

# Pathogen Genomics Unit (PenGU) Update

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GIG  
CYMRU  
NHS  
WALES

Iechyd Cyhoeddus  
Cymru  
Public Health  
Wales



Partneriaeth  
Genomeg  
Cymru  
Genomics  
Partnership  
Wales



Llywodraeth Cymru  
Welsh Government

# PenGU Update

## Facts and Figures



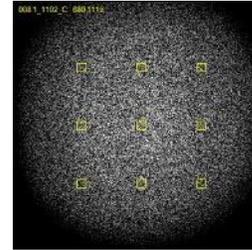
We operate four ISO accredited pathogen genomics services, covering diagnostics and surveillance activities.



We built and maintain open source software that has been used to generate millions of SARS-CoV-2 genomes globally.



**2019:** 8 lab staff and 3 bioinformaticians.  
**2024:** 13 lab staff and (from October) 10 bioinformaticians.



We have the capacity to sequence over 2,000 pathogen genomes per week - more than 10x our capacity at the start of the pandemic.



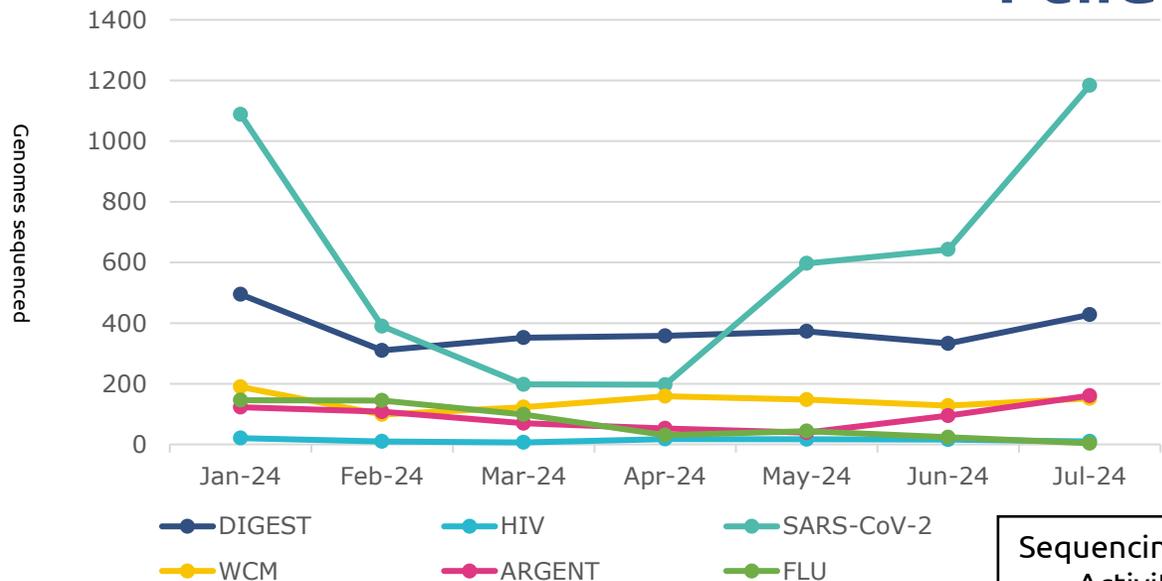
Our services benefit thousands of Welsh patients each year, underpinning better diagnostics, outbreak management and surveillance.



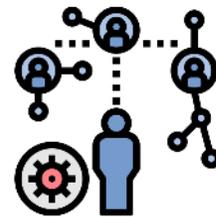
In one year, we can generate and analyse more than 5x the amount of data held by the Library of Congress.

PenGU is integral to the Public Health genomics activity which involves more than 50 staff across PHW, distributed across the Infection and Health Protection divisions.

