GENOME BRITISH COLUMBIA'S

GENOMICS EDUCATION FOR HEALTH PROFESSIONALS

IMPLEMENTATION FRAMEWORK

Genome BritishColumbia

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MAY 2021

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Genomics Education for Health Professionals

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Executive Summary

Genome BC recognizes the ***lack of dedicated resources*** to educate health professionals as one of the major barriers to clinical implementation of Genomics. Therefore, Genome BC is committed to ***catalyze the development of health professional genomics education*** in BC. This will be done by working collaboratively with key stakeholders to develop new genomics educational opportunities for BC health professionals in support of their growing awareness, understanding and needs for delivering personal health care services to British Columbians.

Phase I of this initiative was conducted between May 2018 and August 2019, addressing an important question of "***what is the current landscape of genomics education for BC health professionals?***". An Education Asset Map of current BC and Canada based clinical genomics education resources for health professionals was published and marked the completion of this phase. The Asset Map revealed that BC health professional clinical genomics education and training landscape is very ***fragmented***.

Phase II focused on a deeper understanding of the BC health care environment, stakeholder engagement, situation and opportunity analysis, including a targeted literature search and review of existing needs assessments and genomics education resources. The findings in Phase II resulted in a framework with recommendations on key principles, tactics, and exemplar projects. Together, in the medium term, it will generate genomics training tools/portals/programs for ***interdisciplinary health professionals*** in practice and in training; in the long term, it will build capacity to have ***health education leaders/champions in genomics*** across different professions in BC who will build, deliver and evaluate innovative and interprofessional education programs.

Besides the recommendations presented in this report, provincial genetics and genomics guidelines and the need for genomics competencies were examined and recognized as ***essential building blocks*** in this framework. At the same time, we respect the fact that the responsibility for their development is largely outside of Genome BC's purview.

Genome BC is aware that this is a dynamic field with new materials, innovations, and opportunities presenting constantly, from the partners we have already engaged, and from the ones we have yet to reach out to. To harness the benefit of a synergized effort, it is critical to commit to ***consistent leadership*** on genomics education for health professionals and maintain timely communications between us and our partners.

Last but not the least, we acknowledge the participation, enthusiasm and valuable input we received along the way. We envision ongoing collaboration with our partners who share our vision to successfully support ***the responsible implementation of genomics in health care***.

Section I: Introduction and Background

The era of genomic medicine is emerging from research into clinical care, with advancing clinical utility seen across multiple areas of medicine.[1] The ultimate promise is that genomic, or precision medicine, will improve patient outcomes for a lesser cost, though proving this is complex and remains uncertain.[2, 3] The successful integration of genomics into health care requires health professionals know how and when to provide genetic testing options to their patients, as well as the ability to understand both the utility and limitations of the testing options available. Finally, they need to be able to support the overall management of each patient as the interpretation of genomic results evolve over time. Health professionals need to be actively engaged in the testing process at all stages of delivery, yet there is consistent evidence that health professionals lack basic knowledge and confidence in genomics.

Recognizing the positive impact genomics has on our daily lives, Genome BC has a long-term vision for responsible use of genomics across multiple sectors, including health, forestry, agriculture, mining/energy and environment. The Strategic Plan for 2020-2023 includes utilizing Genome BC's reputation as an "ecosystem builder" to address the provincial issue of low genomic literacy across our health professionals. Genome BC recognizes the lack of dedicated resources to educate health professionals as one of the major barriers to clinical implementation of genomics. In May 2018, a roundtable with key health professional education stakeholders in BC was convened and an important question was raised over the discussion: what is the current landscape of genomics education for BC health professionals? To answer this question, Genome BC published an Education Asset Map in August 2019 of current BC and Canadian based clinical genomics education resources for health professionals.[4] A qualitative approach was used to develop the asset map, involving key informant interviews and an iterative search of web based and privately sourced educational resources. The Asset Map revealed that the clinical genomics educational training landscape for health professionals in BC is very fragmented.

Genome BC then hired a health professional Education Advisor on contract in May 2020 to develop an effective educational strategy to best support appropriate increase in clinical genomic services across the province. This is an expansion into a new area of genomics education for Genome BC and required an understanding of the current landscape and perspectives of stakeholders to build a collaborative approach to maximize the impact on genomic health care delivery. It is important to recognize that we are operating in a complex and dynamic landscape, where we need to understand the key players, grasp what they are up to and identify the win-win opportunities.

