

The 13th Meeting of the Global Microbial Identifier (GMI13): Conference Report



CENTRE FOR
INFECTIOUS DISEASE
GENOMICS AND
ONE HEALTH



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GMI13 Conference Report

A summary of the 13th meeting of the Global Microbial Identifier (GMI13) is provided in this report. Conference details can be found on the GMI13 website: <https://gmi13.org/>. Individual session notes will be provided elsewhere. Conference talks were recorded, and will soon be made publicly available via the CIDGOH (conference host) Youtube channel (@cidgoh).

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GMI13 Goals

The 13th meeting of the Global Microbial Identifier was originally scheduled to take place in June of 2020, but was postponed until September 2023 due to the COVID-19 pandemic. The intervening pandemic years radically changed the genomic surveillance landscape - and

consequently, the conference's agenda. GMI13 was considered to be an opportunity to “reset”, to refocus GMI goals to better align with global surveillance needs, to identify strategies to better engage the GMI membership, and to coordinate with other global organizations.

GMI13 focused on reassessing strategies and milestones for realizing a global data sharing ecosystem. Themes included i) technical mechanisms and data standards for enabling interoperability, reproducibility, and comparability of results; and ii) frameworks for building trust and equitable benefit sharing. Goals included:

1. Exploring platforms and their interoperability for building the “global genomics-based data sharing ecosystem”
2. Assessing data standards for better data harmonization and sharing between public and private repositories
3. Establishing connections with genomics-based networks
4. Reassessing work groups to improve member engagement and alignment with community needs
5. Exploring options for enabling the sustainability of pathogen genomics

Conference Structure, Attendee Demographics, & Partnerships

GMI13 was hosted by the Centre for Infectious Disease Genomics and One Health (CIDGOH) on September 13-15 2023 in downtown Vancouver (Canada) at the Simon Fraser University Wosk Centre for Dialogue. The conference format was in-person, and talks were streamed online to enable a greater range of participants globally. Conference talks were recorded, and will soon be made publicly available via the CIDGOH Youtube channel (@cidgoh). Speaker permissions were collected prior to recording.

Including both formats, there were approximately 90 attendees. The conference program consisted of a keynote talk by the World Health Organization, invited talks by 40 speakers from 17 countries representing 6 continents (with 50:50 gender balance among speakers), as well as two panel discussions, thematic breakout discussions, and Working Group reports. See Table 1 for a list of invited speaker/moderator affiliations, regional representation, and funding Partners. The themes and talks were designed to provide talking points and foundational material for the thematic breakout sessions.

Increased inclusion of participants from resource-limited regions was prioritized. PulseNet International (PNI) held its annual conference immediately after GMI13 (Sept 15-16) at a neighbouring venue. As such, PNI was able to fund travel for GMI13 Asia-Pacific panelists. The co-location of these two meetings enabled an overall reduction in the travel costs of many participants. GMI13 was also able to secure a \$2,500CAD travel grant for a Low-to-Middle-Income Country (LMIC) speaker to discuss strategies for successful LMIC-High Income Countries (HIC) partnerships, sponsored by Genome Canada. GMI13 also partnered with the “MicroBinfie Podcast” - a podcast that features news from the bioinformatics community. Interviews with conference participants were featured in episodes [111](#), [112](#), and [113](#), helping to disseminate conference activities and talking points.

Prior to the conference, a half day invite-only strategic planning session was held at the conference venue on September 12. The planning session was attended by members of the GMI Steering Committee, the GMI13 Organizing Committee, as well as strategic partners

identified by the Organizing Committee. Outcomes and action items from the conference and strategic planning session are presented below. Members of the GMI13 Organizing Committee are listed in Appendix A.

Outcomes and Action Items

Strategic Planning Session

The Strategic Planning Session focused on GMI's role in the new genomics landscape, defining/re-defining GMI projects and activities, improving Working Group member engagement, and increasing LMIC representation. Key discussion points are included below:

