Education on Clinical Genomics

Summary Project Report

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1 Introduction

Genomics is a young and quickly evolving field that provides the ability to analyze and compare entire genomes and apply knowledge to matters of health and disease, probability, as well as risk assessment, optimizing decision making (Guttmacher, 2007).

In 2012-2013 the BC Clinical Genomics Network (BCCGN) and the UBC Division of Continuing Professional Development (UBC CPD) undertook a project with the focus of developing evidence-based educational pieces that incorporated effective Continuing Medical Education (CME) learning principles and engagement strategies to address family physicians (FPs) educational gaps and learning needs with respect to clinical genomics. It was anticipated this project would lead to performance improvement and subsequently, improved health care outcomes in clinical genomics.

The findings from the evaluation components of the study provided insights into the effectiveness of the education strategy and helped determine the shape of future educational offerings as the educational strategy moves forward. The project provided an opportunity for the BCCGN to support BC FPs in becoming more up to date with best practices and emerging opportunities in the field of clinical genomics, demonstrate BCCGN's continued leadership in this area of education as well as increase awareness of the existing support and resources available to provide better patient care.

Deliverables

The deliverables for the Education on Clinical Genomics project consisted of the following:

i. Establishment of an advisory committee with FPs and specialists who gave input to content, learning objectives and physician engagement strategies;

ii. Development of a site map and associated content for a genomics website HUB for FPs with necessary information contained in a single source accessible by physicians for themselves and for their patients

iii. Development of a clinical information package of appropriate content in a form useful to FPs.

iv. Implementation of educational webinars to disseminate some of the applicable and practical information on clinical genomics for FPs

a. Development of the faculty to engage them in appropriate delivery of the content in order to meet the learning needs of the target audience
2 Project Planning

2.1 Core Working Group

The project’s Core Working Group (CWG) was an internal group represented by BCCGN, UBC CPD, and Dr. Linlea Armstrong, Medical Geneticist at the Children’s Hospital, BCCA, and UBC. In brief, the purpose of the CWG was to establish the overall content and direction of the project and actively implement the project deliverables. The CWG was also responsible for identifying and establishing the project Advisory Committee (AC).

The specific responsibilities of the CWG included the following:
1. Approve an effective proposal and implementation plan for a FP education program on clinical genomics.
2. Make operational decisions that guide the project.
3. Ensure the evaluation plan is carried out throughout and summarized at the end of the pilot project.
4. Act as visible and active champions of the project.
5. Work collaboratively to lead the planning, implementation and evaluation of the project.
6. Communicate with others including relevant organizations, partners and physicians about the project including implementation plans, scope and status of the project, benefits to patients and others. (The Advisory Committee will serve as one vehicle to support this.)
7. Facilitate the educational planning and implementation to support the physician lead and project manager in conjunction with UBC Continuing Professional Development (CPD)
8. Approve the implementation plan including:
   a. Goals, objectives, timelines, milestones, budget and deliverables
   b. Detailed plan for each activity
   c. Communication requirements

Further details of the CWG members, responsibilities, reporting process and terms of membership can be found in Appendix 1.

2.1.1 Focused Literature Review and Environmental Scan

To inform the planning and educational activities of the CWG and AC, a substantial activity conducted by UBC CPD, with input from BCCGN was a focused literature review and environmental scan in order to highlight and summarize the background information and strategies for genomic medicine and genomics education in a clinical context, particularly for FPs. Topics included in this focused literature review and environmental included the following:

- Background literature on:
  - The genomics landscape;
  - Canadian perspectives on genomics medicine in clinical practice
  - Physician barriers to integration of genomic medicine
  - Engagement strategies for physician genomics education

- Pathways for patients in BC to obtain genetic services, including:
  - FPs referral
  - Genetic testing options

- Available genomics education frameworks, programs and resources for physicians, including:
Findings from focused literature review and environmental scan

The findings from this focused literature review and environmental scan were used to identify the implications for FP education on clinical genomics. These educational implications were organized into the thematic areas of knowledge, skills, and attitudes. They were also used to stimulate further discussion with the advisory committee on key topics to include in the educational components of the project.

The literature review and environmental scan indicated that FPs were familiar with ordering genetic tests or genetic counselling for patients, such as for hereditary cancer. Further, as genomics was a young and evolving field (e.g. direct-to-consumer genetic testing now available), the findings suggested that health care providers, particularly FPs, needed to be equipped with the skills necessary to answer questions about the risks, benefits and limitations of associated with genomics, including direct-to-consumer testing.

As suggested in the literature, to make use of genomics advances, FPs are not expected to become experts in genomics. The range and depth of educational priorities should be aligned within the context of a FP’s daily practice. This literature review and environmental scan document identified the need for targeted education to FPs on clinical genomics. The following content areas were intended to stimulate further discussion on key topics to be delivered in the project, in addition to feedback received by the advisory committee:

Knowledge
- Knowing the difference between obtaining a genomic profile and genetic testing for specific disease(s);
- Recognizing the types of situations (e.g. risk calculation) that warrant a referral to a genetic/genomic specialist (e.g. couple who are close blood relatives) and FP role in follow-up;
- Appreciating the resources available to assist patients seeking information on genomics.

Skills
- Understanding how to assist patients make sense (i.e. appropriate counselling) of the various genetic screening services available (e.g. DTC genetic testing) and communicate the following:
  - Health value (e.g. evidence linking usage of genomic information relevant to improved patient-centred health outcomes, particularly for common conditions), personal ramifications, risks, benefits and limitations of testing;
  - Appropriately counseling patients, order and accurately interpret genetic tests and appropriate genetic consultation referrals (e.g. regular diagnostic testing versus predictive genetic testing);
  - Facilitating patients to make informed decisions about whether to undergo genetic testing and the appropriate interventions;
- Increasing confidence in interpreting familial patterns of disease, identifying patients with hereditary risk;
- Understanding how to interpret the reported results of genetic testing.
Attitudes

- Realizing the ethical, legal, and social issues associated with genetic testing and recording of genetic information (e.g. privacy and potential implications for health insurance and employment).

Additional non-published topic areas

The following topics were based on suggestions provided by CWG members during meetings for consideration in the educational design:

- Understanding composition of the human genome
- Recognizing inheritance patterns and effects of mutations
- Describing the basic epidemiology, etiologies, opportunities to change natural history for:
  - Congenital anomalies
  - Intellectual disability
  - Familial and hereditary cancer susceptibility
  - Huntington diseases, as an example of a heritable degenerative conditions
  - Genetically mediated variations in responses to drugs
- Knowing how to use genetic information to manage disease
- Understanding diagnosis of chromosomal-related conditions including developmental delay, intellectual disability and autism spectrum disorder
- Understanding pharmacogenetics of how certain individuals will react to certain medications
- Understanding treatment decisions especially for certain cancers – particularly breast and lymphoma at present
- Understanding prenatal testing - what is happening now (i.e. current practice) and what will happen in the future

Additionally, conducting the literature review and environmental scan allowed for content (e.g. online, archived self-learning education) and resources for the clinician website to be identified. **NOTE:** a full summary report of the literature review and environmental scan has been completed, and this complementary document can be obtained by contacting the BCCGN.

### 2.2 Advisory Committee (AC)

The project’s Advisory Committee (AC) consisted of CWG members in addition to FPs and a medical genetics resident. As described in Appendix 1, the purpose of the AC was to provide high level input on the overall educational development to ensure that the content of the educational components of the project (website HUB, information package, webinars) would be appropriately tailored to meet and support the clinical genomics educational needs of the FP target audience in an effective and practical manner.

1. Identify enablers and barriers to physician engagement in practice change and education programs on genomics;
2. Define learning objectives for the education program;
3. Content development;
4. Develop curriculum for the education and engagement strategy;
5. Identify speakers and moderators for webinars;
6. Refine materials for the webinars;
7. Provide input about resources needed for practice change around clinical genomics;
8. Review and provide feedback based on recommendations of the ‘Core Working Group’ for the project;
9. Provide input on resources for the website and the clinician package;
10. Provide input to the evaluation strategy;

The FPs on the AC were purposefully selected as they respectively practiced in a rural and urban setting, which when combined with an urban based FP on the CWG, ensured that respective practice patterns, needs, relevance of the educational content to FPs practicing in urban and rural areas of the province, were considered during the educational content development phases of the project.

2.2.1 Feedback

During the course of the project, there were several instances where the AC was engaged to provide project input electronically and via in-person/teleconference meetings. The following sections highlight the feedback provided by the AC on the:

i. Planning stages of the ECG project;
ii. Marketing/promotional materials for the webinar;
iii. Website HUB; and
iv. Information package.

Planning

The first meeting with the AC was in October 2012, and prior to the meeting, AC were asked to reflect on the clinical genomics areas below and speak to their perspectives during the meeting:

i. What types of clinical cases (i.e. family history, clinical indicators, etc) have promoted them to refer patients for either genetic testing or obtaining a genomic profile?
ii. Did they have any unclear aspects during referrals (e.g. who/where to refer to)?
iii. What types of conversations did they have with patients regarding genomics?
   a. What types of questions do patients ask about genomics
iv. What, if any, clarifications have they needed in interpreting the results of patients genetic test(s)?
v. What types of resources and services for clinical genomics would they like to offer patients?
vi. What do they think are the educational needs of FPs in the area of clinical genomics?

Following this first meeting, the following bullets highlight comments provided by the AC to help inform the educational development for the project.

- The title and learning objectives of the webinars were crucial to promoting webinar registration.
  - The topics needed to be flushed out, focusing on teaching practical approaches through cases rather than teaching about genomics technology.
- Most FPs were unaware of the nature and the potential of genomics. This project needs to help FPs to understand the current value of genomics technology and how it will potentially change what they are doing in the future.
- The average FP needed a package of tools and resources to better understand:
  - How to interpret the genomic reports that come back to FPs;
  - How to quickly identify patients that need genomics testing;
Where to get the testing.

- The key for success of the FP genomics education might be:
  - Conveying genomics content that addresses what FPs see in practice, what FPs either don’t know or need to know more about (i.e. what is now available that can be used in their practice).
    - The challenge will be informing FPs of the genomics related areas that could improve their patient care because they ‘don’t know what they don’t know’.
  - Instead of bringing in DTC reports, patients currently might ask FP questions related to genomics, therefore FPs should be equipped to answer them.
  - Focus on what FPs can order and with the new knowledge and resources available, what would help FPs integrate this into their practice.
  - Re-think the length of each webinar session and explore four 30-min webinars and advertise them as a package.
  - Consider sketching a short case-based session for the webinar
    - The physician webinar moderator taking on role of FP bringing up clinical genomics questions as a naive FP, which would be answered by the webinar presenter - both would have a conversation on relevant issues related to the topic.
  - Present a brief introduction to the basic science of genomics during the webinar.
  - New newborn screening panel testing might also be a good content area for webinars.

Additionally, the CWG recognized the importance of obtaining input of pediatricians with respect to clinical genomics and involvement of FPs; although it was decided it was not necessary to have pediatric representation on the advisory committee. With that in mind, **key informant interviews were conducted with two pediatricians to gather their perspectives and help inform the educational content for the project.** Of these two pediatricians, one had a general pediatric practice, who was unable to order genetic tests (e.g. microarray), the other pediatrician worked in a Biochemical Diseases Clinic at BC Children’s Hospital, who could order genetic tests.

In brief, the questions asked of the pediatricians included:

1. Describing their practice (e.g. whether cases within pediatrics specialized were seen or if they had a specialized practice/area of interest)?
2. Types of referrals they received in the area of genomics/genetics from FPs?
   a. Frequency of FP referrals with respect to genomics (re: appropriateness)?
   b. Areas asked to consult on?
   c. Perceptions on gaps in genomics knowledge perceived exist for FPs, issues going unrecognized (e.g. inappropriate tests being ordered)
   d. What barriers do you think exist for referrals from FPs related to clinical genomics?
3. Types of genomics questions they are asked at appointments by patients and their families?
4. Thoughts on educational need for FPs in the area of clinical genomics?

The following bullets are a **summary of the feedback provided by the two pediatricians:**

- Most general pediatricians are not very knowledgeable in genomics.
- In terms of the interface between FPs and pediatricians, pediatricians get very few genomics related referrals from FPs. Referrals from FPs are most common for developmental delay or malformation.
  - Pediatricians see children with dysmorphic features, developmental delays, mental development issues, autism, malformations and family history and inheritance issues. They do all-around evaluation on the patients, and genetics/genomics is only part of such evaluation.
Having concern around the value, cost, ethical issues and limitation of genomics testing

It is challenging for both FPs and pediatricians to:

- Understand the science behind genomics
- Understand and interpret the microarray report
- Know when to order the testing (FPs do not order them)
- To understand how the tests are changing and evolving
  - E.g. with the rapid advances in genomics, previously non-diagnosed children may get diagnosed now, and there are new opportunities for access to treatment and other useful resources.
  - There is no registry to go back and find these kids but there may be value in doing so and diagnosing conditions - possibly going back 10 or 15 years.
  - Parents at times drive the request for genomics testing. In terms of cost, genome sequencing is around $10,000 while micro array $200 to $300.

The webinar format is an ideal approach for reaching a broad physician population throughout the province

- Content format - clinical dialogue with an expert (Q&A would be a good format) focusing on bringing out learning points and general genomics information that would translate across the board.
- A case-based approach might be helpful using true visual patient images might make it more real for participants. Content should explore patterns, how genomics fits in, and an illustrative example where genomics made a difference and perhaps how microarrays should be read and interpreted.
- Consider including a pediatric case and a cancer case, listing of applicable resources and referral info, interpretation of reports, cost-benefit aspects, etc.
  - Pediatricians could also be a target audience when educational focus is on developmental diseases.
  - FPs are less interested in scientific content (or have less time to focus on this since they are more keen to know the practical stuff that is directly applicable in practice). However, genomics is an area that does involve scientific aspect, especially related with how to understand the value of genomics, and how to interpret the reports – a bit of background science is needed.