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[1] Manolio, Teri A., Robb Rowley, Marc S. Williams, Dan Roden, Geoffrey S. Ginsburg, Carol Bult, Rex L. Chisholm et al. "Opportunities, resources, and techniques for implementing genomics in clinical care." The Lancet 394, no. 10197 (2019): 511-520.

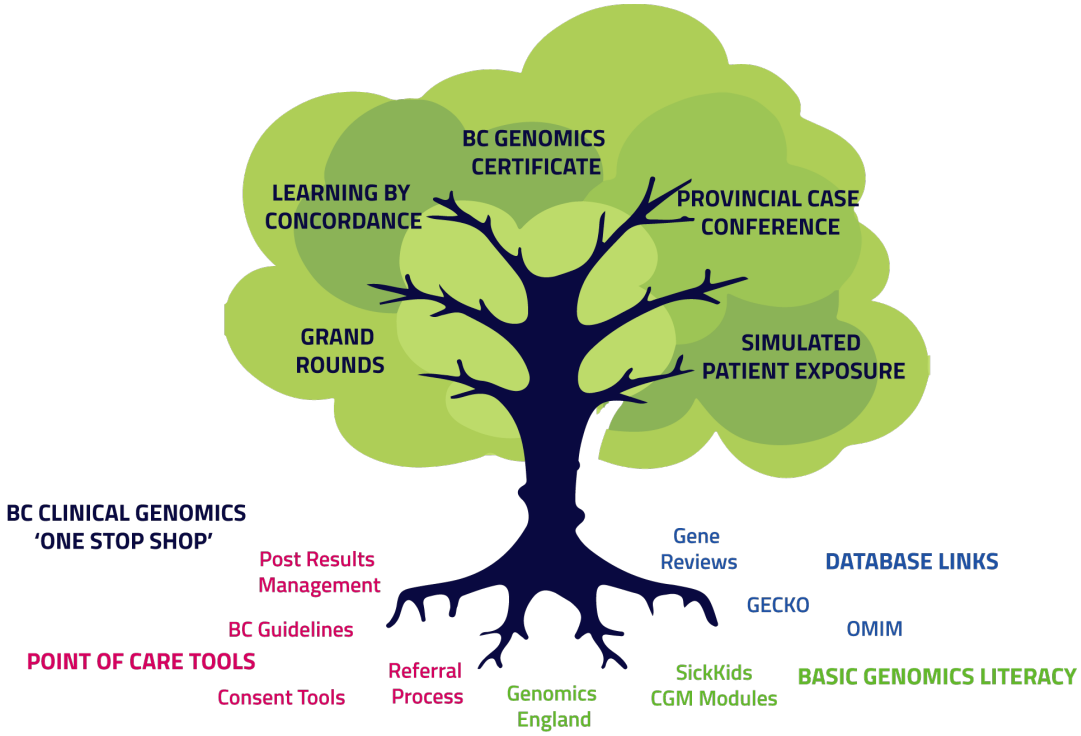
[2] Gavan, Sean P., Alexander J. Thompson, and Katherine Payne. "The economic case for precision medicine." Expert review of precision medicine and drug development 3, no. 1 (2018): 1-9.

[3] Li, Chunmei, Stacey Vandersluis, Corinne Holubowich, Wendy J. Ungar, Elaine S. Goh, Kym M. Boycott, Nancy Sikich, Irfan Dhalla, and Vivian Ng. "Cost-effectiveness of genome-wide sequencing for unexplained developmental disabilities and multiple congenital anomalies." *Genetics in Medicine* 23, no. 3 (2021): 451-460.

[4] https://genomebc.ca/wp-content/uploads/2019/08/Genome-BC-Education-Asset-Map-Project_Report-_AUG-2019_FINAL.pdf

Our goal is an educational framework that builds capacity for increased genomic health care delivery in BC. Of primary importance is the recognition that education must be clinically relevant to the learner.

We propose the following framework to effectively increase the responsible use of genomics in BC health care.



The analogy of a tree is used to highlight both the individual parts of the educational framework, including the roots, branches and canopy as well as to demonstrate how the pieces are integrated into an overall approach. The intention is that the learner may go back and forth between the branches and the roots, even after completion of the canopy, or final certificate, as part of ensuring ongoing and continuous competency in genomics.