- Discussions defined the end goal of GMI activities to be “achieving global data and benefits sharing across public health, research, food safety etc., spectrum”.
- While there is an increase in the number of sequencing initiatives and genomic surveillance programs, sustainability of these efforts remains a critical issue.
- Convincing decision-makers of the value of pathogen genomics is still a challenge for many labs.
- While other organizations focus on technical solutions for implementation, which acts as the “how” of sequencing, there are still gaps in communicating the “why” - especially capturing success stories and evidence from different scientists in different settings to reinforce the messaging that continued support/funding is needed.
- GMI can become the “leaders of *why*”.
- There already exist different advisory documents describing the benefits of pathogen sequencing for researchers, public health, food safety etc. Can these reference materials be centralized so that the community can easily find them and contribute to the collection?
- Can GMI map the current sequencing landscape to understand all of the different players/organizations and their activities to better coordinate and reduce duplication of effort?
- There are also different tools, platforms and mechanisms that provide support for ethical and equitable data sharing including tools for data cleaning, different data infrastructure software and models, data standards etc for making access to good quality data easier. Can the landscape analysis include a catalogue of these resources to make the community more aware of what exists and where to find them (would need to be maintained)?
- Is there a study/tool for determining the level of risk of sharing different types of data? Can GMI or partners help educate decision-makers about perceived vs actual risks for data sharing?
- Can GMI provide advice about how to practically implement data sharing best practices and governance principles (i.e. WHO Guidance document), and define stages/degrees/tiers of data sharing?

Action Items

1. GMI can become the “leaders of *why*”.

2. GMI to start identifying and collecting advisory documents summarizing benefits of pathogen genomics and genomic surveillance
3. GMI to map the current sequencing landscape to understand all of the different players/organizations and their activities (potentially to be carried out by Tuyet Huang, Ruth Timme, and Emma Griffiths)

Conference

A wide variety of topics were discussed during the conference. A summary of themes and action items are discussed below.

Implementing International Data Sharing Recommendations and Best Practices

Dr. Vasee Moorthy presented the WHO's 13 Guiding Principles for Pathogen Genome Data Sharing (2022). There were many specific questions (e.g. how to interpret guidelines for 3rd parties using data, such as Nextstrain) about implementation from the audience. The general sentiment was that best practices and general guidance are very helpful, but that implementing best practices in real-world settings can be complicated (i.e. "the Devil's in the details"). Technical documents providing some worked examples, based on challenges experienced by the community, would greatly facilitate uptake of best practices.

Sustainability

Sustainability of pathogen sequencing initiatives and programs involves the stable funding of personnel and resources, as well as the maintenance and continued improvement of software, systems and capacity (e.g. training). A panel discussion on Sustainability included representatives from Genome Canada, the Bill & Melinda Gates Foundation, the US National Institutes of Health (NIH), and the Wellcome Trust. The panel highlighted ongoing and upcoming opportunities for sequencing initiatives, and also described successes. A group discussion followed during which the challenges of "innovation-based funding" were described. The goal of most health-based sequencing initiatives is routine, high quality, service delivery. Prioritizing funding of innovation over maintenance can often contribute to instability in programs and surveillance of microbial threats, as well as creating inequities. To this effect, gaps in the availability of data of priority pathogens around the world were highlighted. It was noted that successful innovation in bioinformatics, where tools become embedded as critical parts of public health infrastructure, often led to laboratories having to maintain tools for free over long periods of time.

Equity Issues

Open and rapid data sharing increases the utility of data, however, it does not necessarily support data equity. Data equity recognizes the importance of considering issues of power, bias, and discrimination in data collection, analysis, and interpretation. Equitable data sharing requires balancing the potential benefits and risks of different data practices in specific contexts - ensuring the benefits and risks are distributed justly, which can help prevent biases and inequalities, and lead to better health outcomes for all. The Equitable Tools session examined four tools developed in collaboration by the Public Health Alliance for Genomic

Epidemiology (PHA4GE) and the University of the Western Cape (South Africa), that work together to establish and reinforce practical, consensus-driven, community supported, data sharing behavioural norms. These tools included an Equitable Benefit Sharing Framework, the PHA4GE Data Sharing Accord, the ADBEx License Builder, and the ADBEx Memorandum of Understanding (MOU) Builder. While not legally binding, the tools and their products aim to address challenges pertaining to trust, attribution, and communication between data generators and data users. Highly resourced organizations often have legal instruments and guidance available that less resourced organizations do not. Discussions revealed that the disparate availability of these tools can contribute to a lack of understanding of LMIC needs by HICs (e.g. “we already have resources for this, why do we need it?”).

Panel discussions also highlighted discrepancies in the cost and availability of reagents, as well as salary differentials, in less resourced regions. These challenges were not similarly experienced in HIC regions. During discussions, panelists from the Asia-Pacific region noted that it would be beneficial to share documents describing pathogen genomics success stories and cost-benefit analyses. Even if these stories/analyses were in other regions, they would help convince decision-makers of the value of genomics, and strengthen support for sustained surveillance programs.

