



A phylogenetic map showing clusters of HIV transmissions. The colour of each dot corresponds to the province the sample originates from, shown on the inset map of Canada.



Research Scientist, Dr. Jeff Joy

Phylogenetics: The future of the fight against HIV/AIDS and other targeted diseases

A revolutionary phylogenetic monitoring program developed at the BC Centre for Excellence in HIV/AIDS (BC-CfE) demonstrates how HIV is spreading across five provinces in Canada. This first-of-its-kind system identifies HIV transmission outbreaks, or “clusters” (groups of recent, related, HIV infections) in near real-time.

“HIV does not stop at jurisdictional boundaries. Yet time and time again, we treat it like it does,” says Dr. Jeff Joy, Research Scientist. “And while we can see the value of applying this system to HIV in Canada – the long-term impact of this type of phylogenetic monitoring could be significant with the rise of HIV drug resistance testing in other countries and in monitoring the spread of other infectious diseases.”

The HIV phylogenetic map spanning British Columbia, Alberta, Saskatchewan Ontario and Quebec and developed with the support of the Public Health Agency of Canada, tells the story of Canada’s continuing battle with HIV. While most of the provinces contain large, localized HIV clusters, a full 55 clusters span across three or more provinces - including one cluster involving the five provinces.

Researchers say the way HIV travels makes it clear the variation across the country in HIV treatment

needs to be replaced by a consistent, coordinated national effort.

“The federal government’s embrace of the UN 90-90-90 Target, harm reduction, as well as progressive and inclusive attitudes towards the LGBTQ2 community will help move to eliminate HIV in Canada,” says Joy. “We also need to ensure there is equitable access to treatment in hard to reach communities and equal access to antiretroviral treatment. Phylogenetics allows us to make a strong case for this.”

The potential application of this technology does not stop at HIV transmission.

The phylogenetic technology being used by the BC-CfE has evolved from science to implementation to public health benefit, not just for British Columbia, but nationally. The program is designed to respond to a variety of challenges in the context of different epidemics for any virus or pathogen that evolves rapidly. Researchers plan to apply phylogenetics to examine the spread and containment of Hepatitis C nationally.

“Canada has historically been a leader in the fight against HIV/AIDS. The BC-CfE pioneered HAART (highly active anti-retroviral therapy) as the most effective treatment and **Treatment as Prevention (TasP®)** which is now the standard strategy to

tackle HIV around the world,” says Dr. Julio Montaner, BC-CfE Director. “This is the progression of that innovation – getting one step ahead of HIV. In addition, we can use lessons from one of the deadliest infectious diseases in the world to promote a **Targeted Disease Elimination (TDE™)** approach to tackle other high-burden diseases.”

“There is no need to stop inside our borders,” says Joy. “There has been a positive reaction to this technology and the question we are asked most often is ‘how do we do this in other jurisdictions? In China or Australia?’”

The system in Canada is unique to Canada, largely because the data systems in countries like the US are not as centralized, allowing them to look at Canadian results as a representation of what maybe happening in the US. The Canadian system will include every HIV sequence from nearly all the provinces and territories of Canada.

“This is exciting. We have built a system that allows us to develop a unified, national response to HIV, examine how to coordinate a response to other infectious disease and use our resources more effectively,” says Joy. “Going forward we can look at global epidemics, their evolution, migration and the impact of drug resistance. Phylogenetics offers endless possibilities to improve public health around the world and positively impact health care sustainability.”

» “Phylogenetics testing is another tool developed by some of the most innovative researchers at BC-CfE to proactively survey the public health landscape. Using these types of technologies, BC continues to lead the way toward **Targeted Disease Elimination™**, based on the **Treatment as Prevention®** strategy responsible for ending the HIV/AIDS epidemic in this province.”

— Julio Montaner BC-CfE Director



BC-CfE innovation, research and clinical experience at core of Preceptorship program



» For those seeking to provide the best care for their patients living with HIV/AIDS - their families and communities - the BC-CfE's Preceptorship Program offers an opportunity to offer the best possible care to patients with HIV/AIDS.

"This is an opportunity to gain from the Centre's internationally recognized clinical and research work with the latest research, evidence-based practices and expert guidance," says Dr. Silvia Guillemi, Director of Clinical Education. "Vancouver was ground zero for the HIV/AIDS crisis in Canada and the BC-CfE seized the opportunity to lead the way by pioneering programs and approaches that are being used around the world."

Trainees learn practical skills in a hands-on, clinical environment including how to assess patients, initiate antiretroviral therapy as appropriate, monitor and identify patients with treatment failures and toxicities, assess HIV-related co-morbidities and provide a comprehensive care plan to HIV positive patients.

"The opportunity to shadow, listen and learn from other primary care providers is valuable and the medical expertise on top of that is a bonus," says Dr. Neasa Coll. "It's a wonderful, thorough program that provides a

range of clinical and academic opportunities to build knowledge in HIV care."

Trainees acquire competence and confidence to provide the primary care management of HIV positive patients, informed by the principles of **Treatment as Prevention®** and **Targeted Disease Elimination™**.

"**Treatment as Prevention®** was pioneered by Dr. Julio Montaner, making this a made-in-Canada invention, and a global standard in the treatment of HIV/AIDS," says Guillemi. "And a progression of that is **Targeted Disease Elimination™** an innovative, made in BC concept that could set the standard in how we treat a number of infectious and non-infectious diseases based on our experiences with HIV."