The tree representation of the framework also attempts to depict the inter-relationships between key building blocks and effective educational approaches that can support clinically relevant genomic education. Some of the essential building blocks, such as BC Guidelines, are beyond the scope of Genome BC. We therefore recommend key tactics in Section III that utilize education as a tool to drive the development of such essential building blocks while simultaneously building genomic competencies. We believe the tactics support system level change in clinical genomics implementation through education.

Tree Roots:

The roots of the tree represent the key foundational tools required by health professionals in genomics education. Many excellent foundational tools are freely available and can be categorized into three main components:

- Database Links: health professionals need to know what sources are credible and up-to-date and must be readily accessible and easy to navigate. Key databases include Online Mendelian Inheritance in Man (OMIM), Gene Reviews, and Genetics Education Canada - Knowledge Organization (GEC-KO).

- Basic Genomics Literacy: health professionals need basic knowledge in genetics and genomics to understand the literature and engage in conversations with patients, other health care providers, policy makers and administrators. Topics include understanding of genomic technologies as well as policy and ethical implications related to genomic testing. There are many high-quality courses and modules available on the internet to raise genomic literacy such as those provided by Genomics England, Genetics and Genomics Competency Center (G2C2), or the newly Continuing Medical Education (CME) accredited Precision Medicine Primer developed by the University of Calgary Department of Medical Genetics to cite a few examples. Ensuring CME and Continuing Professional Development (CPD) credit for courses taken across different health professions is essential to health professionals' engagement.
- Point of Care Tools: health professionals in BC do not want to be experts in genetics but need to be engaged in the process for them to understand the relevance to their daily practice. Tools to enable consistent practice include guidelines for who can order testing in what specific clinical scenarios, simplified and centralized referral and test ordering processes, as well as tools to assist in time consuming tasks such as patient consenting, and managing patient needs post results disclosure.

Tree Branches:

The branches of the tree represent mechanisms to develop and sustain genomic competencies that are grounded in adult learning theory: competency based, immersive, experiential, and have capacity to extend the learning over time. In addition, providing multiple activities offers ongoing opportunities for support and interaction with BC Genomic specialists while ensuring a personalized approach to learning.

While participating in activities in the branches, health professionals are likely to recognize knowledge gaps, which should prompt a return to the foundational tools located in the roots. A curated list of tools in the roots will support consistent and effective learning, save health professionals time in finding the best tools, and can be structured to provide and/or support accrual of CME/CPD credit.

Tree Canopy

A BC Genomics Certificate for practicing health professionals would be based on successful completion of branch activities and demonstration of key competencies. Ideally, the certificate would need to afford new privileges to the graduate, such as the option of ordering whole genome sequencing (WGS), or whole exome sequencing (WES), for specific categories of patients. The Certificate could also afford recognition of a specialty area of practice within the health professionals' profession.

Section II: Methodologies and Key Findings

Methodologies

Overall direction for developing the educational framework was grounded in Genome BC's Strategic Plan for 2020-2023. The Asset Map, lessons learned in its development and key stakeholder opinions significantly informed our approach. Developing, delivering and evaluating the specific interventions within the framework will require commitment of key organizations, appropriate funding and dedicated leaders.

The development of this report follows a program logic model published in 2019.[5] This logic model was co-designed by a group of 24 international experts and the general applicability of the model was tested in diverse settings in the United Kingdom and Australia. We used this model to align our approach with one of the best practices in genomic education and evaluation. The current focus is on the planning of situation and opportunity analysis, including consideration of stakeholders, review of existing needs assessments, review of existing resources that can be re-purposed, and tailoring strategies and recommendations based on Genome BC's mandate.

Stakeholder Engagement

Review of questions and commentary about the Asset Map was used to develop a list of questions to inform consultations with key individuals who deliver genetic and genomics services in BC. We also explored similar themes with those involved in health professional education including leads within the University of British Columbia (UBC) Department of Medical Genetics, the BC Clinical Genomics Network, UBC Faculty of Medicine (FOM), CPD/CME and UBC's Centre for Health Education and Scholarship. The intent was to better understand their experience, the existing options for delivery and mechanisms by which to support educational program delivery for health professionals in BC.

