Coronavirus Variants Rapid Response Network

Réseau de réponse rapide aux variants du coronavirus

CoVaRR-Net Biobank: Supporting CITF projects

Pandemic Preparedness Biobanking

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CITF Meeting - March 8-9, 2023, Vancouver BC

FUNDED BY CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

Land Acknowledgement

The Ottawa Hospital acknowledges it is located upon the traditional and unceded territory of the Algonquin people. We have the privilege and responsibility to serve First Nations, Métis and Inuit of many backgrounds and from many treaty lands and to demonstrate respect for Indigenous people's contributions and culture. We also acknowledge traditional knowledge and healing developed over countless generations.

"O Canada, our home *on* native land..."

CoVaRR•Net

Biobank Leadership Team

Bioethics

Dr. James Robblee
University of Ottawa Heart Institute
Co-Director

Dr. Raphael Saginur
OHRI
Co-Director

Biobank

Dr. Angela M. Crawley
OHRI
Director

Dr. Curtis Cooper
OHRI
Clinical Associate Director

Dr. Don Vinh
McGill University
Clinical Associate Director

Data Platform

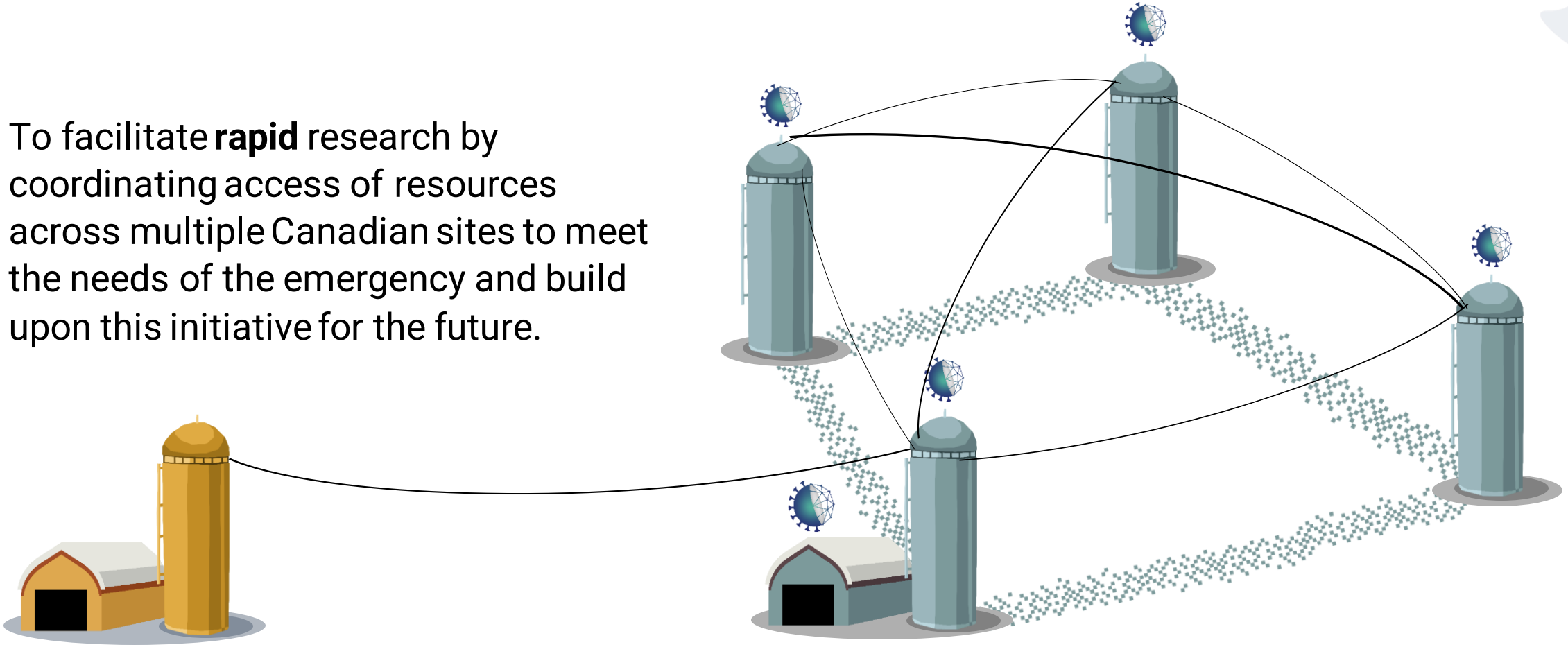
Dr. Amy Hsu
Bruyère Research Institute
Director

Nikita Rayne MSc
OHRI
Manager

Dr. Guillaume Bourque
McGill University
Associate Director

CoVaRR-Net Biobank Aims

To facilitate **rapid** research by coordinating access of resources across multiple Canadian sites to meet the needs of the emergency and build upon this initiative for the future.