After the clinical preceptorship component, trainees also debrief the experience together and receive and offer summative feedback to each other and the preceptor team.

"This feedback is crucial to making sure we have some of the best care, delivered by some of the caring, compassionate and talented practitioners in the country," says Guillemi. "And that is why the Centre is here and that is our focus with clinical education and outreach."

STUDY

TasP® inspired program successfully links "hard to reach" people living with HIV to treatment and care

» A program launched jointly between BC's local health authorities and the BC-CfE is having a positive impact on people living with HIV who may have otherwise "fallen through the cracks".

Two years after the launch of the RETAIN (The Re-engagement and Engagement in Treatment for Antiretroviral Naive and Interrupted populations) Initiative, the preliminary results show within six months of a referral for public health support, 52% were linked to care and 42% per cent were effectively on antiretroviral therapy (ART).

"With HIV, Vancouver was one of the worst hit cities in North America. Even though we find ourselves hitting all the global targets to tackle HIV, there are still HIV positive individuals not engaged in care. We don't want a single person to feel left behind," says Dr. Rolando Barrios, BC-CfE Assistant Director. "RETAIN is based on the **Treatment as Prevention®** strategy - making sure every single person who needs HIV treatment and care can have access to it. Only, then, can we say we are successful."



Dr. Rolando Barrios

This partnership between the BC-CfE and Medical Health Officers (MHOs) ensures coordinated public health support and follow up for all people living with HIV who may need additional support to initiate or remain on uninterrupted ART. An alert is sent to public health officials when antiretroviral treatment has been

interrupted or initiation greatly delayed. MHOs and public health front-line staff in every health authority identify, locate and engage people into care.

"There has always been a sustained and valiant effort by the healthcare community to have HIV diagnosed individuals engaged into care, especially those who may be dealing with barriers to health like homelessness or addiction," says Barrios. "Creating this formalized, innovative system for seeking and treating people, allowed us to provide them with routine, consistent coordination of this support."

RETAIN can be further applied as a model for provision of health care for vulnerable populations to improve public health and lessen the impact on the healthcare system. The BOOST (Best-practice in Oral Opioid agonist Therapy) Collaborative - a Quality Improvement initiative developed by the BC-CfE in partnership with Vancouver Coastal Health (VCH) was inspired by RETAIN. The program seeks to improve outcomes for people living with opioid use disorder (OUD) by identifying those who need treatment and facilitating access to opioid agonist therapy.

"We know health outcomes are often the worst among our hardest to reach populations," says Barrios. "When you improve access to health care and services for our most vulnerable populations who have the most difficulty accessing care and treatment, that's when you have a truly equitable - successful and often cost-effective - health care system."

The final results evaluating the effectiveness of RETAIN will be available in July.

BC-CfE's BOOST Collaborative recognized at BC Quality Forum



Nearly 1000 people took part in the BCPSQC Quality Forum in Vancouver including researchers, patient advocates, caregivers, and clinicians focused on strengthening and improving quality of care in British Columbia.

The BC-CfE's Laura Beamish and Dr. Cole Stanley were recognized for their work in improving quality across the continuum of substance use care with the BOOST (Best-practice in Oral Opioid agonist Therapy) Collaborative. The Quality Improvement initiative, developed and implemented by the BC-CfE in partnership with Vancouver Coastal Health (VCH) seeks to improve quality of care for people living with opioid use disorder (OUD) in Vancouver.

"One of the essential elements for successful quality improvement collaboratives is identifying your population of focus, or the folks you're trying to improve care for," says Beamish. "In our case, these were clients with opioid use disorder accessing services in Vancouver at VCH clinics. Completing this work involved an incredible effort by our frontline clinicians to standardize their clinical data entry. We went from ~600 clients with an accurate diagnosis code to well over 3000 in just five months."

The BOOST Collaborative will unveil some outcome measures this spring on metrics such as optimal dosing and retention with the goal of ultimately engaging more people living with OUD into treatment and care.

LECTURES & EVENTS

Walter S. Owen Lecture

Constitutionalism in a Time of Affliction: South Africa's Democracy and AIDS

Speaker: Judge Edwin Cameron

Wednesday, March 28, 2018, 5-6:15PM

UBC - Allard Hall (Franklin Lew Forum, Room 101)
1822 East Mall, Vancouver, BC

Forefront Lecture

The BOOST Collaborative: Teams at the frontlines of the opioid crisis are driving system change to improve care

Speakers: Drs. Rolando Barrios and Cole Stanley

Wednesday, March 21, 2018, 12-1PM

Large Lecture Theatre, Providence Level 1, St. Paul's Hospital

For more information, contact us at Education@cfenet.ubc.ca or visit our website at www.education.cfenet.ubc.ca

BC Centre for Excellence in HIV/AIDS

- > Improve the health of British Columbians with HIV through comprehensive research and treatment programs;
- > Develop cost-effective research and therapeutic protocols;
- > Provide educational support programs to health-care professionals;
- > Monitor the impact of HIV/AIDS on B.C. and conduct analyses of the effectiveness of HIV-related programs.

Physician Drug Hotline
1.800.665.7677

St. Paul's Hospital Pharmacy Hotline
1.888.511.6222

Website
www.cfenet.ubc.ca

E-mail
info@cfenet.ubc.ca

Funding for the BC Centre for Excellence in HIV/AIDS is provided by the BC Ministry of Health..