Consultations were also held with individuals with demonstrated and respected experience in delivering effective genomics education including individuals from Ontario and England to explore challenges, current directions for growth and outcomes data used to measure success. Finally, interactions with existing Genome BC projects that include educational components informed common themes and challenges. A total of 23 consultations were held with individuals across 14 organizations/groups, ***Appendix*** includes a list with key messages from each consultation.

Key Findings

BC's Strengths to Support Effective Health Professional Education

British Columbia is recognized for its excellence in genetics and genomics research and has world renowned educational institutions that are developing the next generation of health professionals. Provincial laboratory

[5] Nisselle, Amy, Melissa Martyn, Helen Jordan, Nadia Kaunein, Alison McEwen, Chirag Patel, Bronwyn Terrill, Michelle Bishop, Sylvia Metcalfe, and Clara Gaff. "Ensuring best practice in genomic education and evaluation: a program logic approach." *Frontiers in genetics* 10 (2019): 1057.

services provide accredited and highly respected genetic and genomic testing services for germline and tumour interrogation. The clinical genetics community in BC is relatively small, well connected, and consistently dedicates numerous hours annually in the genetics education of undergraduate medical students, pharmacists, dentists, genetic counsellors as well as medical residents and fellows. British Columbia appears to be an ideal environment for effective genomic health professional education. We acknowledge it will require dedicated, systemic and long-term investment and commitment for health professional genomics education, and we are poised to do so.

Success Factors for Genomics Education Programs for Practicing Health Professionals

Extensive review of existing educational materials delivered online, and program outcomes illustrate that success is tightly linked to practical clinical application. The most effective educational initiatives are often tied to implementation efforts. Engaging practicing health professionals in education is best accomplished when the content is seen as relevant to daily practice, delivered in an accessible format and offers CME/CPD credit. Examples of successful international genomics educational programs include Geisinger MyCode, 100,000 Genomes Project from Genomics England, and the Global Genomics Medicine Collaborative (G2MC).

In BC, for most genomic tests, genetic specialists are the only providers that can access funded genetic testing for their patients. Since most health professionals do not directly order genetic tests, they are not exposed to the utility of genetics or genomics to their direct patient care. Most health professionals do not have time or interest to become experts in new areas of practice such as genomics, but they need and want expert guidelines, point of care delivery tools and ongoing support and collaboration with experts to provide best practice care to their patients.

In addition, three themes regarding successful educational approaches emerged. Best options include immersive and experiential learning; interdisciplinary and interprofessional education; and electronic and web-based approaches. Electronic and web-based delivery is specifically highlighted as essential to success as they are easy to disseminate, relatively inexpensive, easy to scale and amenable to ongoing modification over time.

Significant Gap: Lack of Systems Level Guidelines

While most clinical genetic specialists in BC are connected as faculty members in the UBC Department of Medical Genetics, there is no cohesive structure delineating genetic service provision in BC. BC also lacks a provincial genetics and genomics decision making body that defines provincial access to clinical genetics consultations and testing, and there is no central location to house genetic or genomic provincial guidelines or BC focused resources that are broadly and easily accessible to our health professionals. As a result, guidelines for who is eligible for what type of testing is largely dictated by individual genetics clinics. This applies to testing performed at local laboratories as well as testing through out of province laboratories, and it leaves health professionals confused as to who makes decisions about access to genomic testing or how decisions are made.

For example, at the Hereditary Cancer Program, other than for a handful of approved indications and specific oncologists, provincially funded hereditary cancer genetic testing can only be accessed by referring the patient for genetic counselling within the program. One of the outcomes of this process is a waitlist of more than two

years for non-urgent indications. At the same time, there are health professionals in BC who order genetic testing for their patients, although the reasons behind this practice are not well understood. For cancer related testing, the Hereditary Cancer Program decides. For non-cancer related indications, genomic testing at both provincial laboratories and out of province testing needs approval from the Provincial Laboratory Medicine Services (PLMS, previously known as BC Agency for Pathology and Laboratory Medicine or BCAPLM), and/or the Ministry of Health. Most requests will be denied funding. If not approved, the only alternative is for health professionals and/or the patient to arrange to pay for testing out of pocket, relying on commercial laboratories to provide the genetic counselling for patient and physician. These parallel processes result in a two-tiered system of access, decrease the opportunity to collect provincial outcomes data, and increase the chance for inappropriate test request, result interpretation and/or patient management.