Marketing/Promotional Materials

During the early preparation stages of the webinars, the AC members were asked to provide input into marketing/promotional materials to ensure messaging was succinct, and draw physicians and other individuals to participate in the webinar series. Specifically, AC members were also asked to reflect on the specific questions below when providing their feedback on the materials:

1. If they received the marketing/promotional material in their inbox, would they be compelled to register?
2. If not, why not and how could it be improved to capture their attention?
3. If so what is it that attracted them?
Below is a synopsis of the feedback received by the AC that helped refine and marketing/promotional materials and messaging:

- It was thought that FPs would be interested in attending and they would be attracted by the topic and title.
  - AC members liked the look and layout and thought it was important to include a brief explanation of genomics.
- Suggested emphasizing the fact that the webinars were free and accredited (e.g. in the subject line) and perhaps including a question (e.g. what is a genomics report?) to stimulate interest and engagement.
- Suggested putting the wording for promotional messaging into the body of an email and not as an attachment.
- One of the AC members went further and sent the sample marketing materials to a number of their physician colleagues from the Practice Support Program, Physicians Information Technology Office and Divisions of Family Practice, for input and collated their feedback, which included the following:
  - Response to the webinar marketing material was positive
  - Marketing wording needed to be simplified and consider using a suitable hook
  - Including a ‘hook line’ to encapsulate a clinical problem faced on a regular basis would be useful to garner attention. These colleagues suggested the following hook lines:
    - “Are you comfortable counseling your patient on genomics?”
    - “Do you feel left behind by the rapidly evolving world of genomics?”
    - “Everything you wanted to know about genomics but were afraid to ask”

The feedback received from the AC members on the marketing/promotional materials reiterated that education on clinical genomics is an unperceived need for FPs, and it was important to ensure that the marketing/promotional efforts captured the attention of FPs and trigger active interest in learning more about clinical genomics by participating in the webinar series.

**Website HUB**

AC members were asked to comment on versions of the site map that were circulated to them. They were asked to comment and reflect on the following questions (from their perspective and the perspective of their FP colleagues):

- Were the proposed content areas relevant to FPs?
- Did the headings make sense?
- Were content areas missing?
- Should any of the headings be moved, re-titled, or deleted?
- Their thoughts on ease of navigation (recognizing the site map was just in paper form).

In general, AC members thought the website map was clear and indicated that simple language was important, in addition to having someone with a graphics background build the website. Examples of specific comments included the following:

- Website should be basic, quick, and not overwhelming.
  - E.g. Simple tabs with resources, contact information for genetic counselors, genomics 101 (i.e. basic overview), and other relevant material should be included.
- Important to have information to help the physicians who are ordering their own tests.
• It was thought that more likely specialists would be ordering genetic tests (in their own discipline) however some FPs could also order the odd test (e.g. ordering and interpreting hemochromatosis).
• Useful to have a webpage with information on how to best interpret the results of a test (e.g. genetic test for hemochromatosis)
  o WebPages for each of the genetic tests that can be ordered so that those clinicians who do want to order these tests can get any background on interpretation that they need without calling anyone.

Information Package

The AC members provided feedback on earlier versions of the information package that were circulated with the website map, included the associated content. Much of their feedback emulated feedback provided about the website.

Webinar

After sample material/promotional materials were shared with the AC members, they provided a variety of comments to help inform the educational development which included the following:
• Most physicians are looking for something tangible and practical to take home from a CME event.
• Stress the 'practicalities' and 'real world' clinical use, of right now.”
• Relate the webinar content to FPs how the emerging field will affect practice in the near and distant future.”
• Most FPs may not know how advanced clinical genomics is, and may perceive there to be a commercial hype around a 'gee whiz' technology in its infancy”.

A recording of a dry run of the first webinar was also circulated to AC members and a variety of detailed feedback pertaining to individual slides within the presentation was provided. Additionally, larger considerations for the webinar presenter were also suggested in terms of the flow, content areas to emphasis and those to spend less time on, and strategies to “liven” the cases used in the presentation. Finally, comments were also made regarding the importance of visually interesting slides, a dynamic presenter and keeping the introduction concise.
3 Educational Implementation

*NOTE: Throughout the duration of the project, work on the educational components of the project (website site map and associated content, information package, webinars) occurred concurrently.*

At the commencement of the project, in order to effectively and appropriately develop the educational components of the project (i.e. website, information package, webinar series) it was important to better understand the current learning needs of FPs pertaining to clinical genomics. An important initial resource on BC physicians’ perception on clinical genomics was the summary of BCCGN’s 2011 physician needs assessment. This summary provided information on physicians (both specialists and FPs) perceptions in a variety of areas including: impact of genomic technologies, knowledge gaps pertaining to genomics, concerns and encouragements about integrating genomics into their practice, and beliefs and bodies responsible for providing genomics education.

Additionally, as previously mentioned, to help inform the design of the project’s educational components, a focused literature review and environmental scan was conducted and fed into the educational implementation.

3.1 Website HUB

UBC CPD and the BCCGN launched a new website ([www.genomicsandhealth.com](http://www.genomicsandhealth.com)), as a source of on-going, up-to-date info on clinical genomics. The website has been designed to be a simple resource with practical information and tools on clinical genomics, that is inclusive of the following areas:

- A comprehensive list of British Columbia-specific clinical genomics and genetic disorders referral contacts, numbers, and forms, including laboratory contacts;
- A list of Frequently Asked Questions (FAQs) about genomics;
- Basic genetics information and videos to support FP communication with patients;
- Currently available genomic diagnostic and testing applications; and
- Announcements of available and upcoming educational resources related to clinical genomics.

**Development**

Development of the clinician website was an in-depth and iterative process that occurred over the duration of the project. The website was launched just prior to the first webinar on January 28th 2013. Earlier drafts of the website hub were presented visually to represent the various categories that could be contained within the website. Members of the CWG and the AC provided a variety of comments and suggestions on the visual site map in order to refine the content and the usability. The key comments were that the website should be easy to navigate, and contain practical and relevant information for FPs.

The evaluation of the visual site map can be found in Appendix 3. Members of UBC CPD, BCCGN and the AC provided the content that is included within the website.

The website is currently maintained and managed by BCCGN.
3.2 Information Package

The information package provides physicians with relevant learning on clinical genomics in a variety of areas from interpreting genomic reports, awareness on when, where, and whom to refer to for help with managing patients, to currently available genomic diagnostic and treatment applications.

Specifically, topics and information provided in the information package include the following:

- How to make a referral / ask a question
  - List of British Columbian specific clinical genomics and genetic disorders referral contacts, numbers, laboratory contacts, and referral forms (e.g. prenatal, fetal diagnosis, hereditary cancer program, general).
- Description of genetic and genomic testing
  - E.g. genetic testing, targeted diagnostic testing, common genetic testing, metabolic testing, genetic ‘red flags’.

The information package was a PDF format that was designed to have user friendly navigation through hyper linking each section contained in the document. Specifically, the above topics:

- Were placed into a clickable table of contents to allow user to automatically navigate to the desired content.
- Within each page, users could click on respective banners to either be automatically redirected to the main table of contents, or to be automatically redirected to the subheading listing of the topic area.
- The referral forms that were provided in the information package had a clickable print icon that would enable users to automatically print the particular referral page with one click.

In addition to UBC CPD and BCCGN, the other members of the project AC listed below also provided important contributions and input to the development of the information package:

Dr. Linlea Armstrong (Medical Geneticist)
Dr. Karen Niederhoffer (Medical Genetics Resident)
Dr. Bruce Hobson (Family Physician)
Dr. Scott Garrison (Family Physician)

3.3 Webinar Series

Background

The UBC CPD webinars series are very popular with BC physicians, as participants received high quality, up-to-date, convenient, accessible and relevant CME in their homes and/or offices. The aim of using this convenient online platform was to reach a large physician audience (both FPs and specialists) by having content that was relevant for FPs and some speciality groups. The flexibility of the webinar platform allowed for the presentation topics to be selected a few months prior to the webinar.

In the two webinars delivered as part of the project, participant engagement was encouraged via real-time Q&A opportunities with the speaker, live polling, and downloadable resources synchronized in real time through the presentation platform. By using an online platform, learners
were able to participate from anywhere, which extends the reach of CME to rural or remote healthcare professionals who may have limited access to other CME opportunities. Each webinar session was recorded allowing future viewing opportunities for participants. Sessions were each accredited for up to 1.0 Mainpro M1 for FPs and there was no cost associated with registering for webinars. Anyone could participate so long as they registered for the webinars.

Marketing/Promotions

The marketing strategy for the webinar series was robust resulting in one of the highest registered UBC CPD webinars. To achieve these numbers, various organizations and individuals were contacted by email, fax and over the phone with the aim of spreading the word about the two-part webinar series on genomic education for FPs. UBC CPD's database of physicians and previous webinar attendees were also contacted, in addition to BCCGN's professional networks. In the case of organizations, a personalized email was sent to a contact within the respective organization with a request to disseminate information about the webinar to their membership.

<table>
<thead>
<tr>
<th>Marketed Groups</th>
<th>Mode of Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC Association of Pediatrics</td>
<td>Personalized emails</td>
</tr>
<tr>
<td>BC College of Physicians and Surgeons (library as well)</td>
<td>Personalized emails</td>
</tr>
<tr>
<td>BC Family Physicians</td>
<td>Personalized emails</td>
</tr>
<tr>
<td>BC Medical Association nucleus group</td>
<td>Personalized emails</td>
</tr>
<tr>
<td>BC Medical Journal</td>
<td>Online events and print calendar</td>
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<tr>
<td>Canadian Medical Association</td>
<td>Online events calendar</td>
</tr>
<tr>
<td>College of Physicians &amp; Surgeons of British Columbia</td>
<td>Personalized emails</td>
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<tr>
<td>Divisions of Family Practice</td>
<td>Personalized emails</td>
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<tr>
<td>Doc Lounge</td>
<td>Online events calendar</td>
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<td>Genome BC</td>
<td>Personalized emails</td>
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<td>MDcme</td>
<td>Personalized emails</td>
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<tr>
<td>Medical Post</td>
<td>Personalized emails</td>
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<tr>
<td>Northern Continuing Medical Education Program</td>
<td>Online events calendar</td>
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<tr>
<td>Professional Association of Residents of British Columbia</td>
<td>Personalized emails</td>
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<tr>
<td>Royal College of Physicians and Surgeons of Canada</td>
<td>Personalized emails</td>
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<tr>
<td>The Rural Coordination Centre of BC</td>
<td>Personalized emails</td>
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<tr>
<td>Society of General Practitioners of BC</td>
<td>Personalized emails</td>
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<tr>
<td>UBC Department of Family Practice</td>
<td>Online events calendar</td>
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<tr>
<td>UBC Department of Medical Genetics</td>
<td>Personalized emails</td>
</tr>
<tr>
<td>UBC’s Faculty of Medicine</td>
<td>Online events calendar, personalized emails to department heads, Martin Dawes, Karen Buhler etc</td>
</tr>
<tr>
<td>Vancouver Island Health Authority</td>
<td>Online events calendar</td>
</tr>
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</table>
Based on participant feedback collected in the webinar evaluation, the most effective marketing efforts were found in targeted emails made by UBC CPD to our database of physicians. Efforts to engage this audience included email blasts that went out 5 times between December 2012 and April 2013. Each email blast from UBC CPD reached an average of 2,500 physicians in BC. Promotional materials were designed that were featured in other educational webinars delivered by UBC CPD that were offered within the timeframe of the ECG webinars (1-2 webinars a month from December 2012 to March 2013). **Samples of these materials can be found in Appendix 4.**

**Content**

The 'Planning' and 'Webinar' subsections of Section 2.2.1 (AC Feedback) captured the variety of inputs and suggestions that fed into the development and refinement of the two webinars that were delivered within the ECG project.

In brief, the two webinars were delivered on January 28th (Part A) and March 4th 2013 (Part B). These webinars were distinct in content, so that physicians could benefit from attending both sessions. The title for both webinars was: ‘Genomics in Primary Care: What’s Ready for Prime Time? …Get more comfortable using genomics to help your patients’.

The overarching learning objectives that governed the respective content within both webinars were to enable FP participants to:

i. Develop their genomics knowledge base applicable to current primary care practice;

ii. Learn how to access genomics services and technologies to support better patient care; and

iii. Recognize current limitations and future opportunities of genomics applications to primary care.

Two practice sessions were held prior to the January 28th webinar. The first practice session was held approximately three weeks prior to the webinar to members of the UBC department of medical genetics (members of the CWG observed). The second practice session was approximately a week prior to January 28th to members of the CWG. A recording of the second practice session was circulated to the AC members, a synopsis of their feedback is provided in section 2.2.1 (Feedback) of this report. Prior to the practice sessions, the presenter and the FP on the CWG met several times to develop and refine the content of both webinar sessions.

The focus of the Part A webinar was:

- Integration of clinical genomics into management of patients to help answer clinical questions.
  - E.g. What genomic assessments are relevant in estimating a person’s lifetime risk of cancer?
  - How can assessing the genomic abnormalities acquired within a patient’s cancer cells inform her prognosis and optimal treatment course?
  - Associations between single-nucleotide polymorphism (SNP) and disease risk – assessing probability.

