SILENT GENOMES:

Reducing health care disparities and improving diagnostic success for children with genetic diseases from Indigenous populations

- Laura Arbour MD - Pediatrician, Medical Geneticist (UBC, UVic, BCCHRI)

- Nadine Caron MD - Sagamok Anishnawbek (Ojibwa) - Surgeon (UBC, UNBC, BCCA, Associate Faculty Johns Hopkins, Co-director of the Centre for Excellence, Indigenous Health UBC)

- Jeff Reading PhD - Mohawk Indigenous Scholar (SFU, Providence Health, FNHA-Chair in Heart Health and Wellness)

- Wyeth Wasserman PhD – Bioinformatics (UBC, Executive Director of the BCCHRI)

- Dean Regier PhD - Economist (UBC, BCCA)

UBC

University of Victoria

UNIVERSITY OF CALGARY

UNBC

SFU

ASSEMBLY OF FIRST NATIONS

First Nations Health Authority
Health through wellness

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INUIT TAPIRIIT KANATAMI

MÉTIS NATIONAL COUNCIL
RALLIEMENT NATIONAL DES MÉTIS

“The genomic health divide must be kept in check and ultimately bridged through equitable economic investment, clinical research, and provision and use of genomic services and technologies globally”

http://www.who.int/genomics/healthdivide/en/

EQUITY

THE PROBLEM

Data from persons who identify as Indigenous are starkly absent from reference databases used for genomic diagnosis.

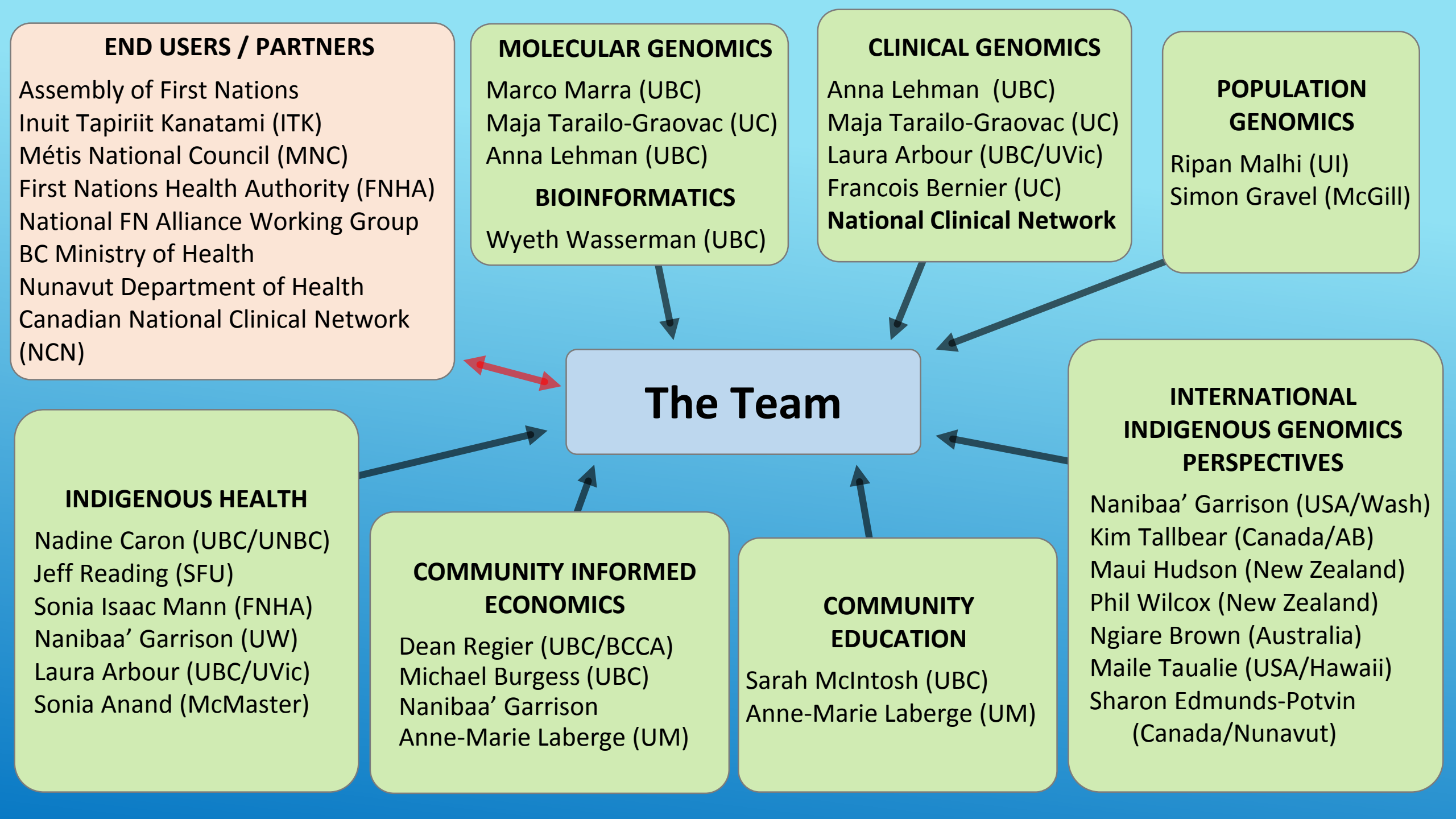
Therefore access to precision diagnosis is limited- increasing health disparity