CoVaRR-Net

Biobank supporting CITF-funded studies

CoVaRR-Net

2
CoVaRR-Net Sites

7
Studies

2,204
Participants

23,210
Samples

75,296
Aliquots

12,801
Distributed

13
Projects Supported

CoVaRR-Net Biobank Catalogue

	Site	Ottawa	Ottawa	Ottawa	Ottawa	Ottawa	Ottawa	Toronto	Total
	Study Name	CV-McG	LEFT	SSO	FUSION	VISID	VIP	CV-Gom*	7
	Theme	hospitalization	long-covid	surveillance	case registry	immunodeficiency	cancer	surveillance	broad
	Study Status	complete	complete	in progress	in progress	in progress	in progress	in progress	in progress
	Participant Registration (closed/target #)	closed	closed	closed	open	100	?	150	open
	Participants	65	70	1181	500	56	199	133	2204
PBMCs	Samples	137	210	3037	-	250	76	197	3907
PBMCs	Aliquots of 10^7 cells	626	958	14005	-	671	130	2920	19310
PBMCs	Distributed aliquots	234	91	72	-	174	-	274	845
PBMCs	Number of Projects that have accessed PBMCs	1	1	1	-	1	-	3	7
Plasma	Samples	325	210	3060	500	216	69	219	4599
Plasma	Aliquots of 1-2 mL	1393	1053	16922	3000	894	264	3719	27245
Plasma	Distributed aliquots	348	84	1410	-	167	-	1501	3510
Plasma	Number of Projects that have accessed Plasma	1	1	2	-	1	-	7	12
Serum	Samples	520	210	4811	-	190	69	-	5800
Serum	Aliquots of 1-2 mL	5200	792	11387	-	499	460	-	18338
Serum	Distributed aliquots	172	268	4307	-	1	-	-	4748
Serum	Number of Projects that have accessed Serum	1	2	1	-	1	-	-	5
Whole blood	Samples of dry blood spot	36	142	7358	-	-	496	30	8062
Whole blood	Samples of whole blood on ACD	-	-	-	-	-	-	-	
Whole blood	Distributed samples	18	90	3394	-	-	-	24	3526
Whole blood	Number of Projects that have accessed DBS	1	1	1	-	-	-	1	4
Saliva	Samples in salivette container	-	-	601	-	-	-	241	842
Saliva	Aliquots of 0.5 mL	-	-	1673	-	-	-	668	2341
Saliva	Distributed aliquots	-	-	-	-	-	-	172	172
Saliva	Number of Projects that have accessed Saliva	-	-	-	-	-	-	1	1
	Associated Analytical Data								
	Visits with Serology	190	194	4811	-	168	144	186	5693
	Visits with SARS-CoV-2 saliva-based PCR test	-	-	6008	-	-	-	-	
	Visits with Immune Cell Phenotyping	137	pending	pending	-	174	pending	pending	311

[CoVaRR-Net Biobank & Data Platform – CoVaRR-Net (covarrnet.ca)]

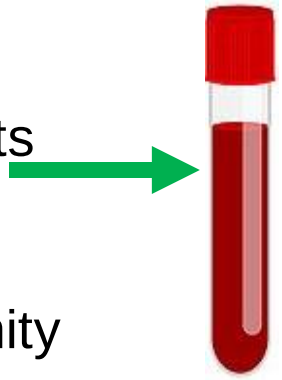
Updated: February 2023

CITF-Funded Studies – Immune response assessment

	Stop the Spread Ottawa SSO	COVID-19 Vaccine Immunogenicity and Safety ImmunoDeficient Patients Study VISID	Vaccine Immunity in Populations with Immunological Cancers VIP
Purpose	Longitudinal analysis of immunity in surveillance and Covid-19 convalescence through vaccination and hybrid immunity.	Assess COVID-19 vaccine immunogenicity and safety the immune compromised.	Assess antibody and cell mediate immunity in hematologic malignancy.
Principal Investigators	Drs. Marc-André Langlois and Curtis Cooper	Dr. Juthaporn Cowan	Dr. C. Arianne Buchan
Participants	1181	56	199
Samples	19,882	656	710
Distributed aliquots	9183	342	0