The focus of the Part B webinar was:

- Briefly reviewing the content covered in the Part A webinar;
- Discussing how clinical genomics and associated technology is currently being integrated into matters such as:
  - Solving diagnostic puzzles of children with developmental delay; as well as
  - Assessing probabilities for good and/or bad reactions to medication (pharmacogenomics).
As previously mentioned both webinars (see links to the archived presentations below) were recorded to allow for physicians unable to attend to the webinar sessions to view the educational content and to allow those who attended to be able to review the content at a time convenient for them.

Part A webinar archive recording: http://ubc-cpd.adobeconnect.com/p2ot8mdogqh/
Part B webinar archive recording: http://ubc-cpd.adobeconnect.com/p7e8zzt0olj/

Highlights of the evaluation results of both webinars are presented in section 4 of this report.

4 Summary of Webinar Evaluation

There were 92 participants who attended webinar A and 77 participants completed the evaluation (84% response rate). Webinar B had 68 participants in attendance with 63 completing the evaluation (93% response rate). Forty participants indicated that they attended both webinars.

A sample of the questions asked by participants in the evaluation can be found in Appendix 5, whereas full results of the webinar evaluations can be found in Appendices 6 & 7.

4.1 Demographics

Although there were participants viewing the webinar from various countries and cities, overall the majority of webinar series participants were from BC (79% for Webinar A and 76% for Webinar B). Over three-quarters of webinar participants were FPs (78% from webinar A and 76% from webinar B), while in webinar A, 8% were specialists and 14% were from other disciples. Conversely, in webinar B, 17% were specialists and 6% were from other disciples (hospitalist, clinical associate, etc). The majority of participants learned about the webinar from UBC CPD emails (89% from Webinar A and 86% from Webinar B). Although the majority of participants heard about the webinars from UBC CPD emails, the marketing efforts highlighted in section 3.3 (Webinar Series) of this report were still important to make certain a diverse range of communication mediums were used to ensure FPs were informed about both webinars.

4.2 Learning Outcomes

Participants were asked three questions in both webinars that captured participants’ self-reported increase in knowledge after vs. before the webinar. In summary, participants reported that they were more familiar with the basics of genomics in a primary care setting after viewing the webinar (58% change in agreement from Webinar A and 63% from Webinar B). Similarly, participants became aware of genomic services and technologies that are available in BC that were previously unknown to them before the webinar (63% change in agreement from Webinar A and 62% from Webinar B). Lastly, participants left the webinar feeling more familiar with the current limitation and future opportunities of genomic application after participating in the webinar (66% increase in agreement from Webinar A participants and 56% from Webinar B).

The evaluation for webinar B included two additional questions that asked participants about intellectual disabilities and medications. In response to these questions, the majority of participants reported that they now have a better sense of how genomics can contribute in the diagnostic process.
of an individual with intellectual disability (81%) and have a better sense of how genomics may in the future contribute to optimizing selection of medications for patients (89%).

Over two-thirds of webinar participants gave the webinars an overall rating of ‘excellent’ or ‘very good’ (67% from Webinar A and 72% from Webinar B).

From an aggregate perspective, the majority of participants from both webinar series had at least one patient in their practice to whom the information presented will be relevant (89%) and almost half of the participants (48%) indicated they were likely to share this information with their colleagues.

The open ended comments spoke to the value of covering the term genomics, the power of visuals throughout the presentation, including a further opportunity for interaction through polling, and highlighting key resources. The most helpful aspects of the webinars were about discussions on the management of patients’ and diagnosis of specific genetic conditions; explanations of the various tests and resources, and addition of clinical cases.

In terms of preserved learning and future plans with the new knowledge gained by participating in the webinars, the open ended comments around practice change highlighted themes of making better referrals and more counseling, changes to patient care and gaining more genomic and genetic testing knowledge.

4.3 Feedback

Participants were asked to share tools and resources that would be helpful in the future to facilitate changing their attitude around clinical genomics in primary care. The responses were broken down into the following themes:

- More education offerings and webinars
- Additional guidelines and algorithms/checklists
- Lists of genetic tests that are available and cost and
- Other easily accessible resources.

Participants noted that the referral forms, information package, and website recourses offered by UBC CPD and BCCGN were helpful resources.

As described earlier, this webinar series was highly rated by participants. Aligned with this, participant testimonials highlight the importance of genomics education and the need to further provide educational offerings on this topic.

Webinar A

“A succinct explanation of practical application and use of genetic testing and counselling in family practice.”

“An excellent review of genomics, a hot topic in medicine that has come a long way in past few years.”

“I was unaware how much had happened in clinical genomics until I took this webinar. I’m very pleased I took it and will be looking to learn more.”
Webinar B

“Dr. Armstrong describes the science of genomics in clear and concise scientific terminology. Her explanations were appropriate for the level of need of family physicians. She endorsed multiple approaches through the case presentations acknowledging a physician’s experience and knowledge base. These webinars are very relevant. Dr. Armstrong is to be congratulated on reaching out to family physicians and encouraging the practical uses of genomics in the primary care.”

“It is always appreciated to have the opportunity to ask questions and learn about the questions that others have when attending a webinar like this, rather than simply viewing a pre-recorded presentation.”

“Another very useful presentation and discussion. Look forward to more developments in this area”.

Participant Webinar Questions

During the webinar, there were a variety of questions asked by the participants, in addition to a few comments posted. These questions and comments are presented below to illustrate the depth and volume of questions participants had while participating in the webinar sessions.

Webinar A

1. I see the point of genomics for breast cancer but for deafness?
2. Could you elaborate why you think SNP results from a Direct to Consumer company (or another source) are not usable in the decision making for something like chronic disease? What is the scientific basis for that?
3. What is the availability and wait time for genetics consultations for follow up of this sort of testing?
4. Do you anticipate that the interpretive costs will decrease as this technology improves?
5. Do you think there should be a genomics component to genetic counselling programs?
6. With all the great genetic tests has survival improved in patients with some of the lethal diseases?
7. What laws [exempt] a person’s genome from employers or the public?
8. Are there any “reputable” DTC genetic testing labs in Vancouver?

Webinar B

1. Realistically, how many genetic tests can really make a difference in primary care at this time? What are those tests?
2. Any update about autism and genetics?
3. Realistically most of us would refer to a sub specialist and specialist care - if we detected Tetralogy on us.
4. What is a FISH probe?
5. Are pharmacogenetics and pharmacogenomics the same or is there a difference?
6. Couldn’t tetralogy of fallot also possibly indicate prenatal alcohol exposure during the first 2-3 weeks? Asking about alcohol use even before pregnancy was known? ie a binge drinking episode at a critical time.
7. We don’t request consent before getting pathology.
8. How does being an individual of mixed-race ancestry affect choice of testing, diagnosis, and prognostication?
9. Testing for MSI without specific consent is already routine in some BC hospital histology laboratories when the histologic diagnosis of colorectal cancer is made. Do you think there could be medico-legal risk in this approach? Is there a prospect of a provincial policy on this?
10. Is there any "proof" (double blind comparison controlled studies) that actually point out that pharmacogenomic testing of likelihood that any drug might "work" or not - sure there is testing - does it influence outcome?
11. What advice can one give to family members, where we don't yet know about a genetic link, who have a strong history e.g. of pancreatic cancer (uncle, father, daughter)
12. Could gleevec a tyrosine kinase inhibitor used in the treatment of Chronic Myeloid Leukemia be one of pharmacogenetics?
13. For the NIPT, are there variances in labs and how much would this cost for women, is it coming to BC?
14. What little i have been able to research on genomic testing seems like it is still a little like soothe saying, ie - i read that in twin studies, with regards to rheumatoid arthritis, genomic testing can only accurately predict 20% of Ra cases before they happen, also I would love to hear more about micro RNA rather than genomic testing, that still seems to be all private lab testing anyway
15. Oncotype diagnosis analysis of breast cancer purports to be cost-saving in overall patient expenditure. Does that claim have merit? If so, would it make sense to offer it in BC?
16. I am from Alberta. Do you know if the clinical resources available in Alberta are similar or if there are any significant differences?
17. Question for those interested in genetic markers for warfarin does not necessarily reflect the general physician population since [webinar is] speaking to an audience who have interest in genetics ie not a random sample of physicians.
18. Are there any drawbacks, besides cost, of the NIPT compared to the serum screen tests for ruling out aneuploidy? Approximately what does it cost?
19. If our pregnant patients are requesting NIPT is there a reputable provider in BC?
20. Have you observed that medical geneticists need to evolve from being "syndromologists" to "bioinformaticians"
21. Is there a genetic signature on the horizon for prostate cancer? Perhaps this could help us decrease "over-treatment" of indolent cancers.
22. Is there a test in BC for testing patients who do not metabolize Plavix?
23. If a patient comes into the office with results of a genetic analysis from a private lab (for whatever reason) is the GP required to keep these private lab test results in the pt file and if so for how many years?
24. If a patient has already been diagnosed as 18q-, if there any advantage to further genetic testing?
25. Sometimes we order some genetic testing such as HFE for hemochromatosis, FMF gene for familial mediterranean fever but it looks like a bit of difficult to do tests and sometimes time consuming, any progress in the technology in reducing cost and making it more accessible.
26. Is there an indication whether pharmacogenetic testing will be covered by MSP vs private pay, or potentially Extended Health Plans?
27. Do you have a good site for NIPT? I know longer practice obs but need to keep up to date?
5 Project Learnings

A number of factors have contributed to these successes throughout the course of this initiative. Key overall lessons learned can be summarized as follows:

- Initial consultation with FPs is important in determining the specific needs of the FPs within the target region. This process also serves to engage key stakeholders and increases awareness of clinical genomics.
- Technology-enable learning is effective because it has the potential to reach more FPs.
- Education that considers various stages of learning (awareness, agreement, adoption and adherence) can be properly structured to meet the needs of diverse family physicians.
- Mobilizing a range of communication and engagement activities in conjunction with educational offerings increases attendance at educational activities and accesses FPs from multiple demographics. These activities also increase awareness within groups of engaged and unengaged FPs.

More specifically the project learnings can be summarized as follows:

1) The partnership between BCCGN (as the subject matter experts on genomics) and UBC CPD (as educational and evaluation experts) to develop and provide the project deliverables (e.g. webinars, website hub, and information package) was effective in providing quality education.

2) Over the course of the project, it was important to have a distinction between genetics and genomics for the physician learners.
   a. Genetics as single gene testing (e.g. within a cancer context) was found to be a good anchor point for discussion that could be broadened to introduce clinical genomics to the physician learner.
   b. The evolution of topics (recognizing the limited time to deliver education and resources) was a key project focal point and a challenge.
   c. As genomics is not only an unperceived learning need but also an unfamiliar topic for FPs it was important to first provide background information on genetics and then continue with adding on to this existing knowledge base by next providing education on genomics.
   d. The relevant and stimulating learning objectives identified by the Core Working Group (CWG) were important for helping to achieve two high quality webinars.

3) It was clear that the webinar participants were an engaged audience as a high percentage took a significant amount of time to complete the evaluation form to a high degree and even provide testimonials.

4) Educational development
   a. Obtaining input from target audience (i.e. FP) in a formal advisory committee (AC) was a key component to producing relevant content that met learning needs.
      i. In addition to an urban FP on the CWG, the respective urban and rural based FPs on the AC provided feedback that guided all aspects of the project.
   b. Obtaining input from pediatricians
      i. Feedback from pediatricians was important to gauge perceptions of: usefulness of the content to pediatricians and other specialists, FPs understanding of genomics and educational needs, volume of genomics cases referred, types of tests ordered, etc
5) **Educational content**
   
a. Work and input from the CWG and AC allow for the successful delivery of relevant education to various audiences.

b. Purposefully structuring the AC to reflect different practice contexts ensured content would meet needs of all FPs in BC (both urban and rural)
   
i. It was difficult to balance the content delivery with educational needs given the time frame and the various knowledge bases that FPs have on clinical genomics.

c. Genomics is an important emerging topic; however, it was challenging to identify aspect(s) of clinical genomics that were ready for ‘prime time’ and relevant for a FP audience.
   
i. It was beneficial for the webinar presenter to obtain input from the UBC Department of Medical Genetics group during a dry-run of the first webinar to complement the feedback provided by the FPs on the project’s CWG and AC;
   
ii. Combined efforts (both educators and content experts) were needed to make delivery of this challenging topic successful

d. **Webinar**
   
i. It was a challenge to achieve a comprehensive introduction and overview during two webinars (given that the total structured learning time was approximately two hours);
   
ii. It was important to have the presenter involved in the planning stages as a member of the CWG which promoted faculty development and a rich knowledge of the learning needs of the target audience;
   
iii. It was important for presenter to be receptive to feedback on the overall direction and educational content to allow for effective content refinement
   
iv. The presenter’s receptivity to work directly with the input of FPs was important in refining the webinar topic;
   
   1. The presenter found the lead FP on the project to be effective at keeping the content focused on the FP audience (e.g. noting where content could be cut, and always making sure that what the audience was to gain from a teaching point was presented in a concise manner.
   
   2. Practice sessions were useful to refine the content and obtain constructive feedback from the CWG and AC.
   
   v. Integration of case examples to illustrate genomics principles was important as a bridge for FPs to reflect and identify the relevance of clinical genomics to a primary care setting;
   
   vi. The webinar was an appropriate medium to raise FP awareness of genomics (*an unfamiliar topic*) applicability to primary care (Pathman Model, 1996) [Awareness → Agreement → Adoption → Adherence] and the educational design and project recommendations were based on this model).
   
   vii. It was important to have distinct webinar title (instead of using Part A and B) to ensure participants are fully aware that webinar content in the series are different and that they will benefit from participating in both sessions.

e. **Website HUB**
   
i. The website design needs to be simplified to make the educational content prominent and clinical resources easy to find
ii. It is important to keep the referrals and glossary up to date as it is the areas that FPs will more often access

iii. It is important to continue collating and analyzing web analytics of the site to track patterns of use.

iv. It is important to continue to keep the website simple, with dynamic practice relevant resources that are easy to maintain and demonstrate that the website HUB contains dynamic content.

f. **Information Package**

   i. It was beneficial to develop information package as a user friendly, interactive PDF that was easy to navigate and access desired content.

   ii. It was effective to include on BCCGN website as part of dissemination process to further create FP awareness of its resources.

