Collaboration and Partnerships: Forging New Opportunities for Nurses with Genomic Literacy

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We are speaking to you from the traditional land of the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and from lands that are now home to many diverse First Nations, Inuit and Métis peoples. We honour Indigenous history and culture and are committed to moving forward in the spirit of reconciliation and respect with all First Nation, Metis and Inuit people.

Please use the chat if you wish to make a land acknowledgement.
Acknowledgements

Canadian Nursing and Genomics (CNG) Steering Committee Members:

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Research Assistant:
Rebecca Puddester MN RN PhD (student)
Objectives

1. To understand the concept of genomic literacy and genomics informed nursing practice.

2. To review case studies highlighting the role of genetics and genomics spanning the cancer care trajectory.

3. To envision the leadership opportunities for oncology nurses in advancing genomic literacy in practice.

4. Explore intra and interprofessional collaboration strategies to advance nursing knowledge and practice.
Nurses are Asking for Genomic Literacy and to Engage in Genomics Informed Healthcare

How can I use pharmacogenomics to make medication administration safe?

What are the ethical and equity issues with genetic testing and genomics?

How can I enhance patient outcomes with genomics?

What is the nurses’ role with genomics and precision healthcare?

Where can I find resources to learn and teach about genomics?

Where is the nursing research to guide practice?
Nurses with genomic literacy can address equity issues associated with genomics and promote social justice

Enable equitable access to genetic testing and counselling services for underrepresented groups, and address disparities driven by social or geographical barriers.

Guard against disability discrimination, eugenic ideals, and fear associated with genetic testing.

Nurses represent 40% of the healthcare workforce, with 91% of regulated Canadian nurses identifying as women, thus enhancing nurses’ involvement in genomics and precision healthcare promotes gender and professional diversity.

Bentley et al., 2017; Green et al., 2021
Nurses with Genomic Literacy have the Knowledge and Skill to Address Ethical Issues associated with Genomics

<table>
<thead>
<tr>
<th>Ethical Issue</th>
<th>Possible strategy</th>
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<tr>
<td>• Reconciling individual and relational autonomy</td>
<td>• Respect for autonomy while supporting informed decision making</td>
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<tr>
<td>• Promoting fair and equitable access to genetic testing</td>
<td>• Advocate for policy, consider social determinants of health</td>
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<td>• Promoting trust in health care and healthcare professionals</td>
<td>• Provide accurate information and appropriate referrals</td>
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<td>• Providing culturally safe care in genomics</td>
<td>• Acknowledge historical and ongoing trauma</td>
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2.9 Nurses maintain a person’s right to give and withdraw consent to access their personal, health and genetic information. They protect the use, privacy and confidentiality of genetic information and human genome technologies.
Engagement Framework Overview

Aim of Canadian Nursing and Genomics
Support nurses to:
- Develop genomic literacy
- Integrate genomics into nursing practice
- Participate in inter-professional collaborative care and research
- Implement precision healthcare
- Address equity issues related to genomics

Building the Engagement Framework
Conducted a literature review to identify strategies known to support genomic literacy
Engaged nurses from all domains of practice and from across Canada to understand needs
Completed an environmental scan to identify gaps and opportunities
Gathered input from international genomics experts to learn about best practices

Rationale for an Engagement Framework
- Nurses are key to the integration of genomics and precision healthcare for enhanced health
- Clear priorities and concerted leadership strategies can accelerate the integration of genomics into nursing practice
- Developing infrastructure with collaboration between nurses from point of care, education, research, administration, and policy is crucial to enhancing nurses’ contributions to genomics

Key Priorities for Nursing
- Engage nurses to see clinical relevance of genomics
- Clarify nurses’ unique and overlapping roles in genomics
- Develop knowledge for nursing practice through research
- Provide education and workforce development
- Support innovation and new care pathways with leadership
- Create infrastructure to support professional practice in genomics

Acknowledgments: Rebecca Pudlester MN RN – Research Assistant and the Canadian Nurses who participated in virtual engagement sessions
Twitter: @CDNNurseGenomic
Genomics-Informed Nursing Practice

Nursing practice interact with patients and their families at different time points in their cancer trajectory.

Genomic literacy will influence health assessment and teaching, clinical recommendations and management, and promote equitable and ethical practices.
Clinical Scenario*

Patient Details: 42yo male diagnosed with colorectal cancer (KRAS mutant)

Family History (maternally) includes 2 aunts with endometrial cancer, grandmother with ovarian cancer, 1 uncle colon and 1 cousin with gastric cancer. Limited awareness of his paternal family history.

*Not a real case
Primary Care Setting

• Patient presented with rectal bleeding
  • Working diagnosis: hemorrhoidal bleeding or lactose intolerance
  • Dietary changes recommended; evaluation for celiac disease

Referral to Gastroenterology

• Persistent symptoms led to specialist referral
  • Colonoscopy performed - mass in the sigmoid colon identified
  • Pathology confirmed adenocarcinoma

Referral to GI Oncology Team

• Baseline imaging revealed metastatic disease to the liver (stage 4)
  • No surgical resection, initiated 1L FOLFIRI
  • Tumor testing revealed deficiency in MSH2 (MMR gene)

Oncology Management

• CT scans performed after 3 months of FOLFIRI revealed progression of liver metastases with new lung nodules
  • Consider a clinical trial with immunotherapy VS. 2L FOLFOX