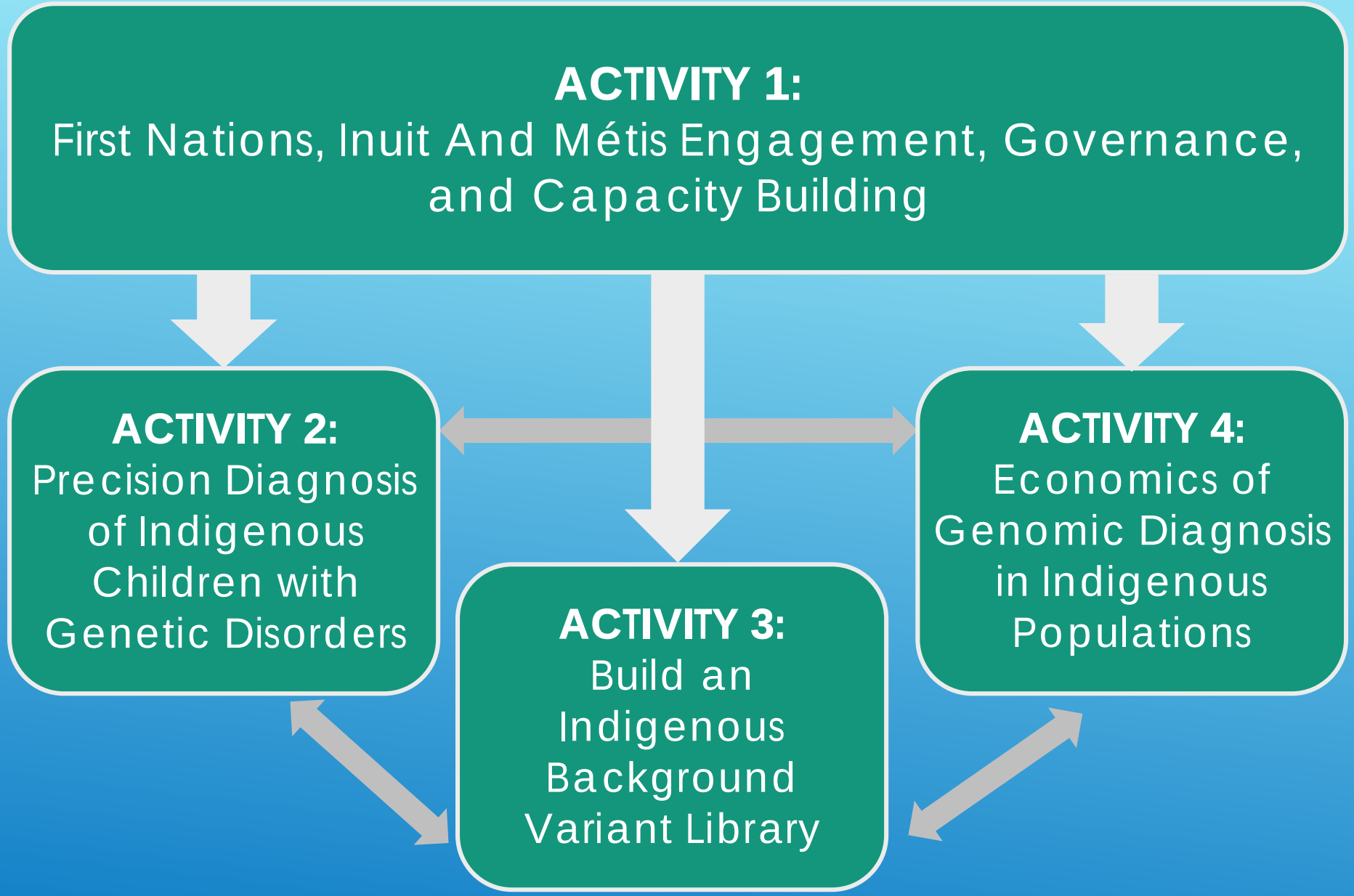
First Nations: 618 FN communities N=851,560.
The Inuit: 53 communities N=59,445.
The Metis: N=451,795.

http://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-011-x/99-011-x2011001-eng.cfm#a4

THE SUSTAINABLE SOLUTION

- ***With Indigenous partners (Nationally, regionally and on a community level) we will:***
  - **build** a strong governance model for genomics research;
  - **plan together,** the necessary steps for development of an Indigenous Background Variant Library (IBVL);
  - **offer genomic diagnosis** to Indigenous Children across Canada;
  - **assess the cost-effectiveness** of the system.