6 **Next Steps and Future Directions**

The high registration and subsequent attendance of physicians in both webinars indicate there is significant interest among physicians and other health care professionals to learn more about clinical genomics. This is further evidenced by the various topics in the table below that participants suggested be included in future educational sessions on clinical genomics.

The evaluation results showed there were reported increases in knowledge across the three main domains of the webinars:

   i. Develop genomics knowledge base applicable to current primary care practice;

   ii. Learning how to access genomics services and technologies to support better patient care; and

   iii. Recognizing current limitations and future opportunities of genomics applications to primary care.

Specifically the evaluation results from both webinars showed that at least 50% of participants agreed they were more familiar with the above domains after the webinar in comparison to their level of knowledge before.

The evaluation finding also revealed that further education is warranted to raise physicians awareness of the resources that has been developed by UBC CPD and the BCCGN for FPs. Specifically, more work is needed to disseminate details about the ‘information package’ and ‘www.genomicsandhealth.com’ website to physicians. Please see Appendix 8 for an initial draft of a message that could be sent to all registrants (inclusive of those who attended and those who did not) of both webinars.

The Website HUB and archived recordings of the two webinars are important legacy pieces that were developed through the project.
Webinar Participants Suggestions for Future Topics Related to Clinical Genomics

Participants expressed an interest in genomics knowledge and shared further topics for further exploration. The table below provides a summary of that data.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer focus</td>
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<tr>
<td>Diabetes</td>
<td></td>
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<tr>
<td>Diseases with proven screening.</td>
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<tr>
<td>Drug metabolism testing as that is a common issue.</td>
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<tr>
<td>Elaboration about specific genetic diseases in a bit of more details specially the more commonly encountered ones in clinical practice.</td>
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<tr>
<td>Genetic syndromes and pharmacogenomics</td>
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<tr>
<td>Genomic information about autism</td>
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<tr>
<td>Genomics behind MEN syndromes (multiple endocrine neoplasia syndromes).</td>
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<tr>
<td>Hemochromatosis</td>
<td>Incorporate genomics in primary care. Possibilities for genomics in common chronic diseases re modification or stratification of treatment regimes.</td>
</tr>
<tr>
<td>Information on future genetic testing for common diseases such as diabetes, thyroid disease etc.</td>
<td></td>
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<tr>
<td>Intellectual disabilities, ADHD, Metabolic Syndrome (Syndrome X), Reproductive issues.</td>
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<tr>
<td>Malignancy in young individuals.</td>
<td></td>
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<tr>
<td>Mental health issues</td>
<td></td>
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<tr>
<td>Micro rna, and specifics are the actuality of genomic testing for given phenotypic or suspectic genotypic diagnoses</td>
<td></td>
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<tr>
<td>Mitochondrial inheritance</td>
<td></td>
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<tr>
<td>More on NIPT.</td>
<td></td>
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<tr>
<td>More on prenatal testing and its availability in BC. More about hereditary cancers, breast, lung, colon, prostate.</td>
<td></td>
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<tr>
<td>New advances in clinical genomics (facts and dispelling myths to allow family physicians to sort out the advances that are still proof-of-concept versus the commercially available and clinically validated</td>
<td></td>
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<tr>
<td>Ophthalmic genetic disorders.</td>
<td></td>
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<tr>
<td>Pharmacogenomics and psychiatric medications</td>
<td></td>
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<tr>
<td>Prenatal diagnosis (including screening component)</td>
<td></td>
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<tr>
<td>Psychiatric medications</td>
<td></td>
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<tr>
<td>Referrals (e.g. when, how, etc)</td>
<td></td>
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<tr>
<td>Terminology of Genome group.</td>
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</tr>
</tbody>
</table>
Dissemination

The project summary report presents an opportunity to build and further develop partnerships with a variety of organizations and institutions:
- E.g. UBC Department of Medical Genetics

Dissemination possibilities:
- Distribute postcard flyers about the website hub to participants attending the May 31st BCCGN Annual Conference and other conference based education
- Adapt the presentation for inclusion as a:
  - ‘CME on the Run’ presentation
    - http://www.ubccpd.ca/event/cme-on-the-run/
  - Vancouver General Hospital (VGH) Department of Medicine Education Rounds
    - http://www.medicine.ubc.ca/education/rounds/
Appendix 1: Core Working Group and Advisory Committee Governance Structure and Terms of Reference

Background

Developing evidence-based educational initiatives that incorporate effective continuing medical education (CME) learning principles and engagement strategies is needed to optimize FP learning and performance to improve health care outcomes in clinical genomics. This initiative provides an opportunity for the BC Clinical Genomics Network (BCCGN) to support BC FPs in becoming more up to date with best practices and emerging opportunities in the field of genomics, and increase awareness of existing support and resources available to provide better patient care.

Core Working Group (CWG)

<table>
<thead>
<tr>
<th>#</th>
<th>Last Name</th>
<th>First Name</th>
<th>Title</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adam</td>
<td>Shelin</td>
<td>Coordinator/ Genetic Counsellor</td>
<td>BC Clinical Genomics Network (BCCGN)</td>
</tr>
<tr>
<td>2</td>
<td>Ameyaw</td>
<td>Stephanie</td>
<td>Research Assistant</td>
<td>UBC CPD</td>
</tr>
<tr>
<td>3</td>
<td>Armstrong</td>
<td>Linlea</td>
<td>Physician Specialist in Medical Genetics/ Education Work Package Leader</td>
<td>TIDE (Treatable Intellectual Disability Endeavor) BC/ BCCA/ Children’s Hospital/UBC Faculty Development</td>
</tr>
<tr>
<td>4</td>
<td>Bluman</td>
<td>Bob</td>
<td>Family Physician/Medical Director of Special Projects</td>
<td>UBC CPD</td>
</tr>
<tr>
<td>5</td>
<td>Lynn</td>
<td>Brenna</td>
<td>Executive Director</td>
<td>UBC CPD</td>
</tr>
<tr>
<td>6</td>
<td>Olatunbosun</td>
<td>Tunde</td>
<td>Project Manager</td>
<td>UBC CPD</td>
</tr>
<tr>
<td>7</td>
<td>Phillips</td>
<td>Lesley</td>
<td>Business Manager</td>
<td>BC Clinical Genomics Network (BCCGN)</td>
</tr>
<tr>
<td>8</td>
<td>Wu</td>
<td>Chloe</td>
<td>Research and Education Coordinator</td>
<td>UBC CPD</td>
</tr>
</tbody>
</table>

Terms of Reference for the Core Working Group

Overview

The Core Working group (CWG) is an internal group that will act as the project leadership for the ‘Education on Clinical Genomics’ (ECG) project. It is comprised on a partnership between the BC Clinical Genomics Network (BCCGN) and the UBC Division of Continuing Professional Development (UBC CPD). The CWG will have the following responsibilities:

1. Approve an effective proposal and implementation plan for a FP education program on clinical genomics.
2. Make operational decisions that guide the ECG project.
3. Ensure the evaluation plan is carried out throughout and summarized at the end of the pilot project.
4. Act as visible and active champions of the project.
5. Work collaboratively to lead the planning, implementation and evaluation of the project.
6. Communicate with others including relevant organizations, partners and physicians about the ECG project including implementation plans, scope and status of the project, benefits to patients and others. The Advisory Committee will serve as one vehicle to support this.

7. Facilitate the educational planning and implementation to support the physician lead and project manager in conjunction with UBC Continuing Professional Development (CPD)

8. Approves the implementation plan to include:
   a. Goals, objectives, timelines, milestones, budget and deliverables
   b. Detailed plan for each activity
   c. Communication requirements

**Reporting**
The Core Working Group for the Project will ultimately report to BCCGN’s co-leaders but will share project visions and directions with the advisory committee as needed.

**Meetings and Term of Membership**
The Core Working group will meet multiple times (as needed) over a 6-9 month period. Whenever possible, meetings will be held in person, though a teleconference line will be available. Communication will also occur via emails requesting input/feedback on various issues and documents, in a timely manner.

**Advisory Committee***

<table>
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<tr>
<th>#</th>
<th>Last Name</th>
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<th>Title</th>
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<td>Dr. Physician Specialist in Medical Genetics/ Education Work Package Leader</td>
<td>TIDE BC/ BCCA/ Children’s Hospital/UBC Faculty Development</td>
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<td>Bob</td>
<td>Dr. Family Physician/Medical Director of Special Projects</td>
<td>UBC CPD</td>
</tr>
<tr>
<td>4</td>
<td>Garrison</td>
<td>Scott</td>
<td>Dr. Family Physician</td>
<td>Richmond, BC (urban input)</td>
</tr>
<tr>
<td>5</td>
<td>Hobson</td>
<td>Bruce</td>
<td>Dr. Family Physician</td>
<td>Powell River, BC (rural input)</td>
</tr>
<tr>
<td>6</td>
<td>Lynn</td>
<td>Brenna</td>
<td>Dr. Executive Director</td>
<td>UBC CPD</td>
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<tr>
<td>7</td>
<td>Niederhoffer</td>
<td>Karen</td>
<td>Dr. Medical Genetics Resident</td>
<td>TIDE BC</td>
</tr>
<tr>
<td>8</td>
<td>Olatunbosun</td>
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<td>Mr. Project Manager</td>
<td>UBC CPD</td>
</tr>
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<td>Phillips</td>
<td>Lesley</td>
<td>Dr. Business Manager</td>
<td>BC Clinical Genomics Network (BCCGN)</td>
</tr>
</tbody>
</table>

*Input/consultation to be obtained for other specialists (e.g. pediatrician or oncologist) as needed.
Terms of Reference for the Advisory Committee

Overview
The Advisory Committee will support the ‘Education on Clinical Genomics’ (ECG) project, in partnership with the BC Clinical Genomics Network (BCCGN) and the UBC Division of Continuing Professional Development (UBC CPD). The Advisory Committee will provide high level input on overall educational development to ensure appropriate and agreed upon educational content is implemented to support FPs in best practices on clinical genomics. The advisory committee will have the following responsibilities:

1. Identify enablers and barriers to physician engagement in practice change and education programs on genomics;
2. Define learning objectives for the education program;
3. Content development;
4. Develop curriculum for the education and engagement strategy;
5. Identify speakers and moderators for webinars;
6. Refine materials for the webinars;
7. Provide input about resources needed for practice change around clinical genomics;
8. Review and provide feedback based on recommendations of the ‘Core Working Group’ for the project;
9. Provide input on resources for the website and the clinician package;
10. Provide input to the evaluation strategy;

Reporting
The Advisory Committee will report to the Core Working Group for the Project.

Meetings and Term of Membership
The Advisory Committee will meet 2-3 times over a 6-9 month period. Whenever possible, meetings will be held in person, though a teleconference line will be available. Communication may also occur via emails requesting input/feedback on various issues and documents, in a timely manner.

Advisory Committee involvement will include: content writing, review, and meeting time. Time commitment will include approximately 4-6 hours of meeting time, with 2-3 additional hours of document review.
Appendix 2- AC Input on Pre-Meeting Reflective Questions

The points below, highlights key comments provided by the advisory committee that pertain to the questions they were asked to reflect on prior to the October 2012 meeting:

- FPs would not be clear of the differences between the genetics and genomics and would need more background information regarding the science of the fields.
- FP knowledge level: for genetics, they would have some familiarity whereas for genomics, level of knowledge would essentially be zero.
- As FPs generally do not know what genomics is, they may not be able to appropriately differentiate the clinical cases they have been involved in where genomics was important, i.e., the awareness of clinical genomics is very low and FPs are not familiar with the context of genomics.
  - FPs may not be familiar with using genomics as a predictive tool for their patients’ conditions. For example: A FP refers a developmentally disabled child to Children’s Hospital. After a long waiting time for the referral to come through, the FP may not understand the (genetic/genomic) findings and may not know what to do with the findings.

Conversations held with patients regarding clinical genomics:
- FPs rarely use the word ‘genomics’ in their conversations with patients. Instead, they use other terms that are usually in reference to specific problems.
  - It was suggested that we could put specific health issues as probe in the webinar titles, making the education more relevant to FP practice.
    - For example, ‘what is going on with a developmentally delayed child?’

Examples of problems that FP struggle with:
- Children with developmental, physical and behavioral problems. (1 to 2 kids a year like this may be seen in practice and the time to have these patients referred and evaluated at Sunnyhill or Children’s is lengthy)
  - Suggestion of the value in sensitizing FPs to patients (e.g. children) who have previously been assessed, but might now benefit from genomics in order to obtain a diagnosis and be better treated.
- Cardiovascular diseases and risk
- Hereditary diseases and risk
- Blood or heart diseases – e.g. hemochromatosis or why a patient is not responding to warfarin?
- Cancers
- Metabolic disorders and risk (e.g. diabetes, hyperlipidemia)

DTC (Direct-to-Consumer):
- Most FPs have not heard about DTC or seen any DTC reports as the customer uptake is not high in Canada. Some physicians might seek information if 1) their patients brought information from Internet to ask about it; 2) physician’s own interest.
  - Paternity requests are likely the extent of requests coming from pts.
- FPs need to be aware of the existence of DTC, knowing what the DTC reports look like and how to interpret them.
Useful resources, tools, and/or services for clinical genomics:
- FPs may not know where to get reliable genomics information without getting bogged down. There is value in ‘We-can-help-you’ tools that point FPs to the clinical resources needed. Should be disease specified: available tests and resources.
- “I rarely send people to medical genetics, and maybe it’s because I don’t know the full scope of what they do”
- The basics of genomics (genomics 101) need to be integrated into the educational delivery and it is important for the content to be clinically relevant.
- ‘Resource navigator’ is needed. Could be email contact, potentially a phone line although FPs inquiries on genomics are not going to be urgent.
  - FPs are likely unaware of the existing provincial genetics program’s phone help line.