A presentation by the First Nations Health and Social Secretariat of Manitoba highlighted the need for a variety of perspectives and data governance strategies, and the incorporation of the “Collective benefit, Authority to control, Responsibility and Ethics” (CARE) and “Ownership, Control, Access, and Possession” (OCAP) principles in data collection and sharing practices.

Best Practices for Bioinformatics Platforms

Different sessions during the conference highlighted how the global data ecosystem includes public repositories as well as regional networks and local laboratories, among other stakeholders and software. Analytical and data sharing platforms that can be used locally, are critical to this ecosystem. Different platforms have their different strengths. Engineering interoperability between platforms, as well as the pipelines and tools that they implement, is therefore key for local-to-national, and national-to-international data flow. The TERRA, Integrated Rapid Infectious Disease Analysis (IRIDA), EFSA-ECDC and AusTRAKKA platforms were presented. During discussions, there was a call for a Working Group to develop and promote best practices for platform development.

Data Standards & Interoperability

Interoperability between datasets, systems and laboratories is greatly facilitated by the implementation of data standards. Standards can apply to sequence data, but also to contextual data (e.g. sample metadata; laboratory, clinical, epidemiological, and environmental data; methods (sampling strategies, library prep and sequencing, bioinformatics processing and software), quality control metrics, data provenance). The lack of coordination between standards development initiatives and the organizations that implement them around the world, can create silos and confusion among practitioners. Genomic surveillance standards development efforts were described by representatives from ELIXIR/Swiss Bioinformatics Institute, PHA4GE, and the International Organization for Standards (ISO). Discussion highlighted the need for best practices and coordination across standards development

communities of practice. Best practices and worked examples of standards implementation were considered helpful and were requested. The first ISO-accreditation for bioinformatics software was presented by the Melbourne Diagnostic Unit Public Health Laboratory (Australia).

GMI Working Groups: Updates & Engagement

As of 2023, GMI had four Working Groups:

Work group 1: Political challenges, outreach and building a global network

Work group 2: Repository and storage of sequence and meta-data

Work group 3: Analytical approaches

Work group 4: Ring trials and quality assurance

Since the last GMI12 meeting in Singapore, there have been significant leadership changes. Dr. Joergen Schlundt - the President of the GMI Steering Committee - retired (as of 2023). Dr. Ruth Timme - formerly Chair of WG3 - announced a move to WG 2 (Metadata). There were several other changes within the Steering Committee resulting in the decision to restructure the group leading up to GMI14.

While the Danish Technical University (DTU) reported progress in the development and execution of External Quality Assurance and Proficiency Testing, this work was under the banner of DTU and funded by the Fleming Fund and other EU sources - and was not strictly a part of WG4 activities. Other WGs reported that a reassessment of projects and priorities was needed. Discussion highlighted that the high turnover in membership and infrequent meetings (once a year) inhibited progress and that better ways to engage the membership were needed to sustain activities. Specifically, projects needed to be aligned to the needs of the post-pandemic genomics landscape, funding would be needed to enable members to contribute time and resources to working on projects, and regular meetings need to be scheduled throughout the year to drive progress. It was also noted that better linkage between GMI meetings was needed to connect identified needs, action items, progress on projects, reporting, and decision-making facilitating next steps, over time.

Action Items

1. GMI should advocate for technical documents highlighting worked examples for the implementation of high level best practices.
2. GMI should explore sustainable funding options, and should work with funders to highlight community sustainability needs.
3. GMI should create a centralized resource for reports containing WGS success stories, as well as links to tools (bioinformatics and also socio-legal), data standards, protocols, etc.
4. GMI should help to articulate and promote best practices for bioinformatics/analytical platform development.
5. GMI should help coordinate global standards development efforts.

GMI14 Announcement

Dr. Armand Sanchez Bonastre announced that the Autonomous University of Barcelona would be hosting GMI14 in Barcelona, Spain.

GMI13 Conference Logistics

Registration, Website Management, and Conference Promotion

Conference registration was managed via Eventbrite. The GMI13 website (<https://gmi13.org/>) was created and managed by the Centre for Infectious Disease Genomics and One Health (CIDGOH). Links to the GMI13 website, as well as promotional material, were included on the GMI official website (managed by the Danish Technical University). Conference information (save-the-date, promotional advertising, reminders of deadlines for registration, notices of conference highlights) was disseminated via Organization Committee networks (including different social media outlets e.g. Twitter, Mastodon).