END USERS / PARTNERS
Assembly of First Nations
Inuit Tapiriit Kanatami (ITK)
Métis National Council (MNC)
First Nations Health Authority (FNHA)
National FN Alliance Working Group
BC Ministry of Health
Nunavut Department of Health
Canadian National Clinical Network (NCN)
MOLECULAR GENOMICS
Marco Marra (UBC)
Maja Tarailo-Graovac (UC)
Anna Lehman (UBC)
BIOINFORMATICS
Wyeth Wasserman (UBC)
CLINICAL GENOMICS
Anna Lehman (UBC)
Maja Tarailo-Graovac (UC)
Laura Arbour (UBC/UVic)
Francois Bernier (UC)
National Clinical Network
POPULATION GENOMICS
Ripan Malhi (UI)
Simon Gravel (McGill)
The Team
INDIGENOUS HEALTH
Nadine Caron (UBC/UNBC)
Jeff Reading (SFU)
Sonia Isaac Mann (FNHA)
Nanibaa' Garrison (UW)
Laura Arbour (UBC/UVic)
Sonia Anand (McMaster)
COMMUNITY INFORMED ECONOMICS
Dean Regier (UBC/BCCA)
Michael Burgess (UBC)
Nanibaa' Garrison
Anne-Marie Laberge (UM)
COMMUNITY EDUCATION
Sarah McIntosh (UBC)
Anne-Marie Laberge (UM)
INTERNATIONAL INDIGENOUS GENOMICS PERSPECTIVES
Nanibaa' Garrison (USA/Wash)
Kim Tallbear (Canada/AB)
Maui Hudson (New Zealand)
Phil Wilcox (New Zealand)
Ngiare Brown (Australia)
Maile Taualie (USA/Hawaii)
Sharon Edmunds-Potvin (Canada/Nunavut)


ACTIVITY 1:
First Nations, Inuit And Métis Engagement, Governance, and Capacity Building
ACTIVITY 2:
Precision Diagnosis of Indigenous Children with Genetic Disorders
ACTIVITY 3:
Build an Indigenous Background Variant Library
ACTIVITY 4:
Economics of Genomic Diagnosis in Indigenous Populations

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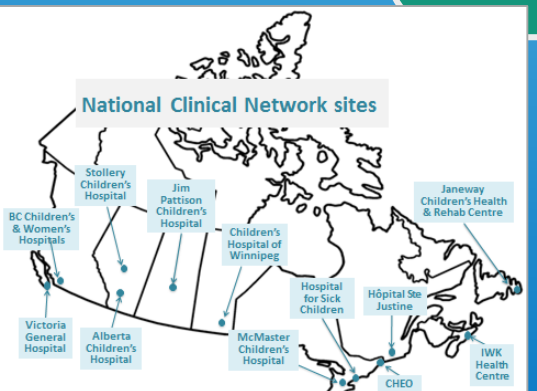

FIG 2.2

ACTIVITY 1:
First Nations, Inuit And Métis Engagement, Governance, and Capacity Building

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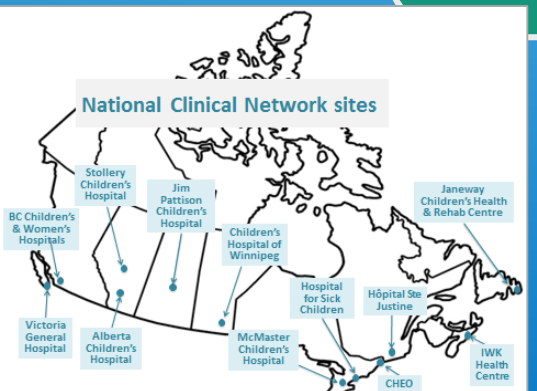
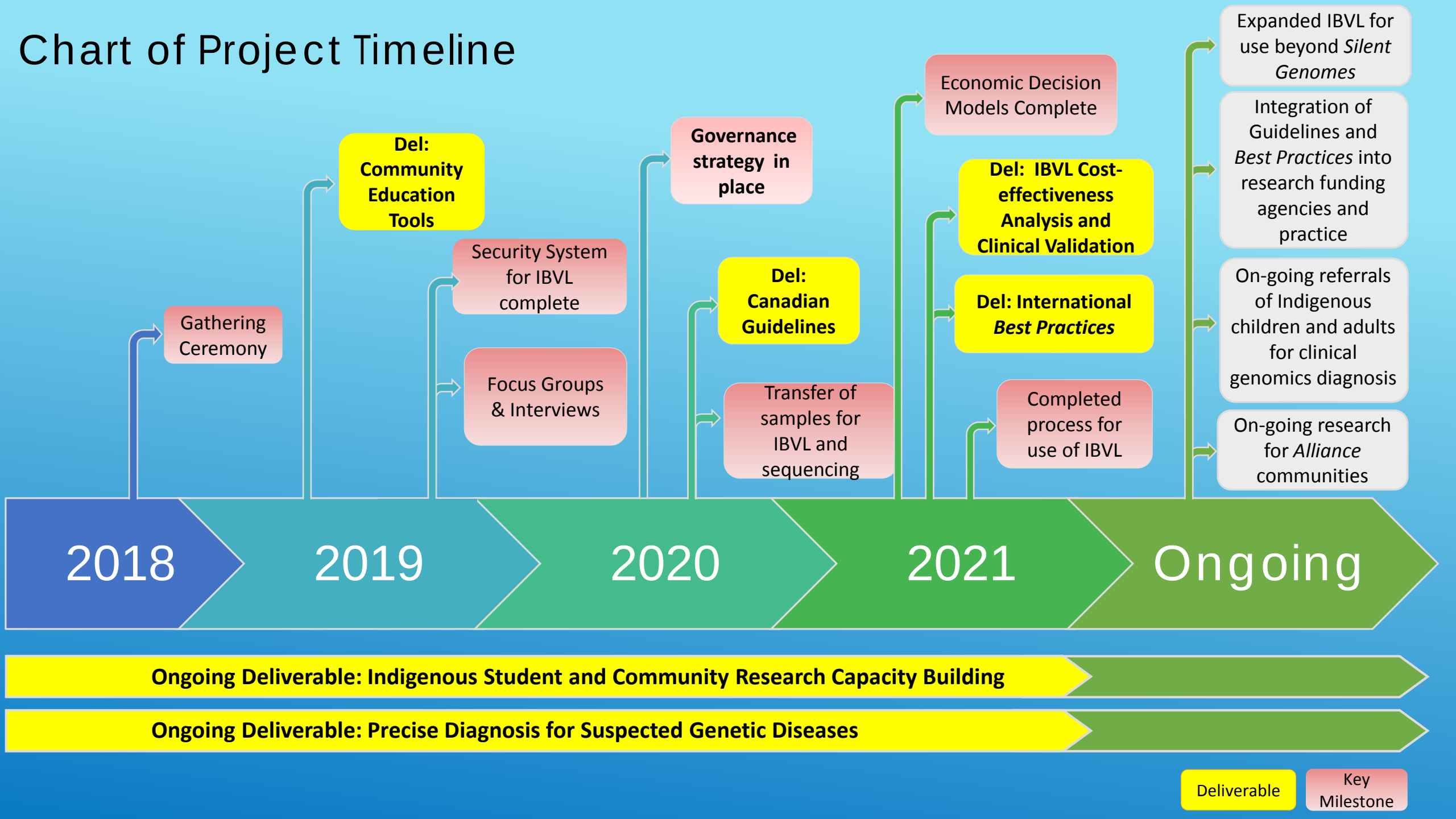