Hence at best the current system is a patchwork, convoluted, and confusing for non-genetic providers.

To fix this gap, ideally as an essential step, a process should be established to develop and disseminate BC Genomic Guidelines, enabling consistent and broader access to genomic health care options. Development of BC Guidelines will require meaningful consultation and collaboration across the specialty genetic service providers. Key competencies for health professionals in identifying eligible patients and consenting for testing should be developed. At the same time, genetic specialist support for results delivery and patient management recommendations should be optimized. Access and awareness to associated point of care decision making tools, educational modules, programming, and certificates that support competency development could be linked to guidelines, with CME/CPD credit for health professionals use and involvement. Together, the system will become more efficient and effective without compromising the level of patient care or a reduction in capturing outcome data.

Underfunded Genomics Education

Genomics education is underfunded at all levels in British Columbia. This is true for education of specialty service providers, such as genetic counsellors as well as the broader population of health professionals. An example of specialty providers is the UBC MSc Genetic Counselling Program, which receives no funding support from the province or the university and operates on a tuition cost recovery model. This off-set of cost to the learner translates to a tuition that is more than double that of all other Canadian programs. This contrasts with programs such as physiotherapy or undergraduate medical education that receive considerable financial support on a per student basis from the province and/or the University of British Columbia. As a result, the total cost of tuition for these programs is aligned with the cost for students being trained in other provinces.

Another key example of an underfunded educational intervention for practicing health professionals is the BC Clinical Genomics Network created in 2011. Their original goal was to engage health professionals to actively take part in genomic research. However, they quickly realized health professionals needed genomics education first and utilized their research funds to deliver education. They developed a high quality, effective program to both engage and deliver genomics education, yet ultimately ceased operation due to lack of funding. Substantial gains in genomics education for health professionals may have been realized had there been long term, dedicated funding to support this initiative.

Combining the above with what we know about the BC context, in Section III, we present key principles and recommend specific tactics for the development and delivery of educational programs. Immediate exemplars are described at a high level for information only.

Section III: Recommendations

We present key principles and recommend specific tactics that support the long term goal of increasing the responsible uptake of genomics in BC health care through effective education of health professionals. Immediate exemplars are presented at a high level for consideration and organization commitment. These exemplars are aligned with the needs and system of genomic health care delivery in BC and afford opportunity to make progress towards a larger vision of the educational framework. The following recommended principles, tactics and exemplars are also consistent with the tree structure illustrated in Section I and will likely be an iterative process.

Principles:

Build long term capacity through deliberate and sustained investment in genomics education for health professionals in BC utilizing the following overarching principles:

- Encourage the development of BC Genetics and Genomics Guidelines
- Identify and build on existing educational opportunities
- Engage with relevant partners in education and health care with top-down approach
- Co-design projects that address key deficiencies and will have the most influence
- Deliver and evaluate the educational programs and training tools with intention to improve and expand
- Explore new funding mechanisms to ensure sustained long-term investment

Education in health care is not likely to lead to meaningful change unless there is infrastructure and workflow to support change. Achieving the desired long term outcomes is expected to evolve over time and is best accomplished with support and direction from both the Ministry of Health and Ministry of Advanced Education and Skills Training. While guidelines and competencies are essential building blocks to support the educational framework, we chose not to present a tactic directly addressing it, because it is beyond the purview of Genome BC to create health care system guidelines. However, Genome BC can play an important role in working towards this vision through ongoing discussions with key partners and stakeholders, and by purposely building supportive steps into the health education programs. For example, provincial guidelines are required to enhance patient safety and patient equity, therefore it's worthy of considering investment. In addition, the process of outcome evaluation should take patient safety monitoring into account. A clear relationship is needed between the guidelines and the approval process for molecular testing to ensure consistent and equitable access to genetic and genomic testing. This should be facilitated by a broad range of health care providers with ongoing provisional support and guidance of genetic specialty providers. Therefore, it is critical to keep the issue of guidelines in mind when each tactic is being deployed. Each project or opportunity should be developed with the intention to build structure and momentum towards achieving the long term deliverables.

