



Cambodia

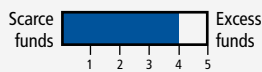
Country Profile

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 Cambodia. Results are based on a landscape assessment conducted with country experts working across the National Institute of Public Health, The Institut Pasteur, the International Centre for Excellence in Research/National Institute of Health. While national and global efforts have been made to use pathogen genomic sequencing for surveillance in Cambodia, support is still needed to scale up the practice and make it a priority. 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 May 2023.

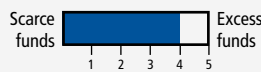
Financing

Sufficient funding for NGS



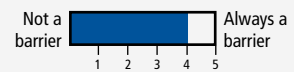
A ranking of perceived sufficiency of funding to support pathogen genomic surveillance over the next 5-year period.

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.

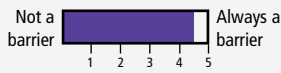
NGS guidelines for public health surveillance

Well integrated

Development of national guidelines for infectious disease surveillance using NGS.

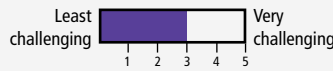
Supply chain

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

6.92
weeks

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

Laboratory infrastructure

Laboratory capacity

5
0.3 per 10,000,000 population

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

Sequencing output

224
1.35 per 10,000,000 population

Average monthly sequencing output within the past year.

Sequencing utilization

7%

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

External quality assurance

Participating

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

- Between 2020 and 2022, 75% of NGS for pathogen genomic surveillance took place in the public sector and 25% in the private sector.
- 20% of the samples from Cambodia were processed out of country.
- Over the past year, the estimated proportion of spending on NGS for pathogen genomics surveillance was;
 - » 25% from external partner-based funding
 - » 50% through academic grants
 - » 25% through private funding
- There is currently no national annual budget allocation for genomic surveillance in the country.
- Cambodia has particularly limited resources allocated to wet lab sequencing and data processing. But the country has gained strong external partner support during COVID-19 through direct financing, donation of equipment and reagents, laboratory training, bioinformatics training, data processing and data analysis.
- Key external partners include WHO, NIH, USCDC among others.
- Cambodia uses all the major sequencing platforms including Sanger, Illumina and Oxford Nanopore Technologies (ONT). However, only Illumina machines are currently running in full capacity.
- Laboratory equipment, laboratory supplied consumables and transportation of samples were identified as major cost drivers. With respect to indirect costs, supply chain and procurement and maintenance contract costs were major cost drivers.
- The main process barriers faced by laboratories conducting NGS for pathogen genomic surveillance were related to trained staff and reagents & consumables.
- All financing barriers for NGS were ranked as “often a barrier” or “always a barrier” highlighting that financing on the whole, ranging from inadequate national budgets to over-reliance on external funders, were perceived as a major barrier to performing NGS for pathogen genomic surveillance in Cambodia.
- In terms of the country’s main training priorities, data processing, data analysis and reporting were ranked the highest.