FIG 2.2

FIG 1.1

Chart of Project Timeline



DELIVERABLES

UPDATES

- Assembly of First Nations Support
- First Canadian **S**ummer internship for **IN**digenous Peoples in **G**enomics (SING Workshop) enabled by LifeLabs Scholarship program to *Silent Genomes*

We will take a quantum step forward to address the "genomic divide" through reducing barriers to access in both the diagnosis of genetic diseases and the research that drives it for Indigenous Canadians

1. **Indigenous led Governance will be the model for Canadian Guidelines and International Best Practices**
2. **Genomic Education Tools for Communities**
3. **Genomics Capacity Building for Indigenous Students**
4. **The platform for a sustainable IBVL will be in place with room to grow to provide precision diagnosis for children, their families and communities**

BENEFITS

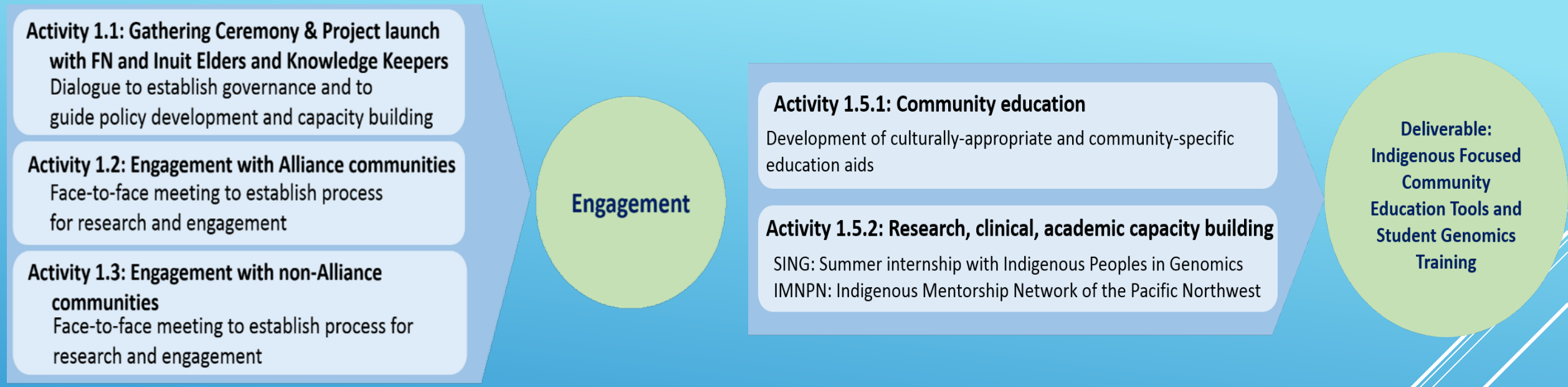
In 2015 Canada signed on to the United Nations Declaration of the Rights of Indigenous Peoples confirming Indigenous Canadians*:*

(Article 24)'have the right to access, without any discrimination, to all social and health services';

(Article 4) 'have the right to self determination'.