Locations FPs look for medical questions outside genetics:
- UpToDate (FPs with membership are offered free access through Divisions of Family Practice), Mayo Clinic, discussions with colleagues, CPSBC medical library service
  - FPs are likely not using the library regularly
  - Above resources are often used when doing in-depth research as they may be too time consuming during patient visits (although UpToDate may be used as a quick reference tool)
- FPs would more likely 1) directly ask an expert via email or over the phone; or 2) refer the patient to specialists and expect a consultation report
- Some physicians would take what they learn from CME events and embed into their own EMR for clinical use.
Appendix 3- Evolution of Visual Representation of Website Map

Early Draft

Final Draft
Appendix 4- - Sample of Marketing Messages

Email blast to all physicians about January 28th webinar

Dear ,

Please join us for the free UBC CPD webinars on genomics:
Genomics in Primary Care: What's Ready for Prime Time?
...Get more comfortable using genomics to help your patients

Mon, Jan 28, 2013, 7-8 pm PST
Mon, Mar 4, 2013, 7-8 pm PST
Registration: https://events.ubccpd.ca/website/index/109911 (limited space)
Target audience: Family physicians, Specialists, and Residents
Accreditation (per webinar): Up to 1.0 Mainpro M1/ MOC Section 1/ AMA PRA Category 1 CreditsTM
Speakers:
Dr. Linlea Armstrong, Medical Geneticist, Children's Women & Children Hlth Ctr.
Dr. Bob Bluman, Family Physician, Medical Director of Special Projects, UBC CPD

These 2 webinars are distinct in content, so you will benefit from attending either one or both sessions. Both webinars will contain practical take-home messages and strategies for implementation in practice.

Learning Objectives:
1. To develop your genomics knowledge base applicable to current primary care practice
2. To learn how to access genomics services and technologies to support better patient care
3. To recognize current limitations and future opportunities of genomics applications to primary care

Testimonial: “After learning about the full potential of genomics, I’m now able to more confidently counsel my patients about when this might be helpful in diagnosing and treating their conditions as well as when a genomic analysis is unhelpful and potentially dangerous” - Family Physician

Sponsored by the BC Clinical Genomics Network (BCCGN) and UBC Division of Continuing Professional Development (UBC CPD).

Please disregard this message if you have already registered for the webinar(s). A connection email with details of the accessing the webinar will be sent to registrants prior to each webinar. For additional information on these webinars, please contact Tunde Olatunbosun (tunde.o@ubc.ca).

UBC CPD Webinars: http://www.ubccpd.ca/events/webinar/
UBC CPD: www.ubccpd.ca (604) 875-5101
STAY CONNECTED! Follow us on Facebook and Twitter @UBCCPD
ECG Webinar promo slide used in other educational webinars

[Image of webinar slide]

**Genomics in Primary Care: What's Ready for Prime Time?...**

*Get more comfortable using genomics to help your patients*

**Target audience:** Family Physicians, Specialists, and Residents

**Dates:**
- Part A: Mon, Jan 28, 2013, 7:00 – 8:00 pm PST
- Part B: Mon, Mar 4, 2013, 7:00 – 8:00 pm PST

**Registration:**
- [https://events.ubccpd.ca/...](https://events.ubccpd.ca/website/index/109911)
- OR click on webinar link on the UBC CPD homepage ([www.ubccpd.ca](http://www.ubccpd.ca))

**Accreditation:**
- up to 1.0 Mainpro M1/MOC Section 1/AMA PRA Category 1 Credits™ (per webinar)

**Cost:** Free

**Location:**
- Online on your home or office computer

**Speakers:**
- Dr. Urlea Armstrong, Medical Geneticist, Children’s Women & Children Hth Ctr.
- Dr. Bob Bluman, Family Physician, Medical Director of Special Projects, UBC CPD

**Learning Objectives:**
1. To develop your genomics knowledge base applicable to current primary care practice.
2. To learn how to access genomics services and technologies to support better patient care.
3. To recognize current limitations and future opportunities of genomics applications to primary care.

*For additional information on these webinars, please contact Tunde Olatunbosun ([tunde.o@ubc.ca](mailto:tunde.o@ubc.ca))

---

**Testimonial:**

“After learning about the full potential of genomics, I’m now able to more confidently counsel my patients about when this might be helpful in diagnosing and treating their conditions as well as when a genomic analysis is unhelpful and potentially dangerous.”

- Family Physician
Reminder Email to Past Registrants

Dear <<Participant Name>>,

Thank you for participating in the January 28, 2013 online webinar on Genomics in Primary Care - Part A. We hope that you enjoyed the event. An archive webinar recording is now available: http://ubc-cpd.adobeconnect.com/p2ot8mdoqhg/

This webinar was funded by the BC Clinical Genomics Network (BCCGN) and delivered in partnership with the UBC Division of Continuing Professional Development (UBC CPD). BCCGN resides within the Department of Medical Genetics at UBC, has a strong mandate in physician education, and is committed to developing genomics education programs that will lead to the appropriate and timely clinical use of genomic technology by BC physicians.

BCCGN and UBC CPD have also developed a genomics website (http://genomicsandhealth.com) as a simple resource with only the best and most practical information and tools on genomics listed. To stay informed about other initiatives being led by BCCGN, and sign up for the BCCGN mailing list, click the 'Contact Us' button at the top of the aforementioned website to enter your contact details.

The Part B webinar is scheduled for March 4th at 7:00 pm. You are invited to register for this webinar if you have yet to do so. Registration information is below.

**Date:** Mon, Mar 4, 2013, 7-8 pm PST – Part B  
**Registration:** https://events.ubccpd.ca/website/index/109911 (limited space)  
**Target audience:** Family physicians, Specialists, and Residents  
**Accreditation (per webinar):** Up to 1.0 Mainpro M1/ MOC Section 1/ AMA PRA Category 1 Credits™  
**Speakers:**  
Dr. Linlea Armstrong, Medical Geneticist, Children's Women & Children Hlth Ctr.  
Dr. Bob Bluman, Family Physician, Medical Director of Special Projects, UBC CPD

Physicians that attended the Part A webinar positively rated the webinar and 89% of participants had at least one patient in their practice they believed the webinar information would be relevant to. Participating physicians also had the following comments:

“A succinct explanation of practical application and use of genetic testing and counselling in family practice;”

“An excellent review of genomics, a hot topic in medicine that has come a long way in past few years;” and

“I was unaware how much had happened in clinical genomics until I took this webinar. I’m very pleased I took it and will be looking to learn more.”
If you are keen to continue your education on genomics then please consider the following upcoming events:

**Event:** BCCGN Physician Workshop – An Introduction to Genomic Technologies  
**Date:** Feb 20, 2013  
**Location:** Children and Women’s Hospital  
**Details:** [http://www.bccgn.ca/news-events/PhysicianWorkshop.htm](http://www.bccgn.ca/news-events/PhysicianWorkshop.htm)

**Event:** BCCGN Annual Conference  
**Date:** Apr 19, 2013  
**Location:** Vancouver Convention Center  
**Details:** [http://www.bccgn.ca/news-events/Conference.htm](http://www.bccgn.ca/news-events/Conference.htm)

UBC CPD Webinars: [http://www.ubccpd.ca/events/webinar/](http://www.ubccpd.ca/events/webinar/)  
UBC CPD: [www.ubccpd.ca](http://www.ubccpd.ca) (604) 875-5101

STAY CONNECTED! Follow us on [Facebook](http://www.facebook.com) and [Twitter @UBCCPD](http://twitter.com/UBCCPD)

To remove or update your email address please reply with “REMOVE” or “UPDATE” in the subject field. Thank you.
Email blast to all physicians about March 4th webinar

Dear,

Please join us for the Part B free UBC CPD webinars on Genomics:

Part B - Genomics in Primary Care: What's Ready for Prime Time?
...Get more comfortable using genomics to help your patients

Mon, Mar 4, 2013, 7-8 pm PST – Part B
Registration: [https://events.ubccpd.ca/website/index/109911](https://events.ubccpd.ca/website/index/109911) (limited space)
Target audience: Family physicians, Specialists, and Residents
Accreditation (per webinar): Up to 1.0 Mainpro M1/ MOC Section 1/ AMA PRA Category 1 Credits™
Speakers: Dr. Linlea Armstrong, Medical Geneticist, Children’s Women & Children Hlth Ctr.
Dr. Bob Bluman, Family Physician, Medical Director of Special Projects, UBC CPD

Testimonials (from Jan. 28th Part A physician participants)

“A succinct explanation of practical application and use of genetic testing and counselling in family practice.”

“An excellent review of genomics, a hot topic in medicine that has come a long way in past few years.”

“I was unaware how much had happened in clinical genomics until I took this webinar. I’m very pleased I took it and will be looking to learn more.”

This Part B webinar is the second in a two-part series (there will be a brief review of the content covered in the Part A webinar, and the full archive recording is available on our website at: [http://ubc-cpd.adobeconnect.com/p2ot8mdoqhg/](http://ubc-cpd.adobeconnect.com/p2ot8mdoqhg/) discussing how clinical genomics and associated technology is currently being integrated into matters such as:
- Solving diagnostic puzzles of children with developmental delay; as well as
- Assessing probabilities for good and/or bad reactions to medication (pharmacogenomics).

Practical take-home messages and strategies for implementation in practice will be provided.

Learning Objectives:
4. To develop your genomics knowledge base applicable to current primary care practice
5. To learn how to access genomics services and technologies to support better patient care
6. To recognize current limitations and future opportunities of genomics applications to primary care

Sponsored by the BC Clinical Genomics Network (BCCGN) and UBC Division of Continuing Professional Development (UBC CPD).
Please disregard this message if you have already registered for the webinar(s). A connection email with details of the accessing the webinar will be sent to registrants prior to each webinar. For additional information on these webinars, please contact Tunde Olatunbosun (tunde.o@ubc.ca).

UBC CPD Webinars: [http://www.ubccpd.ca/events/webinar/](http://www.ubccpd.ca/events/webinar/)
UBC CPD: [www.ubccpd.ca](http://www.ubccpd.ca) (604) 875-5101
STAY CONNECTED! Follow us on [Facebook](http://www.facebook.com) and [Twitter @UBCCPD](http://twitter.com/UBCCPD)
To remove or update your email address please reply with “REMOVE” or “UPDATE” in the subject field. Thank you.
Appendix 5- Webinar Evaluation Questionnaire - Sample

NOTE: the questionnaire below were asked of the Part B (March 4, 2013) webinar participants.

1. I graduated from medical school in _________________[specify]

2. I am a
   □ FP
   □ Specialist _________________[specify]
   □ Other _________________[specify]

3. In what city/town do you primarily practice? _________________

4. How did you hear about this webinar?
   □ UBC CPD email
   □ BC Clinical Genomics Network (BCCGN) email
   □ Other _________________[specify]

4a. Did you attend the Part A webinar on Jan. 28th?
   □ Yes
   □ No

5. BEFORE/AFTER this webinar session, I was familiar with:
   (1=Strongly Disagree; 2=Disagree; 3=Not Decided; 4=Agree; 5=Strongly Agree)

<table>
<thead>
<tr>
<th></th>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Basic knowledge of genomics that is applicable to primary care</td>
<td>1  2  3  4  5</td>
<td>1  2  3  4  5</td>
</tr>
<tr>
<td>b) Genomics services and technologies that are available in BC for patient care</td>
<td>1  2  3  4  5</td>
<td>1  2  3  4  5</td>
</tr>
<tr>
<td>c) Current limitations and future opportunities of genomics applications in primary care</td>
<td>1  2  3  4  5</td>
<td>1  2  3  4  5</td>
</tr>
</tbody>
</table>

6. Please indicate your agreement level regarding the following statements.
   (1=Strongly Disagree; 2=Disagree; 3=Not Decided; 4=Agree; 5=Strongly Agree)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) I have a better sense of how genomics can contribute in the diagnostic process of an individual with intellectual disability</td>
<td>1  2  3  4  5</td>
<td></td>
</tr>
<tr>
<td>b) I have a better sense of how genomics may in the future contribute to optimizing selection of medications for patients</td>
<td>1  2  3  4  5</td>
<td></td>
</tr>
<tr>
<td>c) I have learned a lot from this webinar.</td>
<td>1  2  3  4  5</td>
<td></td>
</tr>
<tr>
<td>d) There were adequate opportunities for interaction during the webinar.</td>
<td>1  2  3  4  5</td>
<td></td>
</tr>
</tbody>
</table>
7. Please indicate your overall rating of the webinar:

- Poor
- Fair
- Good
- Very Good
- Excellent

8. What was the most helpful part of the webinar? _______________[specify]

9. What was the least helpful part of the webinar? _______________[specify]

10. Is there anything you perceive and/or plan to do differently as a result of having attended this webinar? _______________[Please briefly describe.]