Tactics:

We propose three tactics for Genome BC to engage with key partners in education and health care. Each tactic has elements to support the development of system level guidelines. Tactic One (Working with Existing Projects) builds a foundation for system level guidelines through the development of relationships, processes and products. Tactic Two (Long Term Capacity Building) provides key human resources and further builds partnerships to work toward achieving the ultimate vision. Tactic Three emphasizes the importance of innovative technologies in facilitating effective genomics education and improving learner experience. We adopted the following LOGIC model to demonstrate how these tactics with proper inputs will result in desired outputs that will lead to our ultimate outcome:

Tactics in LOGIC Model

<table>
<tr><th>INPUTS</th><th>TACTICS/ACTIVITIES</th><th>OUTPUTS</th><th>SHORT-TERM OUTCOMES</th><th>INTERMEDIATE-TERM OUTCOMES</th><th>LONG-TERM OUTCOMES</th></tr>
<tr><td rowspan="3">Genome BC Staff, Advisors, Partners, Fellows

Funds, Strategic and Operating Plans, Monitoring and evaluation mechanisms

Strategic Communications</td><td>Leveraging existing investment and opportunities led by others</td><td>Co-designed projects with secured funding and appropriate partners</td><td>Proof of partnership and concept</td><td rowspan="2">Genomics competency training tools that are relevant to a broad range of health professions and adaptable for use in both continuing professional development (CPD) and health care professional (HCP) training programs' interprofessional curriculum requirements, med school curriculum, and/or microcredetnials tied to applications of genomics in health care</td><td rowspan="3">Health education leaders/champions in genomics across the different professions in BC who will build, deliver and evaluate innovative and interprofessional educational programs</td></tr>
<tr><td>Build long term capacity by partnering with organizations with education mandate such as UBC CHES</td><td>Co-creation of genomics fellowship programs targeting interdisciplinary health professions

Pilot of interprofessional education programs led by fellows in both continuing professional development (CPD) and university-based programs</td><td>Established relationship/partnership with key organizations

Increased confidence and competence in genomics in across practicing health professionals</td></tr>
<tr><td>Catalyse innovations in Genomics education technology</td><td>Investigation of the most advanced innovative approaches in genomics education globally, and what's available or adaptable to service health systems in BC/Canada

Identification of the appropriate key partners, potential funding mechanism and opportunities</td><td>A pilot to demonstrate the feasibility and utility of such program</td><td>A sustainable program or training portal with innovative technologies serving educational and clinical need with enhanced learner experience and compliance</td></tr>
</table>

The opportunities to support each tactic are constantly evolving and are inter-related, and success will be improved through sustained leadership that identifies and capitalizes on new opportunities as they arise. In the absence of, or while waiting for investment from the ministries or other potential funders, progress can be made in developing, delivering, and evaluating interprofessional competency-based education.

Tactic One: Work with Existing Projects or Opportunities Towards Development of Point of Care and Decision Making Support

Genome BC has invested in and/or is developing projects that include an educational component, or present opportunities for developing one. For example, projects that involve patient access to genomic testing generally include guidelines or criteria to access testing. Engaging with and further supporting the research teams in co-designing and delivering the educational approach for these projects sets a foundation of working with Genome

BC's strategic partners in translational health care research that is practical and relevant to BC's genomic health care delivery.

We will engage with leaders of clinical genomics research projects to establish project specific educational goals that align with the research deliverables, Genome BC's genomic competency goals, and support development of BC genetic and genomic clinical practice guidelines. Activities include selecting project specific competencies to be developed, engaging with downstream uses of guidelines and educational resources to ensure relevance and uptake, and building or re-purposing educational resources. As guidelines and resources are created, a resource repository will be established that is easily accessible by health professionals with preference for this to be embedded or linked to the BC Guidelines. Future activities could include requiring projects to include an educational component to secure funding.

This tactic lays the foundation for broader systems level change that is needed to establish a home for BC Clinical Genetics and Genomics Guidelines and is linked to educational resources appropriate to support genomics competencies across a range of health professionals.