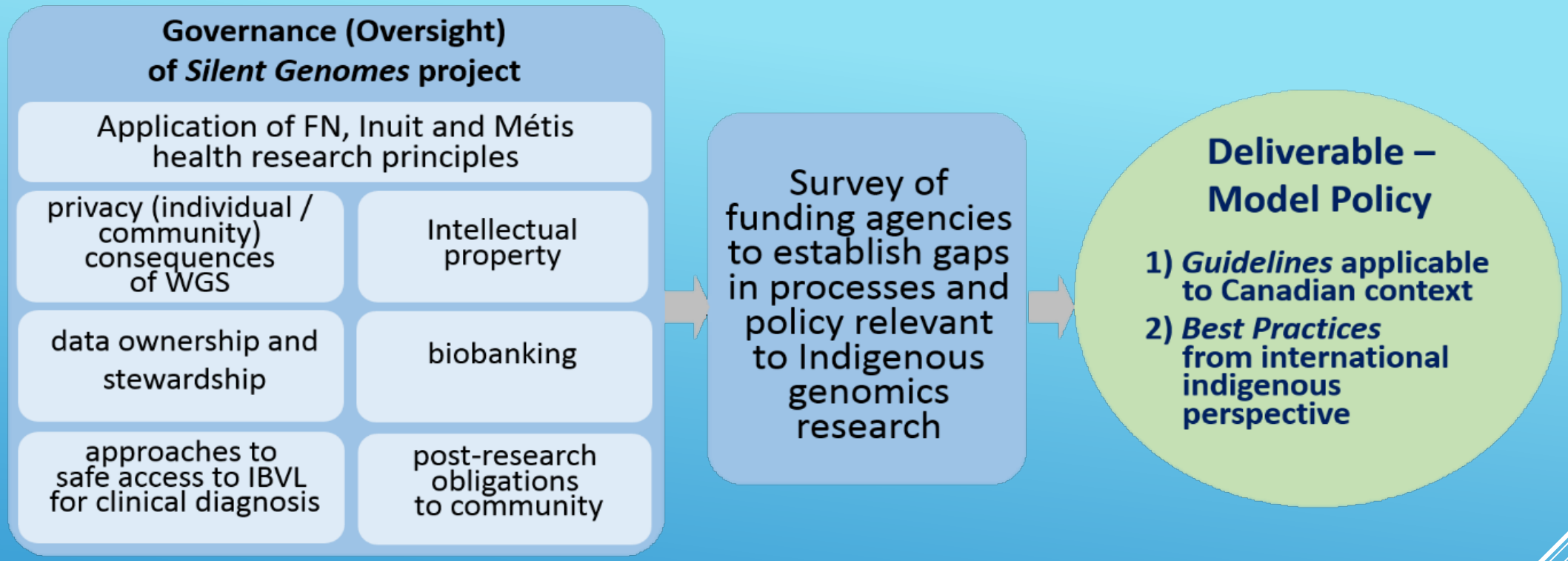
- ***Indigenous persons deserve to have their genetic disease diagnosed and managed-And they have the right to guide the process***
- ***Silent Genomes* has the potential to lead the world by example in developing Indigenous led policy on Genomic research to be integrated into on-going health care.**
- **We are uniquely qualified to bridge the 'Genomic Divide' for Indigenous Canadians by improving access to genomics diagnosis.**