Biological material resources and utilization

- Infected Covid-19
- Unexposed
- Convalescents
- Vaccinated
- Hybrid immunity
- Populations of interest



Current:

- Serum
- Plasma
- PBMC
- Saliva

Other material (to come):

- DNA
- RNA
- …..
- ……

Responsible Banking

Distribution process

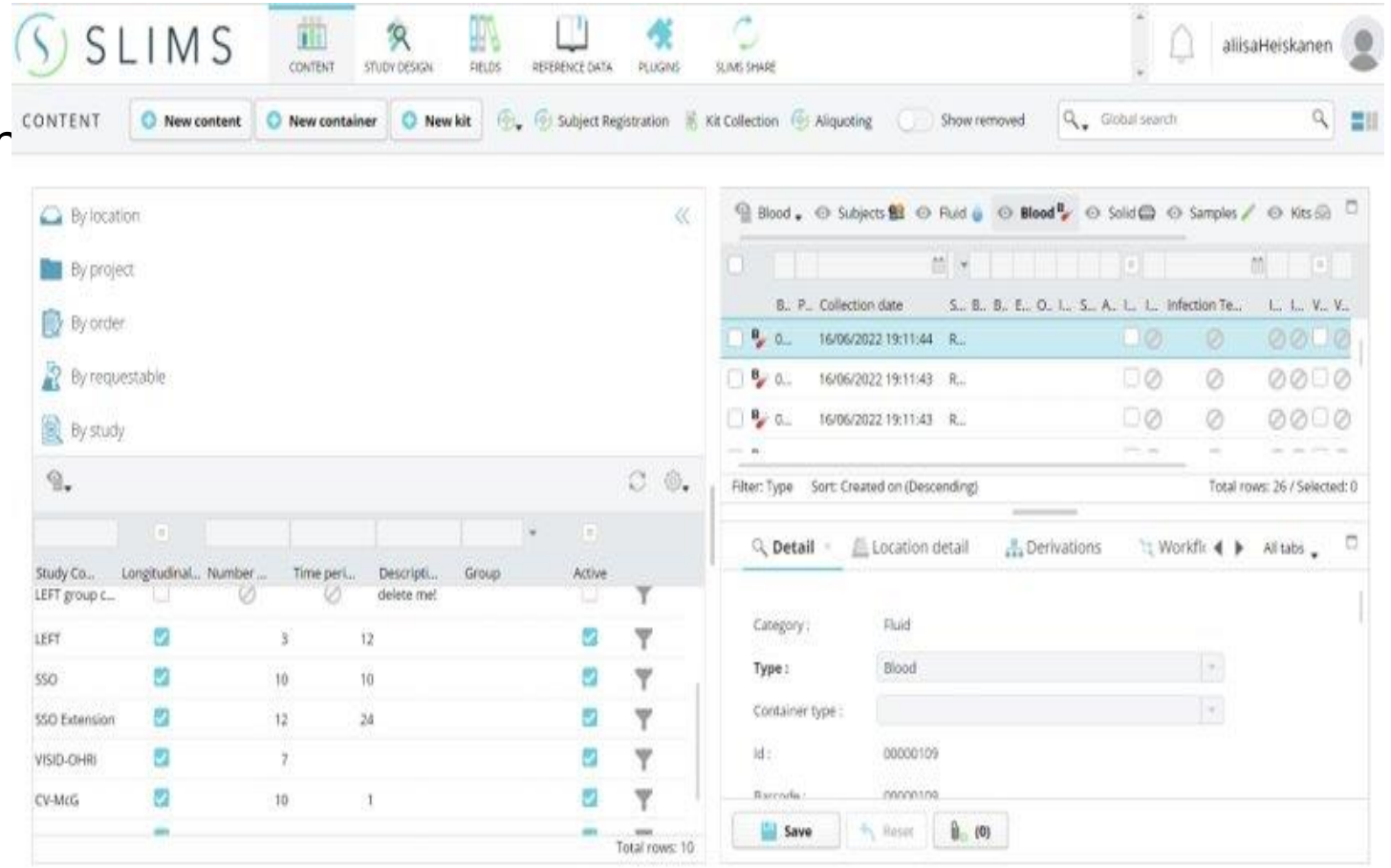
Enabling Research for infectious diseases preparedness

