



Malaysia

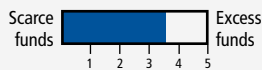
Country Profile

Results from the Asia PGI Landscape Assessment (2023)

This country report provides a snapshot of the status of pathogen genomic surveillance through next generation sequencing (NGS) in Malaysia. Results are based on a landscape assessment conducted with country experts working across Institute for Medical Research (IMR), Malaysia Genome and Vaccine Institute (MGVI), Hospital Canselor Tuanku Muhriz UKM (HCTM / PPUKM), Universiti Malaya (UM), Universiti Teknologi MARA (UiTM), Universiti Malaysia Sarawak (UNIMAS), Institute for Medical Research (IMR), Hospital Sultan Abdul Aziz Shah/Universiti Putra Malaysia (UPM), Universiti Sains Malaysia (USM), Universiti Malaysia Sabah (UMS), Tropical Infectious Diseases Research and Education Centre (TIDREC), and Universiti Kebangsaan Malaysia (UKM). Findings below are presented through five overarching themes ranging from financing to bioinformatics and data sharing, including 16 key indicators covering major barriers in pathogen genomics sequencing and surveillance. The data captured below is as of March 2023.

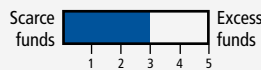
Financing

Sufficient funding for NGS



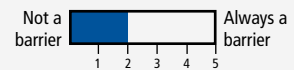
A ranking of perceived sufficiency of funding to support pathogen genomic surveillance over the next 5-year period.

Sustainable funding for NGS



A ranking of perceived sustainability of funding to support pathogen genomic surveillance over the next 5-year period.

Reliance on external support



Country reliance on external support for conducting adequate and effective NGS.

Policy and guidelines

Strategic plan

Well integrated

Status of national strategic plan which includes pathogen genomic surveillance.

National expert panel

Well integrated

Formation of national expert panel or technical advisory group mandated to advise government on pathogen genomic surveillance.

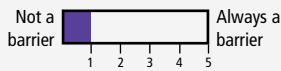
NGS guidelines for public health surveillance

Well integrated

Development of national guidelines for infectious disease surveillance using NGS.

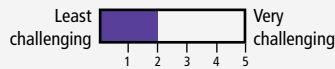
Supply chain

Equipment repair lead time



A ranking of perceived challenges with equipment repair lead time in the last 6 months.

Stock availability – reagents and consumables



A ranking of perceived challenges with reagents/consumables stock-outs for sequencing in the last 6 months.

Resupply time length

6
weeks

Average re-supply time between order and receipt at the laboratory for reagents and consumables.

Laboratory infrastructure

Laboratory capacity

18

5.3 per 10,000,000 population

Total number of laboratories in country performing NGS for infectious disease surveillance.

Sequencing output

2000

595 per 10,000,000 population

Average monthly sequencing output within the past year.

Sequencing utilization

67%

Proportion of average actual monthly sequencing output over maximum monthly sequencing capacity for the past 12 months.

External quality assurance

In progress

Laboratories participating in any proficiency testing or external quality assurance audits for NGS.



Bioinformatics and data sharing

Bioinformatics pipelines for NGS

In use

Containerized, locally installed or in-house pipelines/workflows.

In use

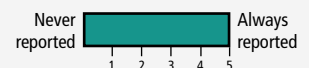
Tools provided by NGS manufacturer or proprietary software.

Data sharing

> 75%

Estimated monthly proportion of sequences shared on public databases (eg. NCBI, GISAID) compared to total sequences.

Reporting frequency



Reporting frequency of pathogen genomic surveillance results to relevant government ministries.

Summary

- There is existing next-generation sequencing (NGS) capacity in Malaysia, and it is divided into 50% in academic institutions, 30% in public institutions and 20% in the private sector.
- Currently, laboratories conducting NGS for pathogen genomic surveillance in Malaysia are not required to be registered.
- The Ministry of Health Malaysia is responsible for the national pathogen genomic surveillance plan.
- Both the Ministry of Health (MOH) and the Ministry of Science, Technology and Innovation (MOSTI) are responsible for managing the NGS budget and 100% of the spending for NGS capacity was derived from public funding.
- There are policy guidelines for pathogen genomic surveillance using NGS in Malaysia.
- The highest cost drivers are laboratory equipment, regulatory requirements, and supply chain & procurement matters (Likert scale 4). The lowest cost drivers are the transportation of samples, waste management, facilities costs, and administrative expenses (Likert scale 2).
- There is a national expert panel/technical advisory group established to advise the government on pathogen genomic surveillance and data interpretation.
- Malaysia uses all the major sequencing platforms including Illumina, Oxford Nanopore Technologies (ONT) and Thermo Fisher and running at full capacity. ONT products are the most found sequencing platforms with over 14 sequencers in the country.
- Some of the barriers with a high ranking include factors across the NGS spectrum – from reagents and consumables, low spending limits, lack of national plan and guidelines, human resources, data sharing and reporting to computing power and storage.
- Computer Infrastructure and training for data analysis, bioinformatics and data use were also marked as essential priority.