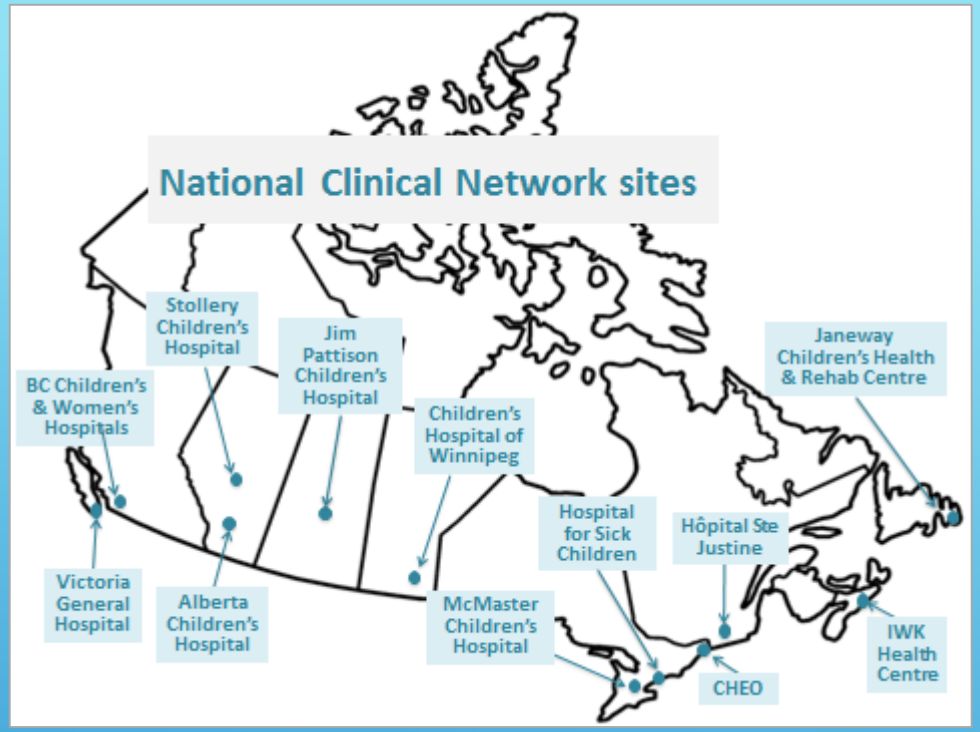
EXTRA SLIDES



ACTIVITY 1: ENGAGEMENT AND CAPACITY BUILDING

ACTIVITY 1: POLICY

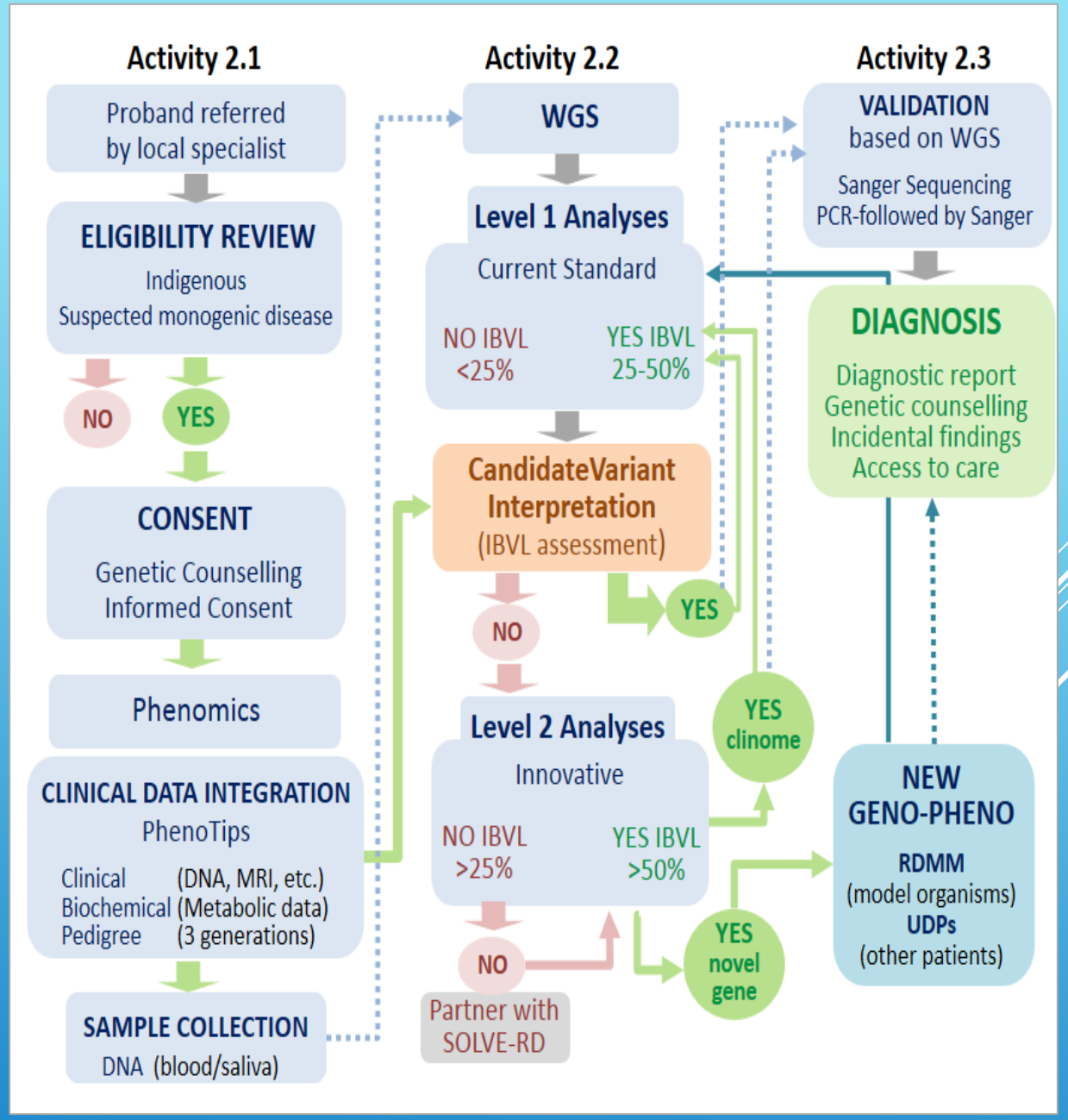


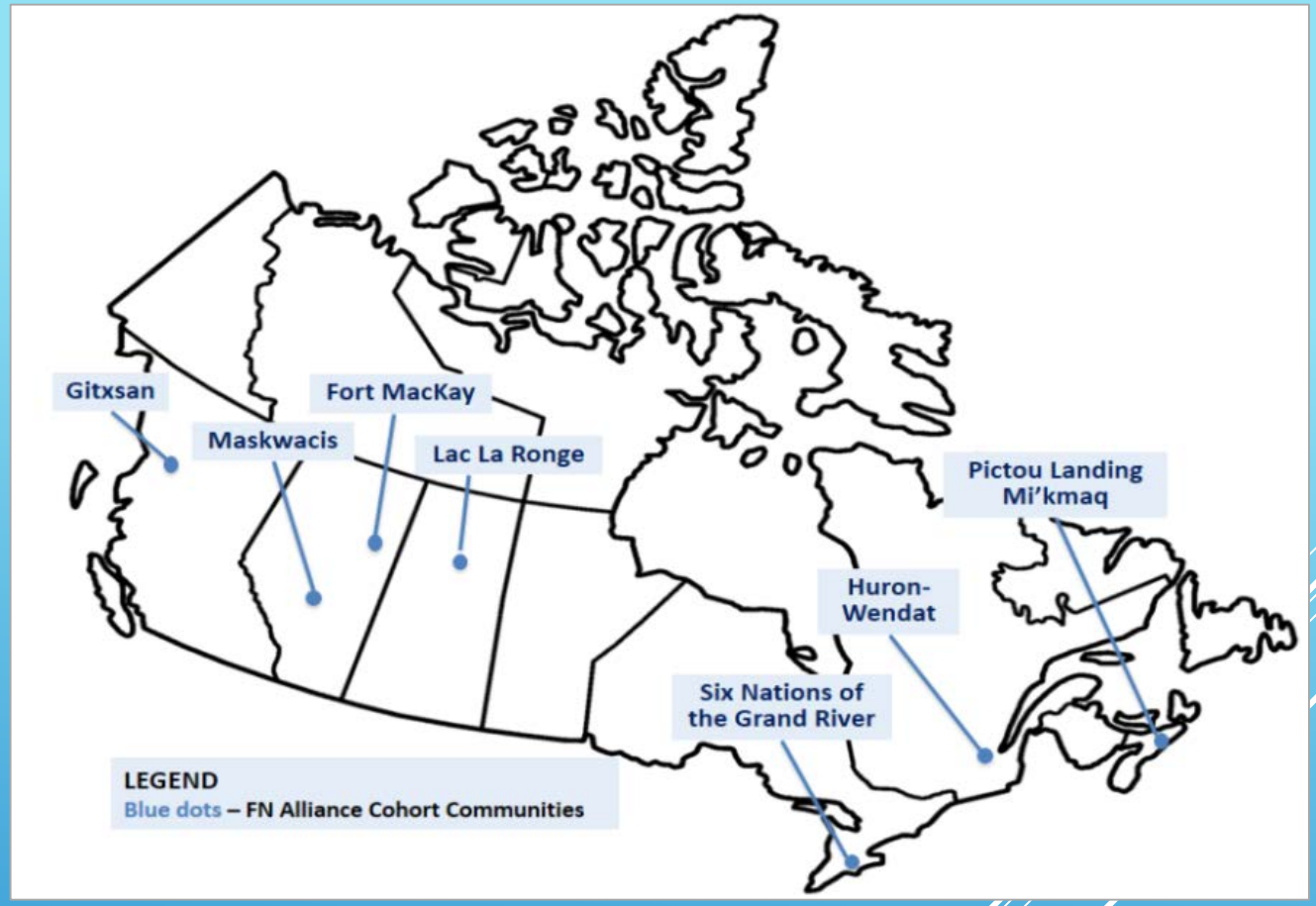


ACTIVITY 2: DIAGNOSIS

Dr. A Lehman

Dr. M Tarailo-Graovac