The Patient Journey
The Impact of Genomic Literacy on the Patient Journey

**Primary Care Setting**
- Patient presented with rectal bleeding
- **Family history** suggestive of Lynch Syndrome (with age of dx of colon cancer <50)**
- **PLAN**: Refer to Genetics Team; organize colonoscopy; dietary changes recommended

**Referral to Gastroenterology**
- **Colonoscopy** performed - mass in the sigmoid colon identified
- **Pathology** confirmed adenocarcinoma
- **Germline testing** revealed MSH2 mutation; tumor testing expedited (deficiency in MSH2)**

**Referral to GI Oncology Team**
- Baseline imaging revealed localized adenopathy, but no evidence of metastatic disease (stage 3)
- Underwent **surgical resection**, followed by adjuvant FOLFOX

**Oncology Management**
- Follow-up CT scans performed 12 months following adjuvant therapy revealed small volume liver metastases (biopsy confirmed)
- Enrolled onto a clinical trial with **immunotherapy**

6-8 weeks 6 weeks 20 months
Patients Trust Nurses to Answer Questions about Genetics and Genomics

Nurses with genomic literacy would feel confident in these situations and give trustworthy answers

Are my children at risk of getting the same cancer as me?

I have my genetic tests results, what should I do about screening and lifestyle change and what is my overall cancer risk?

The doctor said I should get genetic testing. What do you think?

If I agree to genetic testing, can the results be used against me somehow?

The doctor just told me a have a genetic variant and I didn’t understand what she said, can you explain it to me?

What is a polygenic risks score?

I am now in the palliative phase of cancer treatment; how can I get genetic testing so that my family can benefit?
Clinical Scenario*

**Patient Details:** 47yo woman recently diagnosed with locally advanced breast cancer (ER/PR-; HER2-). Currently completing neo-adjuvant chemotherapy.

**Family and Genetic Testing History:** Strong family history of breast and ovarian cancer on her maternal side. Previously underwent BRCA testing – negative result.

*Not a real case*
High Risk Genetic Testing
- Family history suggestive of Hereditary Breast and Ovarian Cancer
  - Prior BRCA testing at age 35 (negative result)
  - Calculated lifetime risk of developing breast cancer >25%

Primary Care Setting
- Enrolled in high-risk screening program and received routine mammography and breast MRI
  - Consideration of risk reduction surgery based upon age and family planning

Oncology Management
- Role for multi-gene panel testing in the context of locally advanced triple-negative breast cancer
  - Implications of CHEK2 mutation for clinical decision-making

Familial Implications
- Communication of panel test results to family members to ensure appropriate cascade testing
  - Anticipate possible ethical and equity considerations and variable testing decisions amongst family members

The Impact of Genomic Literacy on the Patient Journey
Case study in Review: Outcomes

Genomic literacy will directly impact nursing practice and patient outcomes.

1. Captured accurate and actionable family history
2. Appropriate referrals to genetic counselling and clinical interventions
3. Understanding of familial and individual implications of germline and somatic testing results
4. Care coordination with interprofessional collaboration
5. Empowered patients and families to make informed decisions
6. Addressed equity issues such as access to genetic testing, trust and racism during care
How can we integrate family history into our baseline assessment to identify individuals who have genetic risks and who should be referred to genetic testing?

Where can we find educational resources to learn about multi-gene panel testing and the implications of pathogenic variants?

What informational and psychosocial supports do people need as they navigate genetic test results?

How can you collaborate with the clinical team and empower the patient to make an informed decisions?
Oncology nurses are uniquely positioned to translate genomic research and technologies into clinical care and shape precision health.

Genomics Advancements are on the Horizon:

I. Mainstreaming of whole-genome and whole-exome sequencing into routine care.

II. Integration of artificial intelligence to manage and filter enormous datasets associated with genome sequencing.

III. Transition towards liquid biopsies and improve the clinical utility of ctDNA.
Oncology Nurses: Opportunities for Leadership

CLINICAL PRACTICE:
• Provide patient education that translates scientifically complex genomic data to enable patients and families to participate in cancer screening, prevention, and treatment decisions.

• Collaborate with the multidisciplinary care team to ensure care plans and clinical programs are adaptive and responsive to genetic and genomic data.

EDUCATION:
• Clinical Nurse Educators can partner with genomic champions within nursing to develop educational programs.

• Post-Secondary Nursing Programs can create pathways for undergraduate and graduate degrees with a focus on genomics.
# Oncology Nurses: Opportunities for Leadership

**POLICY:**

- Support policy formation and communication campaigns that educate the public around genetic testing and support access to counselling services.
- Contribute to policy recommendations surrounding funding for genetic services and staff, as well as the genomic analyses approved for different cancer diagnoses.

**RESEARCH:**

- Academic institutions and health organizations need to build research capacity in genomics by supporting Masters and PhD prepared nurse leaders.
- Forge interdisciplinary research partnerships to create large databases and biobanking initiatives.

**ADMINISTRATION:**

- Nursing organizations and regulatory bodies need to prioritize the integration of genetics and genomics into nursing curriculum, care pathways and competencies for genomic literacy.
- Support clinical innovation and the development of infrastructure and resources to support genomic literacy efforts within oncology nursing.
The Future of Nursing and Genomics is Bright
What Steps Can YOU Take?

I. Visit online resources
   I. https://www.nursingandgenomics.com/
   II. https://www.ons.org/
   III. https://www.g2na.org/
   IV. https://www.isong.org/

II. Read an article about nursing and genomics

III. Engage with the CNG or related organizations (ISONG or G2NA)

IV. Advocate within your organization to support genomic literacy and genomics informed nursing practice
Questions?

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Selected References