Tactic Two: Long term capacity building: fellowships in UBC Centre for Health Education and Scholarship (CHES)

Investing in genomics educational leaders builds long term capacity for the delivery of innovative health professional education in genomics in BC. Creating CHES Fellowships that are paired with Genome BC projects is a strategic approach to engaging clinical education leads across the health professions. Fellowships can be structured to ensure innovative approaches to program delivery, and/or to evaluate options such as certification or micro credentialing in genomic competencies that are recognized in BC. Projects could include evaluation of clinical and educational outcomes while maintaining relevance to health care delivery in BC. Developing multiple simultaneous fellowships to include health professionals in nursing, family medicine, pediatrics, pharmacy and genetic counselling will stimulate inter-professional collaborations while maintaining discipline specific relevance for CPD and may afford an avenue into building genomic knowledge and competency in university curriculums either as uni-professional or in interprofessional learning requirements. Additional options include partnering with other educational programs, such as the new University of Calgary Precision Health Program[6] to engage learners to tackle key projects as part of the experiential learning requirement for the master's degree.

We will first engage health professions programs to co-create CHES fellowships and secure funding, and then pilot projects of interprofessional education programs can be led by fellows in both CPD and university-based programs. This tactic will result in increased confidence and competence in genomics in across practicing health care professions.

Tactic Three: Catalyze innovations in genomics education technology

Harnessing the power of innovative technology in genomics education will be important to deliver effective training programs and decision support tools for health professionals. Just-in-time decision support tools are

[6] https://cumming.ucalgary.ca/gse/about/programs/precision-health

critical for general practitioners. Use of innovative technology should ensure that the tools will be easily updated, accessible and scalable.

For example, under the British National Health System, a partnership between a clinical cancer genetics team and an innovative technology company resulted in a co-developed online training portal and dashboard that can quickly adapt and send relevant clinical updates in a timely fashion. This represents the kind of support needed for the clinical community to practice genomics, now and in the future. Other examples include incorporation of chat bots with mini education and notification in e-charts, digitalized health professional education via various diverse promotion channels (blogs, podcasts, massive online open courses, etc.) and social media platforms to provide options for target audiences in different age groups.

We will first investigate the advanced innovative approaches in genomics education globally and assess what is available or adaptable to service health systems in BC/Canada. Identification and engagement of interested key partners and funding mechanisms is a critical step in this process. Once the utility and feasibility of such an effort is demonstrated, we envision the outcome of this tactic will be a sustainable program or training portal with innovative technologies serving educational and clinical need with enhanced learner experience and compliance.

Section IV: Exemplars

Based on above principles and tactics, three exemplar projects are identified for Phase III – the implementation phase. We encourage organizations sharing the same enthusiasm and vision for Health Professional Genomics Education to reach out to us, and we remain open to other collaborative opportunities. At the same time, Genome BC is committed to and will continue working with our partners in the next phase, with the hope that the outputs of these projects will be taken up by our partners, and those organizations with an educational mandate for health professionals in training and in practice.

1. Precision Medicine Modules

The CME accredited Precision Medicine modules developed by genetics residents at the University of Calgary could serve a key role as the roots of the BC educational framework as they include key foundational tools in genomic literacy and could be modified to include needed point of care tools, decision aids and database links for BC health professionals.

Project Plan:

This project will build on existing educational opportunities to fit practical needs of health professionals in BC. This will be a co-design project that addresses key deficiencies in basic genomic knowledge, and it will deliver and evaluate the program with intention to improve and expand. Key relevant partners to engage during this process include individuals in Provincial Medical Genetics Program (PMGP), health professional education and health care.

2. In-time Familial Hypercholesterolemia (FH) mini Education Modules for ACCURATE study

GeneSolve project titled "***The Advancing Cardiac Care Unit-based Rapid Assessment and Treatment of hypErcholesterolemia (ACCURATE) study"***, led by Dr. Liam Brunham at UBC and Providence Health Care is approved for funding with a start date of July 1, 2021. Familial Hypercholesterolemia (FH) is one of the most common heritable conditions for which genetic testing is not routinely available, yet consensus statements support genetic testing and there is growing favour for implementation of population-based screening as a means to reduce morbidity, mortality and health care costs associated with FH.

This project will pilot the implementation of FH genetic testing during routine care of patients admitted to the acute cardiac care unit at St. Paul's Hospital who present with early onset heart attack. With this setting, this project provides an educational opportunity to engage patients' primary and secondary physicians with essential literature, guideline-based treatment target recommendations, and possibly available advanced therapeutic tools. Physicians will need to be properly educated to support accurate interpretation of results.