Biobank Inventory Management System

SLIMS
LIMS + ELN

(Agilent)

- State of the art, highly configurable, out-of-the box inventory management system
  - Ability to handle various sample types and study designs
  - Linkable with other data systems
- Accessible for biobanks without BIMS ~$14,000/year for 5 seat increments (cost-sharing, depending on need)



Supporting CITF projects

Pandemic Preparedness Biobanking

A Federated System of Biobanks

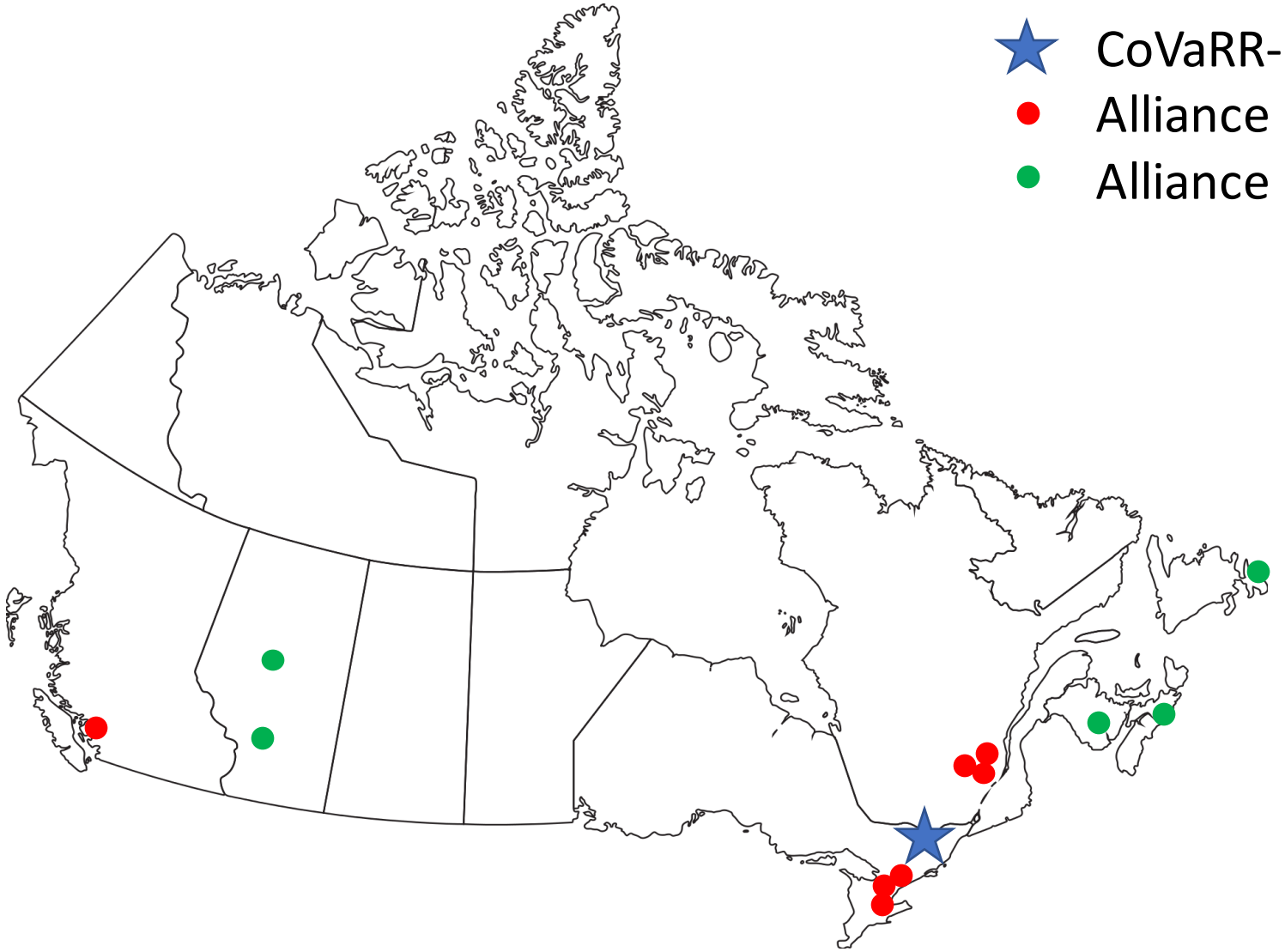
- Federated model to share materials and data
  - CoVaRR-Net Biobank facilitates open, fair and rapid exchange between researchers