11. Please specify any tools or resources that would be helpful in supporting a change in attitude and/or practice around genomics in primary care? _______________

12. Is the webinar information relevant to at least one patient in your practice?

- Yes
- No

13. How likely are you to share the information you learned from the webinar with your colleagues in primary care?

- Not at all likely
- Somewhat likely
- Very likely

14. Please comment on a clinical genomic topic area(s) that you would like to see included in a potential future webinar or educational session on clinical genomics? _______________

Presenter Evaluation

15. Please indicate your agreement level regarding the following statements for Dr. Linlea Armstrong

(1=Strongly Disagree; 2=Disagree; 3=Not Decided; 4=Agree; 5=Strongly Agree)

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Knowledge was communicated successfully.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Speaker was interesting and engaging.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional comments on the presenter: _______________

16. During today’s session, did you experience any difficulties viewing the webinar?

- Yes
- No

_______________ If ‘Yes’, please describe.
17. Did you feel there was any industry bias in the webinar?

☐ Yes
☐ No

___________ If ‘Yes’, please describe.

18. Have you visited the new family physician genomics website (www.genomicsandhealth.com) developed by UBC CPD and BCCGN?

☐ Yes
☐ No

___________ If ‘Yes’, please provide any comments about the website (e.g. usefulness of information, ease of navigation, etc).

19. Have you referred to the information package on clinical genomics handout that was made available during the Jan. 28th (Part A) and today’s (Part B) genomic webinars?

☐ Yes
☐ No

___________ If ‘Yes’, please provide any comments about the information package (e.g. usefulness of information/resources, etc).

20. If you enjoyed the webinar please leave a testimonial that we can use to explain its value to other physicians.

______________________________________________________________________________________________________________

______________________________________________________________________________________________________________
Appendix 6- January 28, 2013 Webinar Part A Evaluation Results

Joint UBC CPD/BCCGN Webinar Evaluation Summary

Webinar Date: Monday, January 28 2013
Topic: Genomics in Primary Care: What’s Ready for Prime Time (Part A)
Speakers: Dr. Linlea Armstrong & Dr. Bob Bluman

Total Participants: 92
Total Evaluations: 77
Evaluation Response Rate: 84%

1. Year of Graduation:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 1980</td>
<td>18</td>
<td>28%</td>
</tr>
<tr>
<td>1980-1989</td>
<td>20</td>
<td>31%</td>
</tr>
<tr>
<td>1990-2000</td>
<td>15</td>
<td>23%</td>
</tr>
<tr>
<td>After 2000</td>
<td>7</td>
<td>11%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Subtotal</strong>:</td>
<td><strong>64</strong></td>
<td><strong>78%</strong></td>
</tr>
<tr>
<td>No response</td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

2. I am a

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP</td>
<td>59</td>
<td>78%</td>
</tr>
<tr>
<td>Specialist</td>
<td>6</td>
<td>8%</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>14%</td>
</tr>
<tr>
<td><strong>Subtotal</strong>:</td>
<td><strong>76</strong></td>
<td><strong>78%</strong></td>
</tr>
<tr>
<td>No Response</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*If specialist, please specify:*
- Neuro-Ophthalmologist.
- Trained in endocrine, metabolic and biochemical diseases.
- Psychiatrist.
- Pediatrics.
- Emergency Medicine.
- Psychiatrist.

*If other, please specify:*
- International Medical Graduate-Internal Medicine.
- ERB.
- Hospitalist.
- SMO.
- Medical Administrator.
- Undergraduate Student.
- Family Nurse Practitioner.
- Genetics Technologist.
- Mental Health Clinician.
- Postdoctoral Fellow.
3. I practice in the following city/town:

Canada (in BC)
- Abbotsford: 1
- Burnaby: 1
- Castlegar: 1
- Central and north Vancouver Island: 1
- Coquitlam: 1
- Delta: 3
- Duncan: 3
- Fort ST John: 1
- Kamloops: 2
- Langley: 1
- Nanaimo: 2
- Nelson: 1
- New Westminster: 1
- North Vancouver: 1
- Penticton: 1
- Port Coquitlam: 1
- Port Moody and Surrey: 1
- Powell River: 1
- Revelstoke: 1
- Richmond: 2
- Spruce Grove: 1
- Surrey: 3
- Terrace: 1
- Vancouver: 26
- Vernon: 1
- Victoria: 2
- West Vancouver: 1

Canada (outside BC)
- Ottawa, ON: 1
- Whitehorse, YK: 1

World at large
- Accra, Ghana: 1
- Bermuda: 1
- Sao Paulo, Brazil: 1
- Seattle, USA: 2

Other
- Currently on Sabbatical: 1

4. How did you hear about this webinar?

<table>
<thead>
<tr>
<th>Source</th>
<th>Responses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>UBC CPD email</td>
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<td>69%</td>
</tr>
<tr>
<td>BCCGN email</td>
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<td>8%</td>
</tr>
<tr>
<td>Other</td>
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<td>3%</td>
</tr>
<tr>
<td><strong>Subtotal:</strong></td>
<td><strong>73</strong></td>
<td></td>
</tr>
</tbody>
</table>

If other, please specify:
- Division of General Practice email.
- St Paul's family medicine departmental rounds.
- UBC CPD website.
LEARNING AND APPLICATION OF KNOWLEDGE

5. Before/After this webinar session, I was familiar with basic knowledge of genomics that is applicable to primary care.

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Disagree</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>Undecided</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Agree</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>77</td>
<td>77</td>
</tr>
</tbody>
</table>

% Increase in Agreement (‘4’ + ’5’) After vs. Before: 58%

Before/After this webinar session, I was familiar with genomics services and technologies that are available in BC for patient care.

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>Disagree</td>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td>Undecided</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>Agree</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>76</td>
<td>77</td>
</tr>
</tbody>
</table>

% Increase in Agreement (‘4’ + ’5’) After vs. Before: 63%

Before/After this webinar session, I was familiar with current limitations and future opportunities of genomics applications in primary care.

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Disagree</td>
<td>27</td>
<td>4</td>
</tr>
<tr>
<td>Undecided</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Agree</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>77</td>
<td>77</td>
</tr>
</tbody>
</table>

% Increase in Agreement (‘4’ + ’5’) After vs. Before: 66%
I have learned a lot from this webinar:

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tr>
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Subtotal: 73
No Response: 4

There were adequate opportunities for interaction during the webinar:

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Undecided</th>
<th>Agree</th>
<th>Strongly Agree</th>
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Subtotal: 75
No Response: 2

Please indicate your overall rating of this webinar:

<table>
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<tr>
<th>Poor</th>
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<th>Good</th>
<th>Very Good</th>
<th>Excellent</th>
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</table>

Subtotal: 74
No Response: 3
What was the most helpful part of the webinar?

a. General comments:

Excellent and engaging description of the state of the art with good clear illustrations of how we might be using this material in real cases. A good overview and explanation of Genomics; referral resources; also good handouts. All the general information in this evolving area of medicine. Consideration of specific difficult scenarios and questions asked of the presenter. Current update. Excellent walk through of Genomics and examples of use. Discussion about testing and resources to access if we have patients who have done the testing or we want to order. Explained what is genomics. General information about the area of genomics. General review but with "real" application of problems we see in the office (breast cancer, prenatal etc.). Going through the basic of genome. Good overview & explanation on genomics; good handout. Just learning about this totally new topic to me. Learning about the future potential of genomics. Learning about the potential for genomics and also to be aware that patients may present with SNIP screening. Loved the ability to answer multiple choice questions. The general discussion of genomics, what it is and what at this point in time we might encounter with patients who have paid for SNIP screening. The layout and flow was excellent. I enjoyed the interactive surveys.

b. Specific comments:

Consult Genetics. How to think about gene panels, different kinds of genetic testing, what the results from recreational labs look like. Information re how to handle/refer counsel patients who have had DTC genetic testing done.; The role of Genetic testing by Physicians in diagnosis of difficult genetic syndromes.; Referral sources if a patient is tested positive for gene linked to a hereditary disease. List of referral sites. Made me aware of genomics and possible patient testing form "recreational labs". Practical approach with cases. Significance of SNPs. The provincial genetics cancer program. The resources. The value of genomics in specific disorders. To know what is currently available for disease diagnosis and management. Visual slides very helpful- i.e. encyclopedia Britannica. Visuals were good, the multiple choice questions were effective at engaging the listener. The info about the relative weighting to give to the information provided by direct-to-consumer genomic results. The information how technology has made sequencing available at much lower costs moving genomics into the focus of primary care. The information on biochemical diseases. The Disease Causation Breakdown, and the recreational versus medical lab consideration. The case studies wherein she presented someone approaching a fictitious gp with a private lab genetic; risk profile, it has happened to me already a couple of times, and I have been a little floored - she helped guide us through how to manage such an encounter - thanks. Question and answer as well as the excellent presentation. Differentiation between individual genetic tests/results and actual genetic diseases.

Joint UBC CPD/BCCGN Webinar 2013
The subject matter itself is very important and as FPS we need to know what to recommend to patients. I would like to see more recommendations in terms of cancer genetics however. I have young patients who get breast ca at 40, have 2 daughters and her mother in law had breast and maybe bowel ca in her 50s but she is not offered genetic testing. I think for the daughters’ sake, it would be made available. However, it is not. So... do I recommend she go through private testing for the BRCA1 and 2?! What about for dementia?

Knowing what our patients have access to, and what the pitfalls of that information are.

What was the most helpful part of the webinar?

Topics

Diagnosis. 4
Diagnostic pathway and interpretation of Cancer of the Breast in a family. 1
Discussion of DTC testing/How to deal with Direct to Consumer test results. 3

What was the most helpful part of the webinar?

c. Speaker and Presentation:
Excellent speaker, very clear and understandable, uses great analogies.
Good speaker...able to use analogy of encyclopedias effectively!
Speaker’s use of library analogy helps with understanding of information sequencing and storage in genome.
Slides were useful and directive. I liked the encyclopedia analogy to explain the genomics approach to testing. The sign in and technology was very easy to use and intuitive.

What was the least helpful part of the webinar?

Explanation of DNA.
I am still very confused as to what is being tested and under what circumstances I would recommend testing - the examples used were hearing, breast Cancer, intellectual disabilities, - how did these get picked?? Do we just pick out of a hat what disease may be genetically tested for?? Not at all clear and very confusing.
I would have preferred the webinar being a bit longer and covering more material.
I’d like a bit clearer idea of how realistic it is to get a patient through the wait list and into testing.
It didn’t seem all that relevant to practicing primary care physicians (except for the few DTC scenarios).
It was all pretty useful, although the intro part of what is “DNA” was probably not really necessary.
More information needed about “recreational genomics” and dangers.
More time for questions would have been good.
Not getting the PowerPoint to add notes to.
Only questions at the end. The seminar was clear about the need for interpretation and how much we would need it. It seems that there is not likely the people to carry this out for us if this really takes off.
Review of very basic genetics.
Seeing the answers to the questions before most people have entered an answer— it skewed the results.
Some of the introductory material due to previous background.
Testing genomics for deafness.
The introduction to DNA/genetics was too basic.
The software doesn’t let you print info as the slides are presented...I guess I wanted to squirrel away the website information while we were going through the presentation. Sorry.
Too little time for interaction.
Very basic genomics.
Would like to be able to download the slides in presentation.

Is there anything you perceive and/or plan to do differently as a result of having attended this webinar?

a. Referring and counselling for patients:
Access them more if need be.
Always involve a geneticist.
Be more open to genomic testing by DTC companies and to call upon the expertise of the genetic counselling services for assistance in what to advise pts to do with these results.
Better counselling for patients.
How I would counsel patients re DTC testing; When to refer for Genetic counselling or assessment.

Joint UBC CPD/BCCGN Webinar 2013
I am going to make a phone call...
I think I'll think of genetic and familial a little differently. I may go straight to genetics consultations where I would have referred to the related clinical specialist in the past.
I try to refer as appropriate (medical genetics, hereditary cancer program etc) This serves to broaden my knowledge and base of things I can refer about.
I will be better able to counsel patients about testing available.
I'll have a much lower threshold for referring people for genomic evaluation.
Refer to BC Hereditary program more.
To refer familial cases.
Use the phone line for provincial medical genetics program.
Yes, referral services.

Is there anything you perceive and/or plan to do differently as a result of having attended this webinar?

b. Changes to patient care:
Better handle patient requests re: genetic testing and test interpretation.
I think for the time being I may dissuade my patients from getting private dna risk profiles.
I will be thinking about my patients differently and pondering how I might help them more effectively, more than I did prior to attending this webinar.
Will be more comfortable discussing genomics with patients.
Yes, How I advise patients on the use of the DTC services and demands to order genomic testing from medical labs.
Management of patients.
More aware of how to handle private lab testing results that patients come into the office with.

Is there anything you perceive and/or plan to do differently as a result of having attended this webinar?
c. Genomic knowledge and resources:
Attend part 2.
Be more knowledgeable about screening tests.
Check the Genetics websites more often to see what the new info is.
Counsel patients at risk.
I have to read more and/or attend more educational events to become comfortable with the genetics which apply to general practice.
Learn more about genomics, ethics and genetic counselling.
Reading more about genomics.
Try to attend the next one , and read more.
Good handouts and referral notes.
The information package was wonderful and will be put to good use.
Yes, that there are various resources available for a clinician . This will improve on Patients care.

Is there anything you perceive and/or plan to do differently as a result of having attended this webinar?

d. No change
I will have to think about this.
It does not apply directly to my work but I feel I should stay current.
No
No
No.
But the website info is useful. Thanks for that.
Not personally – however this knowledge informs my administrative role.
Not really.
Not really, already send patients for genetic testing and counselling.

Joint UBC CPD/DCCGN Webinar 2013
Not too likely - I am unsure.
Not yet.
Not yet.
Not yet.