Funding, Costs, Sponsorships, and Registration Fees

The total cost of GMI13 was \$41,425.71CAD. A breakdown of expenses is included in Table 2. A tiered set of sponsorship packages were developed for sponsorship negotiations (Table 3). GMI13 was funded by a Canadian Institutes of Health Research (CIHR) Planning and Implementation Grant (Reference: 165023; Title: Technology, Policy and Implementation: a cross-disciplinary workshop to generate innovative solutions for data sharing in public health genomic epidemiology practice) valued at \$24,931.29CAD, and a series of Canadian sponsorships: Canadian Association for Clinical Microbiology and Infectious Diseases (CACMID), \$3,000CAD; Genome Canada, \$3,000CAD; and Genome British Columbia, \$3,000CAD. GMI13 also received an additional \$2,500CAD from Genome Canada for travel sponsorship of one LMIC speaker. The Organizing Committee reached out to different potential industry sponsors (Illumina, Oxford Nanopore, American Type Culture Collection, etc) but their responses indicated that they were not interested in sponsoring an event about data sharing.

Historically, GMI13 registration has been free. To avoid a large no-show factor commonly experienced by free events (problematic for calculating venue space and catering costs), GMI13 charged participants a registration fee of \$150CAD. Registration fees were waived for speakers and attendees from LMICs via a discount promo code in Eventbrite. Registration fees were collected via Eventbrite (which charged a fee for processing transactions). Registration revenue totalled \$5,286.18CAD.

Equity Challenges

Immigration Canada requires entry visas for travellers from a particular regions/countries. The application process can be lengthy (several months). Approval of visas may require proof of assets as well as familial relationships and employment in home countries. Although invitation letters were provided for many participants (see Appendix B for example

invitation letter for submission with visa applications), a major challenge for GMI13 was denial of visas for invited speakers and attendees.

Daycare was also required for one invited speaker. Childcare facilities in Vancouver are usually oversubscribed and very expensive. However, the Organization Committee was able to secure a nanny and use breakout rooms to provide childcare, enabling the speaker to attend the conference and also check on their child periodically throughout the conference. Future GMI conferences should consider the provision/availability of child care in their planning.

Although increased inclusion of participants from resource-limited regions was prioritized, only limited travel sponsorship could be obtained. Vancouver travel and accommodation prices are prohibitively expensive for many prospective attendees. The Organization Committee received many requests for travel grants, which could not be provided due to lack of funding. Future GMI conferences should include the provision of travel grants in their funding requests, and work to develop strategies for convincing funders of the importance of the inclusion of diverse voices in global decision-making at events such as GMI.

Action Items

1. GMI should consider travel costs and visa criteria/timelines when choosing host locations.
2. GMI should encourage the inclusion of support letters in visa applications, and provide such letters.
3. GMI organizing committees should include the provision of daycare in conference planning.
4. GMI should pursue funding to support travel of LMIC participants.

Acknowledgements

CIDGOH gratefully acknowledges funding from the Canadian Institutes of Health (CIHR), Genome Canada, Genome British Columbia, the Canadian Association for Clinical Microbiology and Infectious Diseases (CACMID), and travel support for some participants by PulseNet International. CIDGOH also acknowledges the hard work of all the speakers, moderators, and participants, as well as the GMI13 Organizing Committee and GMI Steering Committee. Special thanks to Tuyet Hoang and Lee Katz for sharing conference notes, and to all the incredible volunteers (Zohaib Anwar, Rhiannon Cameron, Damion Dooley, Ivan Gill, Madeline Iseminger, Nithu Sara John, Miguel Prieto, Anoosha Sehar, Aishwarya Sridar, Mike Trimble, Tian Rabbani) who helped make GMI13 possible.

Tables, Figures and Appendices

Table 1: Affiliations, Regional Representation, and Funding Partners

Columns represent independent data (not linked across rows).