- Each partner biobank maintains autonomy
  - Partner biobanks can retain custody over the materials and data they collect and store
  - Privacy is honoured through a strict de-identified process

CoVaRR-Net

Canadian COVID-19
Biobank and Data Alliance
A CoVaRR-Net initiative

Alliance canadienne des
biobanques et données COVID-19
Une initiative du réseau CoVaRR-Net



- CoVaRR-Net headquarters
- Alliance Hubs
- Alliance Nodes

Ontario

- CoVaRR-Net Biobank
- University of Toronto COVID-19 Biobank
- University Health Network COVID-19 Biobank
- Sunnybrook COVID-19 Biobank
- Baycrest Centre

British Columbia

- British Columbia (BCBN) COVID-19 Biobank Network

Québec

- Biobanque québécoise de la COVID-19 (BQC19)

Alberta

- Canadian BioSample Repository

Newfoundland & Labrador

- Memorial University

Nova Scotia

- Dalhousie University

National

- Pediatric Outcome imProvement through COordination of Research Networks (POPCORN)

Quality Assurance

1) Standard Operating Procedures (SOPs)

- Promote consistency across biobank partners
- Ensure compliance of guidelines
- Facilitate training of personnel

2) Quality Control

- Perform routine tests to assess samples quality/integrity

3) Sample and Data Auditing

- Review biobank procedures
- Harmonize biobank practices
- Ensure database accurately reflects patient information

4) Follow-up

- Obtain feedback from researchers regarding sample access process and quality of samples

CoVaRR-Net Data Platform - Metabase

Partner Biobanks (BIMS)

Amy Hsu and Macadamian Technologies

APIs

CoVaRR-Net Biobank (BIMS)

CoVaRR-Net Data Platform

Database supporting sample query processing

COVID-19 Biobank Alliance Data Catalogue and Dashboard

CoVaRR-Net Biobank
Sample and Data Distribution Process

Request

- **Researcher** search catalogue and complete application

Review

- **Scientific Review Panel** review application
- **Research Ethics and Access Officer** evaluate contracts (i.e. UDBMTA)

Select

- **Biobank Coordinator** selects samples from inventory
- **Biobank Technician** retrieves samples

Ship

- **Biobank Technician and Coordinator** ships samples and transfers data
- **Biobank Coordinator** follow-up with Researcher

Research Ethics

- Ready-to-use research ethics protocol – avoids delays to research

- CoVaRR-Net Research Ethics
  - provincial, multi-jurisdictional: model → Clinical Trials Ontario protocol (approved 2021)
  - CoVaRR-Net-initiated collection of diverse biospecimens
  - Secondary use, adult and pediatric

- Revised TCPS2 2022
  - Single ethics review for minimal risk research **across Canada!!!**
  - Secondary use
  - Overcome provincial border barriers

Universal Data and Biological Materials Transfer Agreement (UDBMTA)

- Contractual agreement pre-established, ready-to-use, avoiding delays
- Facilitates multidisciplinary, multi-institutional, collaborative research
- RAPID exchange of samples, data and reagents
- Manages privacy, sample/data custody, secondary use consent, intellectual property

A New Mantra for Canadian Academic Biobanks

Trailblazing for Pandemic Preparedness

No time for complacency: The CoVaRR-Net Biobank is an essential element of laboratory preparedness for infectious disease outbreaks

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JAMMI

2022

Developing a pandemic preparedness model of biobanking

- **Phase 1:**
  - Covid-19 pandemic: mostly **investigator-driven biobanking**
  - Workflow: support project, manage applications for sample/data access

- **Phase 2:**
  - National biobanking approach – Requires sustainable funding
  - **Biobank-initiated** sample/data collection
    - National surveillance research by academics
    - Continue to support investigator-driven studies
    - Support clinical trials and industry

Annual Preparedness Mandate

- Sampling Canadians:
  - Intentional sampling, longitudinal
  - Hubs: ≈ 1000/yr; Nodes: ≈ 500/yr
  - Include vulnerable/under-served populations, disease specific, etc.