ACTIVITY 3: IBVL DEVELOPMENT

Discussion underway with FN arm of Canadian alliance for healthy hearts and minds

Figure 4.2 Decision model examining cost-effectiveness of WGS and the IBVL versus standard care

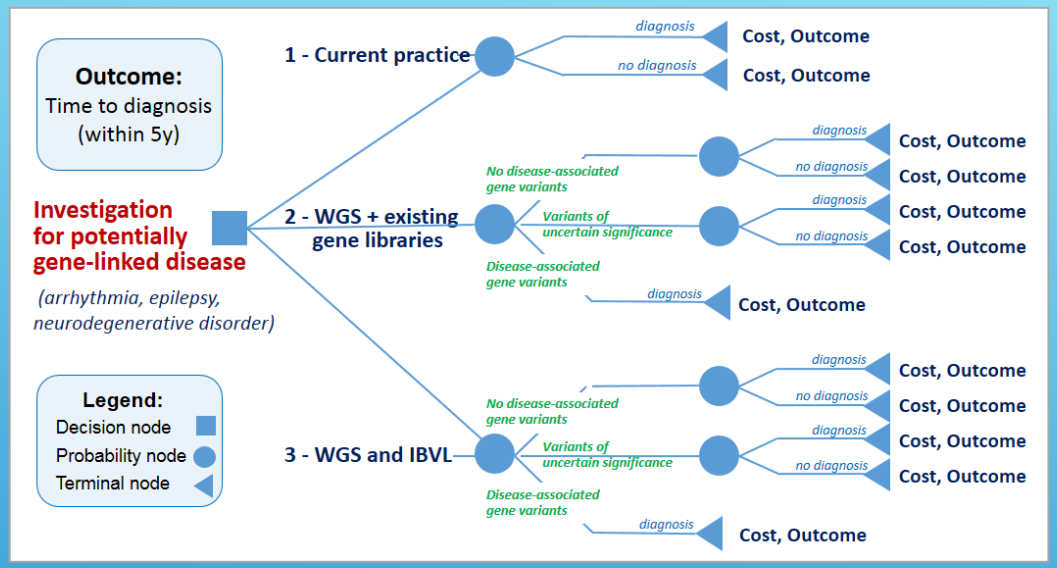
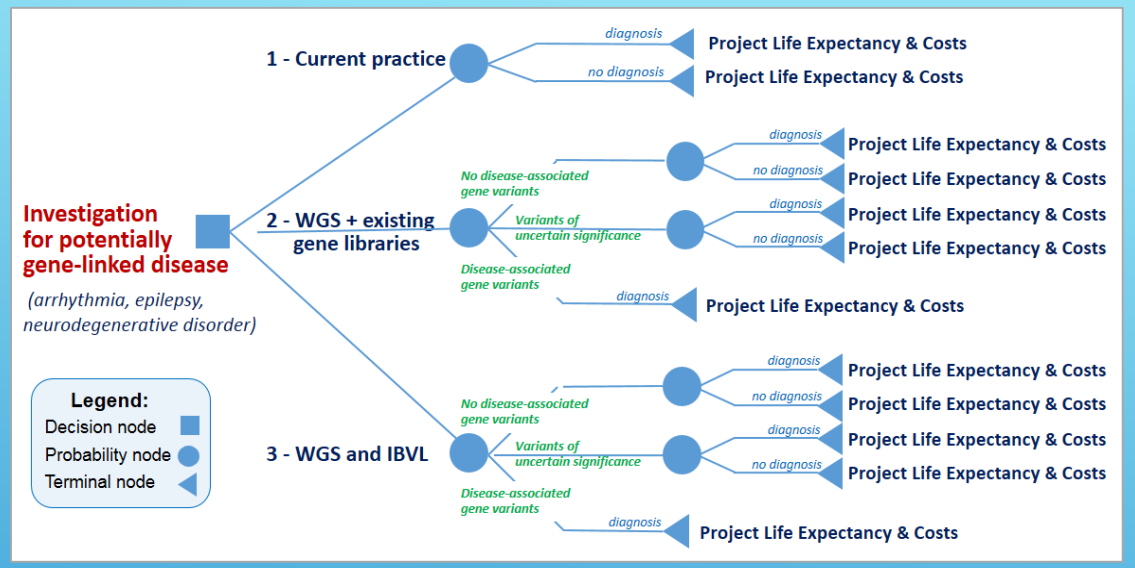


