation Systems". Now one may wonder, what does this exactly mean? Well, the workshop took a slightly different approach than one would traditionally imagine, at least different from ones that I have grown accustomed to. This workshop was a hands-on, dialogue-based space where there was ample time for self and group reflection and rich discussion around Indigenous evaluation.

The underlying focus of this workshop was on unlearning colonial ways of knowing and decolonizing one's evaluation practice. We also reflected on the inaccessibility and exclusivity of the field of evaluation. For example, many of those considered pioneers of the field aren't exactly representative of the general population by any stretch of the imagination. In addition to taking a critical look at the field of evaluation and long-standing issues with access and inclusion, there were also moments to reflect on our own individual and collective privilege and place in society. For example, the majority of attendees were university-educated folks, a few from minority backgrounds, coming

from organizations with funding to support their attendance, and with some form of supports in place to attend including child or elder care as well as having the ability to be physically and mentally present to participate.

> " There was purposeful dialogue around the tensions that exist between Western epistemologies and how these contrast to Indigenous ways of knowing. "

And how these two perspectives of what knowledge is, should be, and how it is created and disseminated, at their core, are fundamentally inconsistent. Colonial approaches, those that continue to inform the way health systems operate dictate how and which data is collected and what is considered as metrics for success. Such approaches are rooted in

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physical-based ways of knowing and focused very much on generalizability. Whereas Indigenous ways of knowing exist in both physical and spiritual domains with a focus on subjectivity. Importantly, it was noted that continuing to operate in ways that reinforce Western or colonial ways as being superior to other worldviews continues to perpetuate harms, increase distrust, and further oppress diverse people and populations. In the words of Hill "knowledge can be used to repress, oppress or supress or it can be used to empower and liberate, but the choice is yours, the choice is ours".

The conference theme was *"Access and Empowerment"* so it was no surprise that the workshop theme also unscored the importance of allyship as it relates to the field of evaluation and evaluation practice. The inaccessibility of evaluation as a field means that there aren't many Indigenous evaluators. In order to shift this, there is a need to create safe spaces and opportunities for underrepresented folks to enter the field. Hill stressed

that as we continue work to create welcoming spaces for Indigenous evaluators, we must also do our part in pushing back against the status quo. Often, those coming for marginalized or minority groups and existing in more vulnerable spaces where there may not be others like them end up carrying the largest burden to advocate for change. With this advocacy comes immense emotional labor and a requirement for endless resilience. Therefore, as a collective, whether we sit in Evaluation, Analytics, Research or beyond, it is up to each of us to continue to challenge the status quo. Just because we have always done something in a particular fashion, does not mean we need to continue to do it that way. Whether this means reconsidering our project timelines in order to engage with communities respectfully and on their terms or creating space for different knowledges to be highlighted in how we present data and assess impact, including narrative and oral histories, we can and must do better to create meaningful and transformative health care change.

**ADDITIONAL READINGS:**

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