- Incentives: Compensation for meeting target sample (cost/per sample)
  - Funds to support technicians, clinical team (pt/FTE), materials and equipment, etc.

Preparedness Biobanking

a) *maintain ongoing operations*

b) *carry out prioritized post-pandemic activities*

c) *establish pandemic preparedness operations and innovations*

Preparedness Biobanking – 5 year draft plan

- Ongoing support for **Highly Qualified Personnel (HQP),** materials and facility user fees

- **Years 1-2:**
  - Support biobanks for disease sequalae studies: post-Covid syndrome, vulnerable populations, large cohorts
  - Establish Alliance governance, equipment, certification of sites, training, harmonization
  - Connect biobank hubs/node databases to the Alliance Metabase

- **Years 2-4:** Implement **baseline operations**
  - Compensation of biobank sites and study participants

- **Year 5:**
  - Adapt to the rise and fall of emerging pathogens (baseline operations → **surge capacity operations**)

Showcase collaborative biobanking
PILOT STUDIES

- 1. Demonstrate the similarities and strengths for data across biobanks and test procedures for access.
- 2. Highlight the resource value of shared inventory (e.g., post-Covid syndrome specimens and associated data).
- 3. Link Wastewater signals to biological markers, geographically for SARS-CoV-2.

Biobanking – A Complement to Public Health

Canadian COVID-19 **Biobank and Data** Alliance
A CoVaRR-Net initiative

Alliance canadienne des **biobanques et données** COVID-19
Une initiative du réseau CoVaRR-Net

Public Health Agency of Canada
Agence de la santé publique du Canada

- Existing Public Health (PH) infrastructure is important for surveillance and response functionality
  - Provincial PH labs and National Microbiology Laboratory
  - Agenda to serve and protect health of population
- **Academic biobanking:**
  - Highly differentiated *surge capacity*
  - Agenda of discovery and knowledge sharing
  - Complementary & collaborative with PH to enhance and hasten response

Funding provided by:

COVID-19 IMMUNITY TASK FORCE
GROUPE DE TRAVAIL SUR L'IMMUNITÉ FACE À LA COVID-19

CIHR IRSC
Canadian Institutes of Health Research
Instituts de recherche en santé du Canada

Please send us your questions/feedback/input!

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CoVaRR-Net

Baseline Operations → Surge Capacity Operations

Baseline

- $$$ Sustainable, long-term funds
- Maintain ongoing rapid research through sharing of data and biological materials
- Support biobanking of studies for key cohorts and networks
- Observe health of Canadians by collecting longitudinal samples and data
- Characterize samples and data sets
- Regular data uploads to the Metabase
- Conduct ethical biobanking with expert guidance

Emergency

- $$ Supplemental funds
- Initiated by surge capacity of emerging pathogens
- Increase target sampling and more rapid sharing of data and biological materials
- Shuffling of prioritization of characterization
- Frequent data uploads to the Metabase

Funding Sources of Alliance biobanks

Provincial, Federal, time-limited

- **CoVaRR-Net CIHR Operating Grant** – renewed 2022 - 2024 (1yr of funds) Bridge? Long-term?
- Fonds de recherche du Québec – Santé/ Ministère de la Santé et des Services Sociaux/Public Health Agency of Canada (PHAC) (-March 2023?)
- Canadian Foundation for Innovation Exceptional Opportunities Fund
- Alberta Health Services
- POPCORN - CIHR
- University Health Network Biobank support and Clinical Trial: Pandemic Response Biobank for Coronavirus Samples (PRESERVE)
- UBC Faculty of Medicine Strategic Investment Fund, UBC Faculty of Medicine donors and Genome BC
- Canadian Immunization Research Network (CIRN)
- Covid-19 Immunization Task Force (-March 2023)
- Investigator funds (end of grant term)

CoVaRR-Net