Would any tools or resources be helpful in supporting your change in attitude and practice around genomics in primary care? Has MSP approved resources for all of these activities? Which screening tests are cost-saving and appropriate? (What is the positive predictive value for screening for each of these genes and/or diseases? Negative predictive value? Costs in stress and anxiety to patients?...)
Who is going to pay for all of the necessary work (interviews, research, interpretation, etc.) required prior to counselling and then counselling? Has MSP approved resources for these activities? Which screening tests are cost-saving and appropriate? What is the positive predictive value of these tests? Negative predictive value? Costs in stress and anxiety to patients?... How much time is to be spent on these activities and which healthcare workers are going to be knowledgeable enough, skilled enough, and have enough free time to be dedicated to this function?
Who is effectively regulating and effectively enforcing regulations of genomics companies?

A copy of the PowerPoint would be useful; Tools / guidelines on how to interpret commercial test results
A website to register patients, with a visual representation of where you are in the priority and what the wait-time is, so I can learn whether I am wasting your time with a given referral and also so I can help my patient be aware of how likely it is that they will be tested, and how soon.

Algorithms for how to approach a patient's issues.
Be able to refer back to the slide presentation.
Email to participants the websites at the end of Dr. Armstrong's presentation.

Good guidelines.
Hands on learning of genetic technologies.
Helpful to know of the different clinics for the hereditary conditions.

Hereditary cancer.
I will benefit from knowing more about this complex subject.
I would have thought of genetics testing for a newborn with neuro-sensory hearing loss but not a patient with cardiomyopathy. A list of clinical disorders most likely to be illuminated with genetic testing.
Increase the availability of medical personnel to assist in genetic advice/counselling.

Information about how to access this for patients: what might be covered in what situations and reasonable to order.
Interested in resources for exploring the science and progress of developing personalized medicine for general patient use.
It's difficult to share information resources with patients, and then not have much time to spend with them. A short lead-in time for patients who have real concerns for genetic consultation will be welcome.
Just the links to the website.

Knowing that the genetic counselling colleagues are willing to help us in GP when facing these issues.
List of physicians in certain sub-specialties for whom the use of genomics is apparent and necessary
Local lectures.
More information as to which testing is actually available - and cost i.e. the BRCA testing for breast cancer.
More information generally.
More information on local sources for testing and interpretation in Primary Care.
More information sessions - possibly a "guideline" never thought I would hear myself say that!!

No.
No.
Not sure.
Not yet.
Not yet.
Patient handouts.
Periodic updates as testing improves.

Referral resources, also good guides.

The available websites are awesome.

The resources are very likely already out there. I have just to motivate myself to look for them.

We need to be updated on a continued basis as this is an ever-changing field and we need to be informed as to what resources are available to us and our patients and what recommendations are current in terms of who should be screened.

Yes.

Yes, the referral forms were fabulous!

Is this information relevant to at least one patient in your practice?

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<tr>
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<th>No</th>
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<tbody>
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How likely would you share the information you learned from the webinar with your colleagues in primary care?

<table>
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<td>Total</td>
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Was there anything you were hoping to learn that was not covered in this webinar that you would like to see included in the next Genomics Webinar on March 4th (Webinar Part B)?

<table>
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If you answered other, please specify

- Can any of this info apply to elderly patients, or are we mainly dealing with children and young adults?
- Micro rna.
- Mitochondrial disorders.
- Non invasive prenatal testing and its availability in bc.
- Not sure.
- Practical FP information.
- Utility of pharmacogenetic tests.
PRESENTER EVALUATION: DR. LINLEA ARMSTRONG

Knowledge was communicated successfully.

<table>
<thead>
<tr>
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Speaker was interesting and engaging.

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Did you feel there was any industry bias in any of the presentations?

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If you answered yes, please specify:
The bias was rather AGAINST industry. Without industry (e.g., Myriad Genetics) we wouldn’t have the present technological and interpretative options presently available. Let’s not be hypocrites...

General comments/suggestions on the webinar/handout/website/clinician package?

A fascinating and cutting edge topic.
Excellent, exciting and daunting at the same time! Thank you for this wonderful educational service.
Excellent. I was riveted.
Good.
Great job.

Have not yet downloaded the package.
Have not yet looked at handouts but good material so far.
I recognize I need more than two hours to learn everything I need to know. This field has gone nuts since I last studied human genetics.
Very exciting stuff. I want my genome completely read!
I’m interested in learning a bit more of non invasive prenatal testing.
My thanks to Bob Bluman and Linea Armstrong!
Need lots of info on pharmacogenomics.
nil
nil
The technology worked well. Ease of access is tremendous.
Website well done.

If you enjoyed the webinar please leave a testimonial that we can use to explain its value to other physicians:
A great way to learn without leaving your home.
A great, engaging and easy way to learn basics on an important topic, especially in the future.
A succinct explanation of practical application and use of genetic testing and counselling in family practice.
Cutting edge info in the direction Medicine is headed.
Dr. Armstrong presents fascinating information that can be used by clinicians immediately. She explains the scientific underpinnings for clinical decisions in a concise, thorough manner. I learned an enormous amount about the usefulness of genomic tools in everyday practice.
Looking forward to Part 2 and sorry I have to wait so long.
Effective and accessible CME.
Excellent.
Excellent CME tool, accessed anywhere (I'm presently doing a locum in New Zealand), topics are very pertinent, well presented and usually full of valuable information.
Excellent presenter! Very accessible lecture-I participated in the webinar from home. Relevant information-timely and important to know!
Excellent speaker with ability to simplify a difficult topic and make it understandable.
For a 1969 graduate (UBC) the opportunity for acquiring familiarity with genomic principles is very welcome.
Good review of genomics, a hot topic in medicine that has come a long way in past few years.
Great to have quality CME in the comfort of your own home. Thanks.
Greatly, value is in the practicality of the presentation.
I am a psychiatrist and work with individuals with developmental disorders, with often very unique and unusual reactions to medications so these webinars are very helpful
I didn’t realize how much had happened in this field until I took this webinar. I’m very pleased I took it and will be looking to learn more.
I think the fact that there are resources available and Primary care Physicians are aware of, this will make a big difference. The physicians will be able to always consult.
It is easy informative so why not attend?
It is very informative.

New technology is only good if we apply our first and foremost credo of First Do No Harm or we may end up with Caveat Emptor instead. Therefore, it behooves all of us to study this matter cautiously and passionately so we can maximize its utility in alleviating disease or better yet preventing it.
The whole family can listen, in the comfort of their own home, and even eat dinner at the same time!
This is a very convenient way to learn. Nice to get this kind of information in nice one hour, non-exhausting packages.
This will be the future of medicine and a working knowledge will be vital.

Useful to learn the very basic info re Genomics so that I can be aware of what patients may be referring to with private "recreational" screening. Also I’m interested to learn more from the second half of the genomics series.
Very good way to learn. In the comfort of home and in my PJs.
Very informative, and speaker was able to explain the complex topic very effectively.
Very interesting, but also question-generating.
Waiting for part 2.
Appendix 7: March 4, 2013 Webinar Part B Evaluation Results

Joint UBC CPD/BCCGN Webinar Evaluation Summary

Webinar Date:
Monday, March 4 2013

Topic:
Genomics in Primary Care: What’s Ready for Prime Time (Part B)

Speakers:
Dr. Linnea Armstrong & Dr. Bob Bluman

Total Participants: 68
Total Evaluations: 63
Evaluation Response Rate: 93%

1. Year of Graduation:

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If specialist, please specify:
- Internal Medicine
- Psychiatrist

If other, please specify:
- Clinical Associate
- Hospitalist
- Mental Health Clinician
- Pediatric
3. I practice in the following city/town:

Canada (in BC)
- Burnaby: 2
- Cranbrook: 1
- Courtenay: 1
- Fort ST John: 1
- Kamloops: 2
- Langley: 1
- Maple Ridge: 1
- Nanaimo: 2
- Nelson: 1
- New Westminster: 2
- North Vancouver: 1
- Penticton: 1
- Port coquitlam: 1
- Powell River: 1
- Spruce Grove: 1
- Surrey: 3
- Vancouver: 26

Canada (outside BC)
- Ottawa, ON: 1
- Calgary, AB: 1
- Toronto, ON: 3
- High River, AB: 1

World at large
- Accra, Ghana: 2
- Seattle, USA: 2
- New Dheld, India: 1

4. How did you hear about this webinar:

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If other, please specify:
FP department rounds, SPH

4a. Did you attend the Part A webinar on Jan. 28th?

<table>
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<td><strong>100%</strong></td>
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LEARNING AND APPLICATION OF KNOWLEDGE

5a. Before/After the webinar, I was familiar with: basic knowledge of genomics that is applicable to primary care.

<table>
<thead>
<tr>
<th>Response</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
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<tr>
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5b. Before/After this webinar session, I was familiar with genomics services and technologies that are available in BC for patient care.

<table>
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<tr>
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<th>After</th>
</tr>
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<tbody>
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5c. Before/After this webinar session, I was familiar with current limitations and future opportunities of genomics applications in primary care.

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<tr>
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<th>After</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Disagree</td>
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<tr>
<td>Undecided</td>
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<tr>
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<tr>
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Joint UBC CPD/BCCGN Webinar 2013
6a. I have a better sense of how genomics can contribute in the diagnostic process of an individual with intellectual disability.

| Strongly Disagree | 2  | 3% |
| Disagree          | 0  | 0% |
| Undecided         | 10 | 16%|
| Agree             | 33 | 52%|
| Strongly Agree    | 18 | 29%|
| **Subtotal:**     | 63 |
| No Response       | 0  |

6b. I have a better sense of how genomics may in the future contribute to optimizing selection of medications for patients.

| Strongly Disagree | 2  | 3% |
| Disagree          | 0  | 0% |
| Undecided         | 5  | 8% |
| Agree             | 39 | 62%|
| Strongly Agree    | 17 | 27%|
| **Subtotal:**     | 63 |
| No Response       | 0  |

6c. I have learned a lot from this webinar.

| Strongly Disagree | 1  | 2% |
| Disagree          | 3  | 5% |
| Undecided         | 10 | 16%|
| Agree             | 26 | 41%|
| Strongly Agree    | 23 | 37%|
| **Subtotal:**     | 63 |
| No Response       | 0  |

6d. There were adequate opportunities for interaction during the webinar.

| Strongly Disagree | 1  | 2% |
| Disagree          | 3  | 5% |
| Undecided         | 11 | 17%|
| Agree             | 29 | 46%|
| Strongly Agree    | 19 | 30%|
| **Subtotal:**     | 63 |
| No Response       | 0  |

7. Please indicate your overall rating of this webinar:

| Poor   | 0  | 0% |
| Fair   | 4  | 6% |
| Good   | 17 | 27%|
| Very Good | 29 | 46%|
| Excellent | 13 | 21%|
| **Subtotal:** | 63 |
| No Response | 0  |
8. What was the most helpful part of the webinar?

a. General comments:

The webinar provided an introduction to some of the applications of genomics technology.

Update on current use genomics in primary care.

New knowledge.

The content of the information. The information was explained clearly and at a suitable pace.

PowerPoint presentation and very good explanation. Timing is excellent. Lecturer and moderator were great.

Practical applications.

Very well presented to family practice.

Answered questions that were relevant and practical in a straightforward manner.

Have a better sense of where Genomics fits into family practice.

New knowledge for me.

The webinar was broad enough to include many levels of knowledge on genomics.

The whole thing...what a big topic!!

Well presented. I know understand what genomics can do currently, and is yet to come. Thank you for using so many case examples to make your points.

Information about the general topic of genomics.

Just about the upcoming technology that will be available.

Very good review of basic concepts of genetics as a background to go into details about the usefulness of genomics.

Having notes for reference afterwards

It was concise! I’d liked the interactive questions.

The slides I only wish that the entire discussion could be saved i.e. the actual lecture

Like the interactivity and voting.

Discussion of wide variety of uses for genomics in every day medical practice.

Update new genetic knowledge.

b. Specific comments/topics

Discussion of pharmacogenomics and targeted use of medication.

As I have been out of BC for over 3 years, I was not previously aware of the NIPT screening test. This was a really helpful nugget of information, as I take it this will probably become covered by MSP in some time and will really change processes for prenatal screening for the main chromosomal abnormalities. I’m also really interested to learn about the Spartan RX device, developed in Canada and currently in proof-of-concept phase that can do a rapid detection for genetic sequences that predict hyper- or hypo-metabolism of warfarin for post-stent patients.

How to manage the genetic disorders in future.

For my own practice the information on NIPT will probably be useful in the near future. The remainder of information is interesting but will not have a direct impact on my clinical practice at this time.

Clarification of rationale for Genetic diagnosis. Education re availability and applications for pharmacogenomic testing. Information re NIPT.

The value of sequences and copies in the assessment of individuals with an array of disabilities.

Diagnosis.

General overview of genomics/new PN testing available/pharmacogenetics information.

Indication of the extensive future usage of genomics in diagnosis and pharmacotherapy interaction potential.

Clinical scenarios and specific examples of Pharmacogenetics.

Learn about new genetic markers and tests that can be done now and in future.

I provide prenatal care and was very interested to hear about upcoming non-invasive technologies for screening for trisomy 21.

Maybe the bit about private prenatal genomic screening instead of amniocentesis.

Pharmacogenomics.

Explanation of tests to order for intellectual disability. cytochrome P450 info.

Explanation of cytochrome system and how genomics may help in the future with prescribing of drugs.

Pharmacogenetics and potential; diagnosing individuals with Intell disability and why it is important to try and find a diagnosis.

Examples of genomics tests.

Cases.

Clinical examples.
9. What was the least helpful part of the webinar?

Although the webinar was helpful as a basic introduction to medical applications of genomics technology, many questions remain in my mind.
Answering questions with minimal knowledge.
Bit slow and dull this week ct last one.
Details of the genomic matrixes.
Didn’t understand the tree-trunk slide.
I need to know more basic information about Genome.