Invited Speaker/Moderator Affiliations	Regional Representation	Funding Partners
World Health Organization	Switzerland	Canadian Institutes of Health Research (CIHR)
European Food Safety Authority	Italy	Canadian Association for Clinical Microbiology and Infectious Diseases (CACMID)
Argentina Public Health Network	Argentina	Genome Canada
ANLIS Malbran	United States of America	Genome British Columbia
PulseNet for Latin America and the Caribbean	Canada	PulseNet International
Pan American Health Organization	United Kingdom	
PulseNet International	Australia	
US Centers for Disease Control and Prevention	Thailand	
Wellcome Trust	Taiwan	
Genome Canada	Philippines	
Bill & Melinda Gates Foundation	Malaysia	
National Institutes of Health/National Institute of Allergy and Infectious Diseases	New Zealand	
Theiagen	South Africa	
Public Health Agency of Canada	The Gambia	
Microbiological Diagnostic Unit Public Health Laboratory/Doherty Institute	Lebanon	
University of Melbourne	Denmark	
National Center for Biotechnology Information		
U.S. Food and Drug Administration		
European Nucleotide Archive		
South African Bioinformatics Institute, University of Cape Town		

Africa Centres for Disease Control and Prevention		
Simon Fraser University		
First Nations Health and Social Secretariat of Manitoba		
National Institute of Health of Thailand		
Centers for Disease Control, Taiwan		
Research Institute for Tropical Medicine (RITM), Philippines		
Institute for Medical Research (IMR), Malaysia		
Institute for Environmental Science and Research, New Zealand		
Lebanese American University		
University of East Anglia, United Kingdom		
London School of Hygiene and Tropical Medicine		
Africa Pathogen Genomics Initiative		
American University Beirut		
Public Health Alliance for Genomic Epidemiology		
Swiss Institute of Bioinformatics		
Danish Technical University		
University of Guelph		
Autonomous University of Barcelona		

Table 2: GMI13 Expenses and Total Costs

Expense	Cost (CAD)
SFU Wosk Centre (rental + catering+ AV)	\$38,523.73
Miscellaneous (e.g. printing)	\$111.98
Indigenous Welcome - Elder stipend	\$290.00
LMIC travel	\$2,500.00
Total	\$41,425.71

Table 3: GMI13 Sponsorship Packages

Sponsorship Level	Package Value	Sponsorship Benefits
Platinum	\$15,000 CAD	Booth for the entire conference, plus 1 lunch symposium during the meeting, logo on conference program
Gold	\$10,000 CAD	Booth for the entire conference, logo on conference program
Silver	\$5,000 CAD	Booth for 1 day during the conference, logo on conference program
Bronze	\$3,000 CAD	Logo on conference program

Appendix A - Program Committee Members

Dr. Emma Griffiths (Simon Fraser University)
 Dr. William Hsiao (Simon Fraser University)
 Dr. Pratima Shrivastava (Simon Fraser University)
 Dr. Joergen Schlundt (Nanyang Technological University)
 Dr. Gary Van Domselaar (Public Health Agency of Canada)
 Dr. Morag Graham (Public Health Agency of Canada)
 Dr. Natalie Knox (Public Health Agency of Canada)
 Dr. Catherine Carrillo (Canadian Food Inspection Agency)
 Dr. Ruth Timme (US Food and Drug Administration)
 Dr. Heather Carleton (US Centers for Disease Control and Prevention)
 Dr. Mirko Rossi (European Food Safety Authority)
 GMI Steering Committee

Appendix B: Example Invitation Letter for Visa Application



CENTRE FOR
INFECTIOUS DISEASE
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ONE HEALTH

[date]

Dear [participant name],

The GMI13 organizing team is pleased to invite you to attend our upcoming conference on microbial data sharing in September 2023!

Sharing of microbial genomics data is critical for situational awareness of existing and emerging pathogens, understanding microbial evolution, as well as research and innovation. The global data sharing ecosystem is complex - with many data generators, data consumers, and ways of sharing (e.g. with trusted partners, among networks, and with public repositories). The wide array of uses for microbial genomics data also comes with ethical, legal and social implications.

The Global Microbial Identifier conference is an annual event that brings together scientists from around the world to discuss challenges and solutions for microbial genomics data sharing. The next Global Microbial Identifier meeting (GMI13) will be held in downtown Vancouver, Canada on September 13-15 2023.

The meeting will explore the technical and social/ethical/legal aspects of microbial genomics data sharing, including mechanisms, initiatives and solutions for:

- building interoperability of systems and datasets
- data governance
- building equitable partnerships
- sustainability
- coordinating different efforts around the globe

As [refer to affiliation, expertise], we would like to invite you to share your knowledge with us at GMI13.

Please let us know if you have any questions, or if we can be of further assistance.

Sincerely,

Emma Griffiths
On behalf of the GMI13 Organizing Committee

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