# PenGU activity



288 routine genomic epidemiology outputs



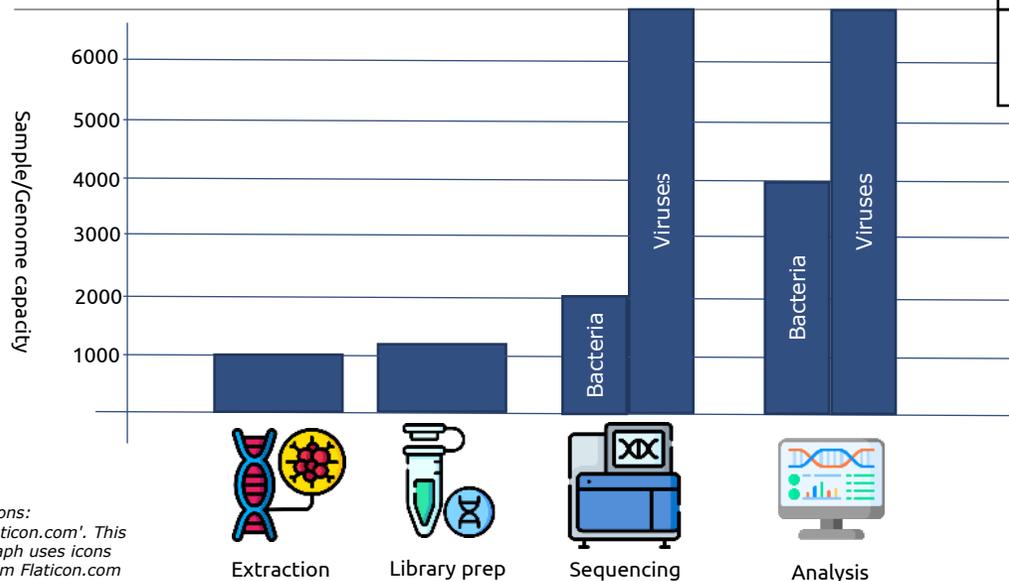
20 SARS-CoV-2 signals investigated



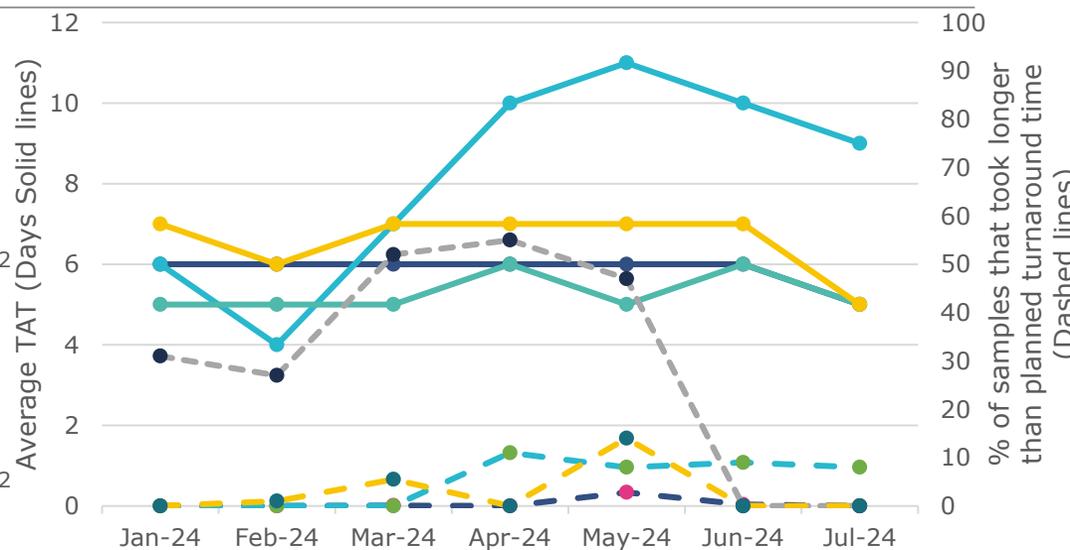
9000+ genomes shared to GISAID since January 2023



4 research studies underway, 6 papers published



| Sequencing Activity | Epi Outputs    |
|---------------------|----------------|
| Lab Capacity        | Indicative TAT |



'Icons: Flaticon.com'. This graph uses icons from Flaticon.com

Note: SARS-CoV-2 TAT was altered as of June 2024 based on sample throughput post-pandemic.

## Achievements

- Release of a new influenza bioinformatics pipeline
- Development and completion of a new bioinformatics audit procedure. First audit completed
- Successful recruitment of 2x B6 bioinformaticians
- Hosting and evaluation of ClearLab Dx platform in association with AB Scientific

## External collaborations

- Portsmouth University: Working to deliver a training package for BMS course which includes genomics-both wet lab and bioinformatics
- Hosting a final year STP in bioinformatics
- IBMS: Specialist portfolio development in molecular pathology-to include genomics
- HEIW: Working to deliver a structured framework for genomics workforce (bioinformaticians and lab) and career development within pathogen genomics
- Lodestone: Four nations approach to improved MTB lineage and resistance calling. Developed by CU; driven forwards by PenGU Bioinformaticians
- PHA4GE: Collaborating as part of an international group on bioinformatics best practices and pathogen-specific guidance documents
- UKMFC: Managed by DSTL-PenGU an official partner. Develop capacity for the detection/management of emerging threats
- Wellcome grant: ISO in a box-Cardiff University and University of South Africa

## Current Challenges

- Finance: Annual budget 'managed' by GPW with governance process -provided by WG as part of PHW core allocation; not ring-fenced. Recruitment delays
- IT: Different requirements-not a 'standard' laptop; StackHPC and hardware provisioning
- Training: Staff training time impacts trainers and staff, hitting productivity/capacity
- Communication: Upstream changes affecting genomics; time taken to develop pipelines/services-amendments change schedule and completion time
- Staffing: Impact of LTS & Training
- SysAdmin: Replacing and provisioning ageing hardware; just recruited