I think I am still left with a lack of a comprehensive approach to determining which patients in general practice would benefit from genetic testing for screening, diagnostic or prognostic purposes. P.17 onward of the “Information Package on Clinical Genomics for Physicians” is actually very helpful, as it lists out the various instances in which the physician may think of referring a patient for testing. However, as the field is changing so quickly and new tests are coming online all the time, I think it would be very helpful if a clinical guideline/approach were to be developed, which would help physicians navigate this quickly changing field and keep genetic testing options at the front of the mind. Essentially, I think the learning tools for clinical genomics for the family doctor are yet to be developed fully.

I would have liked the webinar to be a bit longer.

Information overload.

Interesting to hear about the current “state of the art” but not much practical day-to-day help at the front line.

Little practical information about how to get the tests and how to use them in primary care.

Not enough time for all questions to be answered.

Not having notes for genomics, part I.

Resources available in BC (however, I do not live in BC).

Testing on intellectual disabilities....still do not really understand it.

There weren’t enough case studies, nor were there enough specifics about what I should do - given a certain situation - sorry.

Upgrade my knowledge about the genetic.

Would like to be able to access the notes in advance.

10. Is there anything you perceive and/or plan to do differently as a result of having attended this webinar?

   a. Referring and counselling for patients:

   Certainly accessing Genetics Specialties will be more comfortable for me to do.

   Consider genetics in different disease states.

   Consider genomics testing in particular cases.

   Greater use of genetic resources for diagnosis and counselling for patients and family members with genetic mediated disease.

   Have a greater awareness of genetic counsellors and how they may help me.

   Involving the right specialist early in treatment.

   Refer patients for NIPT.

   Think of genetic testing and referrals at an earlier stage.

10. Is there anything you perceive and/or plan to do differently as a result of having attended this webinar?

   b. Changes to patient care:

   Use noninvasive prenatal testing.

   Use the NIPT more so with confidence.

   Yes, order NIPT.

   More use and discussion genomics with pts.

   Consider options for genetic testing and advising patients about such possibility.

   Consider thinking about non invasive genetic tests for prenatal versus amino.

   I plan to contemplate the use of genomics in the cases with multiple problems, as well as consider their use in general.

   More aware of coming tests such as NIPT and the concept of genomics, using multiple tests to characterize a given genetic disease.

   My referral practices early in diagnosis re involving geneticist. Ability to educate patients re their options when it comes to genetic testing.

   NIPT; call genetics re a specific patient related to warfarin therapy.
Approach to ordering genetic/genomic tests.
I will be thinking about genomic testing in diseases with a hereditary component.

10. Is there anything you perceive and/or plan to do differently as a result of having attended this webinar?

c. Genomic knowledge and resources:
Plan to read more about application of genomics in the REAL world i.e. who, why, when, for what clinical pictures, ... predictive value of the most-often-ordered genomic tests by patient situation; reliability of laboratories, especially private labs; how to help prevent wastes of public health system resources secondary to inappropriate testing; how to help prevent unnecessary patient or family anxiety, and/or patient financial hardship, secondary to inappropriate or unhelpful testing.
Be aware of basic clinical applications as they become available.
Better understanding of potential for genomics.
Continue to learn about role of genomics in my practice - pediatric oncology.
I was most interested in the intellectual disability etiology knowledge today but this is only generally applicable to my practice.
I will look into NIPT.
I will review the information and referral guidelines in the "Information Package on Clinical Genomics for Physicians". I will also plan to attend any future CME events on clinical genomics, as I am aware that the field has changed so drastically since I left my residency in 2009, and this is definitely the field in which physicians need to keep current.
It is becoming clear to me that genomics is becoming more significant for the practice of medicine, and I am going to be more attentive to CME in this area.
Keep up with pharmacogenomic updates.
Look at the Clinical Genomics website. More comfortable discussing genomic issues with pts.
My awareness has grown and I am very pleased with the information I have learned. I am unsure at this moment what I will do next.
Study more.
Yes - 1. I will do some further readings/learning about NIPT. 2. Gives me some new ideas to think about with intellectually disabled children.
Yes, plan to investigate this area more in my specialty field, esp wrt medication choices.
More aware of tests potentially available.
Need better preparation e.g. recommend reading prior to the presentation.

10. Is there anything you perceive and/or plan to do differently as a result of having attended this webinar?

d. No change
No.
No.
No, but I'm waiting for pharmacogenomics to hit prime time.
Not yet.

11. Please specify any tools or resources that would be helpful in supporting a change in attitude and/or practice around genomics in primary care?
Point-of-care testing and interpretation. Include more information about genomics in physician training. On demand case presentations.
Already downloaded the handouts which will be helpful.
As earlier mentioned, I think that an innovative, comprehensive approach needs to be developed to aid family physicians in understanding current applications in clinical genomics, marrying recent advances with knowledge we learned back in medical training (e.g., conventional understanding of hereditary disease in the pre-genomics era), and establish the foundation to learn about future advances in clinical genomics at a fast pace.
Comprehensive listing of available tests applicable to primary care.
Cost advice.
Easily accessible referral sources for specific diagnoses.
Genomics website and resources, will use and suggest to pts.
Guidelines that are easily accessed, current, and practical.
Handbook.
Have a form with checklist to indicate what tests are available and when they are indicated and how to refer for doing them.

Include in St Paul's and other well attended CME. Provide more practical information as to how to refer and where to send for NIPT.

Info on web site.

Maybe more similar lectures.

More access to clinical tests for the public on limited budgets.

More information.

More of these webinars to provide education on this important subject. Thank you for giving me this opportunity tonight.

More on pharmacogenomics...but practical stuff.

More webinar.

Need more education.

NIPT.

NIPT is a fabulous way to detect aneuploidy. It may be time to bring some pressure to bare on the government, as if they don’t already have enough of their own scandals to deal with.

No.

None for now.

Steven Johnson syndrome- testing would be very helpful before prescribing. Getting adults with serious adverse effects tested for specific variants to avoid future drug reactions.

This has been great. Just getting the word out to family doctors that this exists is an important thing to do.

Updates on what is available re: PN testing, common types of cancer and whether it is available here, the cost and how to access.

Website provided as initial step for me.

Would be nice to think there is a ready way to communicate to us as new disorders or drug genomic tests become available, so we know who and when to refer, the handout is v helpful. I will check out the website periodically but keeping up to date worries me.

Written handout materials for patients re: services available through genetics department and prognostic capability.

Your package for clinicians is a very good start.

12. Is this information relevant to at least one patient in your practice?

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13. How likely would you share the information you learned from the webinar with your colleagues in primary care?

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14. Please comment on a clinical genomic topic area(s) that you would like to see included in a potential future webinar or educational session on clinical genomics?

Pharmacogenetics.

Anything that is relatively easily available.

Cancer.
Diabetes.
Further information regarding prenatal diagnosis. Information re: future genetic testing for common diseases such as diabetes, thyroid disease etc.

Genomic information about autism please.

Hemochromatosis.
I am particularly interested in the genomics behind MEN syndromes (multiple endocrine neoplasia syndromes).
I would like to see an educational session on pharmacogenomics and psychiatric medications. Genetic syndromes and pharmacogenomics.
Include more diseases with proven screening.
Malignancy in young individuals.
Mental health issues.
Micro rna, and specifics are the actuality of genomic testing for given phenotypic or suspectic genotypic diagnoses. Also maybe, when to refer - in the top ten list.
Mitochondrial inheritance.
More applications or ways Family physicians can incorporate genomics in primary care. Possibilities for genomics in common chronic diseases re modification or stratification of treatment regimes.
More elaboration about specific genetic diseases in a bit of more details specially the more commonly encountered ones in clinical practice.
More on drug metabolism testing as that is a common issue.
More on NIPT.
More on prenatal testing. more about hereditary cancers, breast, lung, colon, prostate.
Ophthalmic genetic disorders.
Pharmacogenomics.
Psychiatric medications.
Prevalence of screening for prenatal patients.

I would welcome an entire series of webinars on new advances in clinical genomics (with fact-fiction busting to allow family physicians to sort out the advances that are still proof-of-concept versus the commercially available and clinically validated)

Terminology of Genome group.

Webinar dedicated to topics individually: Intellectual disabilities, ADHD, Metabolic Syndrome (Syndrome X), Reproductive issues.

**PRESENTER EVALUATION: DR. LINLEA ARMSTRONG**

15. Knowledge was communicated successfully

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<th>1 Strongly Disagree</th>
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16. Speaker was interesting and engaging

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Joint UBC CPD/BCCGN Webinar 2013
17. Did you feel there was any industry bias in any of the presentations?

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18. Have you visited the new family physician genomics website (www.genomicsandhealth.com) developed by UBC CPD and BCCGN?

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If yes, please provide any comments about the website (e.g. usefulness of information, ease of navigation, etc).
I plan to revisit the site.
useful, informative, easy to navigate

19. Have you referred to the information package handout on clinical genomics that was made available during the Jan. 28th (Part A) and today’s (Part B) genomic webinars?

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If yes, please provide any comments about the information package (e.g. usefulness of information/resources, etc).
I appreciate the access to this information.
The "Information Package on Clinical Genomics for Physicians" is brief, but contains good referral information and explanation of provincial resources.
Very good.
Will need to look more in-depth.

20. If you enjoyed the webinar please leave a testimonial that we can use to explain its value to other physicians:
A pretty good introduction to an area in which older physicians (myself) have had almost no prior exposure.
A very useful method of sharing information. I would be interested in future webinars.
Another very useful presentation and discussion. Look forward to more developments in this area.
Clariifies a huge and confusing topic.

Dr. Armstrong describes the science of genomics in clear and concise scientific terminology. Her explanations were appropriate for the level of need of family physicians. She endorsed multiple approaches through the case presentations acknowledging a physician's experience and knowledge base. These webinars are very relevant. Dr. Armstrong is to be congratulated on reaching out to family physicians and encouraging the practical uses of genomics in the primary care.

Dr. Armstrong is a good presenter, albeit from the perspective of a medical geneticist. Unfortunately, when patients present to our offices with their 1000 genomes on a USB stick, there will be insufficient numbers of medical geneticists and counsellors to deal with the overflow of data. It is completely inappropriate to suggest a referral to a specialist, since this will not happen in a reasonable timeframe. Family physicians will need to adapt to this largely on their own. Medical geneticists are also going through a transformation. They need to evolve from being adept at recognizing syndromes to interpreting the complicated bioinformatics of the genome and its relationship to disease.

I able to enjoy your lecture from distance. (Toronto). Wish you continue this program. This is the smart education method for the future. Thank you for your effort.
I cannot imagine a more relaxing way to learn at home.
I like the voting part!!
Interesting presentation - provided background on how genetic/genomic testing is developing - and how it may help with patient care in certain situations at present and in the future.
Interesting topic.
It gave me a basic understanding of several areas of genomics (including prenatal testing and pharmacogenomics), some resources to use and will allow me to discuss these things with my patients.
It is always appreciated to have the opportunity to ask questions and learn about the questions that others have when attending a webinar like this, rather than simply viewing a prerecorded presentation.

Modern teaching method in the future.

Opens Genomics to your practice.

Thank you for your time, effort, and teaching.

The webinars on genomics have been accessible and contained important information. The presenter was knowledgeable, engaging and helpful.

This is a new area that will allow targeted therapy for illness.

This is a rapidly expanding field and has gone from exotic and "ivory tower" to useful on practical level for our primary care patients in just a few short years.

This is an excellent way to update oneself on topics, with the ease and convenience of attending "where one is at the moment"!

Very enlightening!

Very good update on what is available in genetic testing at present.

Very interesting topic, need to keep up with more information. Would like to know more about the local accessibility of NIPT (in Vancouver)

Please advise, thanks. Dr. Helen Leung : jhleung@gmail.com

very up to date and informing, good guide line in practice

Was surprised at how genomic testing may have application in Primary Care/Family Practice rather than just being in the domain of Specialists.
Appendix 8: Follow-up Email to all ECG Webinar Registrants - DRAFT

Dear zzzzz,

Thank you for participating in the 2013 two-part online webinar series on Genomics in Primary Care. We hope that you enjoyed the events funded by the UBC Department of Medical Genetics BC Clinical Genomics Network (BCCGN) and delivered in partnership with the UBC Division of Continuing Professional Development (UBC CPD).

BCCGN and UBC CPD have also developed a genomics website (http://genomicsandhealth.com) as a simple resource with only the best and most practical information and tools on genomics listed. At this website you will find:

- Referral forms and laboratory contacts in BC;
- Resources for physicians (e.g. communicating risk, taking family history, etc) and patients (e.g. videos about genomics, etc);
- List of archived and upcoming educational opportunities;
- FAQs about genomics;
- Glossary of genomics terms; as well as
- Genomics related news.

To stay informed about other initiatives being led by BCCGN, and sign up for the BCCGN mailing list, click the ‘Contact Us’ button at the top of the aforementioned website to enter your contact details.

An archive recording of the webinar series is available through the links below:
Webinar Part A (Jan 28, 2013): http://ubc-cpd.adobeconnect.com/p2et8mdoqhg/
Webinar B (Mar 4, 2013): http://ubc-cpd.adobeconnect.com/p7e8zzt0olj/

If you are keen to continue your education on genomics then please consider the following upcoming event:

**Event:** BCCGN Annual Conference  
**Theme:** Personalized Medicine, Can Everyone Benefit  
**Date:** Friday, May 31st 2013  
**Location:** Sheraton Vancouver Wall Centre (1088 Burrard St., Vancouver)  
**Details:** http://www.bccgn.ca/news-events/Conference.htm

Thank you for your participation,

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To remove or update your email address please reply with “REMOVE” or “UPDATE” in the subject field. Thank you.