Most importantly, this will further increase access to genetic testing in BC through inclusion of non-genetics specialists with genomics competence.

Project Plan:

This project will initially be designed as a companion project to the ACCURATE study, with the goal to expand and integrate into the EMR system when opportunity arises for FH genetic testing to be offered in BC.

3. UBC Centre for Health Education and Scholarship (CHES) Fellowships

CHES is a research and education centre at UBC that aims to improve health outcomes for people and populations through supporting the educational practices of health professionals. This overarching goal aligns well with the outcomes for Genome BC's genomic HCP education framework. Through CHES, Genome BC can work with key partners in UBC health professions education to build capacity and educational leadership for HCP genomic education, while also providing meaningful evaluation. By leveraging CHES's support structure and capacity in project development and evaluation, Genome BC will better understand how health care providers learn and how health profession educators teach and ultimately improve outcomes.

The plan is to create multiple and ideally simultaneous, CHES Fellowships to build clinical genomics education leads across medicine, genetic counselling, nursing, and pharmacy. Fellowships could be paired with Genome BC projects that include a genomics education component. Fellows would develop, implement and evaluate educational programs for effectiveness in competency development. Fellowships could be structured to ensure innovative approaches, and/or to evaluate HCP certification or micro credentialing in genetics and genomics competencies as a method towards increasing access to genetic testing.

Project Plan:

This project provides the human resources to develop and implement the current exemplars and/or interface with future projects while simultaneously building sustained leadership for health professional genomic education in BC.

Appendix — List of Consultation Information and Key Messages

Between May 2020 and January 2021, a total of 23 consultations were held with individuals representing 14 organizations/groups across genetic service delivery, education, and research.

All individuals/groups consulted expressed interest in collaboration with Genome BC on health professional education.

	Primary Organization	Key Informant	Primary Representation
1	Provincial Medical Genetics Program (PMGP)	Linlea Armstrong	PMGP Medical Director; Medical Geneticist
		Caitlin Chang	Medical Geneticist
		Anne Swenerton	PHSA Professional Practice Lead Genetic Counselling
2	187CRD – Rare Disease Genomic Applications Partnership Program by Genome Canada and other co-funders	Anna Lehman, Tanya Nelson	Project Leader and core team member
3	BC Clinical Genomics Network	Shelin Adam	Genetic Counsellor
		Patricia Birch	Nurse in Genetics, UBC Dept Medical Genetics Friedman Lab
4	Centre for Health Education Scholarship (CHES) at UBC	Kevin Eva	Associate Director CHES
		Rose Hatala	Director Clinical Educator Fellowship
		Derek Wilson	Director Evaluation Studies
5	Genetic Education Canada – Knowledge Organization (GEC-KO)	June Carroll	Primary Care Practitioner (PCP) in Ontario; Founder of GEC-KO
6	Invitae	Hana Sroka	Genetic Counsellor, Western Regional Manager

	Primary Organization	Key Informant	Primary Representation
7	Saskatchewan Health Authority Provincial Laboratory	Rachel Vanneste	Laboratory Genetic Counsellor
8	271LYM – Lymphoma Project funded under Large Scale Applied Research Programs by Genome Canada and other co-funders	Sam Pollard	PhD candidate - interviewed clinicians, patients/public, and decision-makers on introducing Precision Medicine to Lymphoma patients
9	UBC Faculty of Medicine CME/CPD	Brenna Lynn	Associate Dean, Continuing Professional Development
10	BC Cardiac Services	Kirsten Bartels	Genetic Counsellor Lead, BC Inherited Arrhythmia Program and rep. to MOH on developing a Comprehensive Cardiac Services Plan for BC
11	Hereditary Cancer Program	Jennifer Nuk	Clinical Coordinator, BC Cancer Hereditary Cancer Program
12	UBC Undergraduate Medical Education (UGME)	Michelle Steinraths, Jane Gair	Genetics content lead for UGME
13	276OGC – GenCOUNSEL funded under Large Scale Applied Research Programs by Genome Canada and other co-funders	Alison Elliott	Project Leader; Genetic Counsellor
14	Nursing Practice in Genomics	Jacqueline Limoges, Lindsay Carlsson, Sarah Dewell	Lead of Canadian Initiative Workshop to Advance Nursing in Genomics held in Nov 2020

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