Figure 4.3 Long term decision model examining cost-effectiveness of WGS and the IBVL versus standard care



ACTIVITY 4: ECONOMIC ASSESSMENT

ACTIVITY	PLANNED START (dd/mm/yy)	PLANNED DURATION (#Quarters)	QUARTER - 3 months Start Date (01/10)															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Activity 1: INDIGENOUS COMMUNITIES ENGAGEMENT, GOVERNANCE, AND CAPACITY BUILDING																		
Activity 1.1 Gathering Ceremony; Project launch	15/01/18	3				1												
Activity 1.2 Community Engagement for Activity 3	05/04/17	16																
Activity 1.3 Additional FN and other community Engagement	01/07/18	16																
Activity 1.4 Model Policy	15/01/19	16									2a			2b		2c		7
Activity 1.5 Capacity building for communities and Indigenous Training Program	15/01/18	16																
Activity 2: PRECISION DIAGNOSIS OF INDIGENOUS CHILDREN WITH GENETIC DISORDERS																		
Activity 2.1 Patient Recruitment, Phenotyping, and Biological Sample Collection	Ongoing	15																
Activity 2.2 WGS for Precise Diagnosis	01/07/2018	16																
Activity 2.3 Validation of the WGS-derived Diagnosis	01/10/2018	16																
Activity 3: BUILDING AN INDIGENOUS BACKGROUND VARIANT LIBRARY (IBVL)																		
Activity 3.1 Database Construction	15/01/18	12								3								
Activity 3.2 Sample Processing	Ongoing	16									4							
Activity 3.3 Whole Genome Sequencing (WGS)	01/01/2018	16																
Activity 3.4 Data Analysis	01/07/18	16															5,6	
Activity 4: ECONOMICS OF GENOMIC DIAGNOSIS IN INDIGENOUS POPULATIONS																		
Activity 4.1 Documenting Community and Individual Acceptability	01/06/18	14								8				9				
Activity 4.2 Estimating the Cost-effectiveness	15/01/18	16								10			11				12	
Project Management																		
Project Management	15/1/2018	16				▲				▲				▲				▲

Plan | Ongoing | Complete | Reactivate | Milestone | Annual Reports

Milestone 1- Act 1.1: Gathering ceremony (Q4)
Milestone 2a- Act 1.4: Governance process in place (Q9)
Milestone 2b Guidelines (Canadian) (Q12)
Milestone 2c Best Practices (International) (Q14)
Milestone 3- Act 3.1: Security system completed for IBVL (Q6)
Milestone 4- Act 3.2: Begin sample transfer of existing samples for IBVL (Q9)
Milestone 5- Act 3.4: Data analysis for IBVL (Q15)
Milestone 6- Act 3.4: Validation of Clinical diagnosis samples with IBVL (Q15)
Milestone 7- Act 1.4: Complete development of process for use of IBVL beyond Silent Genomes (Q16)
Milestone 8– Act 4.1 – Focus groups and qualitative interviews and analyses completed (Q8)
Milestone 9– Act 4.1 – Preference-based analyses completed (Q12)
Milestone 10 – Act 4.2 – Chart review and associated analyses completed (Q8)
Milestone 11– Act 4.2 – Decision model 1 completed (Q11)
Milestone 12–Act 4.2 – Decision model 2 completed (Q15)