GIG CYMRU NHS WALES | Iechyd Cyhoeddus Cymru Public Health Wales	**Name of Meeting** Knowledge, Research and Information Committee **Date of Meeting** 5 March 2024 **Agenda item:** *6.3*

Public Health Genomics Programme – building our research and data capacity

Executive lead:	Professor Fu-Meng Khaw, National Director Health Protection and Screening Services Executive Medical Director
Author:	Professor Tom Connor, Head of Public Health Genomics Programme

Approval/Scrutiny route:	Business Executive Team- 21 February 2024 HPSS POT Team – December 2023

Purpose

Here we present the detailed structure for the Public Health Genomics programme, introduce plans to address our key development needs in the research and digital space, and highlight key activities that we are planning to undertake in relation to data and research as part of the Public Health Genomics Programme.

The paper is presented to inform the Knowledge, Research, and Information Committee (KRIC), to stimulate discussion and to gain feedback to help inform the detailed development of the Programme itself.

Recommendation:

APPROVE	CONSIDER	RECOMMEND	ADOPT	ASSURANCE
☐	☐	☒	☐	☒

The Committee is asked to:

- **Note** the development of the programme to date and **Suggest** key staff from outside of HPSS who should be engaged as part of further development activities.
- **Note** our plan to deliver a digital blueprint for genomics in 24/25.
- **Note** the participation of the Programme in national and international networks.
- **Endorse** the aim to develop a research plan for Public Health Genomics.

Link to Public Health Wales <u>Strategic Plan</u> Public Health Wales has an agreed strategic plan, which has identified seven strategic priorities and well-being objectives. This report contributes to the following:	
Strategic Priority/Well-being Objective	5 - Protecting the public from infection and environmental threats to health
Strategic Priority/Well-being Objective	7 - Building and mobilising knowledge and skills to improve health and well-being across Wales
Strategic Priority/Well-being Objective	All Strategic Priorities/Well-being Objectives

Summary impact analysis	
Equality and Health Impact Assessment	Not Required
Risk and Assurance	Not Required
Health and Social Care (Quality and Engagement) (Wales) Act	Not Required
Financial implications	None
People implications	None

Contents

1. Purpose / situation

The purpose of the paper is to introduce the agreed structure for the Public Health Genomics programme, and to discuss key development needs for the Programme in the research and digital space. The paper is presented to inform and seek advice with respect to key activities, and to stimulate discussion and to gain feedback to help develop the Programme itself.

2. Background

Pathogen Genomics was established as a capability within PHW in 2016, and, following the 2017 Welsh Government Genomics for Precision Medicine strategy, the Pathogen Genomics Unit (PenGU) was formally created within PHW in 2018. PenGU joined Genomics Partnership Wales – the body setup by Welsh Government to oversee the delivery of the 2017 strategy as one of its key partners.

In a wider strategic context, Welsh Government has followed its 2017 Genomics for Precision Medicine Strategy with the publication of a Genomics Delivery Plan for Wales (December 2022), which follows on from the UK-wide Genome UK strategy launched in 2020.

In both the Genome UK strategy and the Welsh Government Genomics Delivery Plan for Wales, the scope of these documents goes beyond a narrow focus on clinical services and considers key enablers (such as digital) and the wider ecosystem (such as research) that will be needed to deliver on the potential of genomics in healthcare.

The COVID-19 pandemic response in Wales demonstrated the major role of genomics, including as part of a global ‘research response’, to rapidly unpick key biological questions about SARS-CoV-2, enabling the development of new services and iterative improvement of our existing capabilities.

The significance of pathogen genomics saw the creation of dedicated genomic epidemiology capacity within CDSC during the pandemic, while the wider implications of genomics (pathogen and human) for public health were also recognised within PHW. BET agreed in 2021 that a programme should be established, which was followed by a more detailed plan being adopted in 2022 to establish a Public Health Genomics Programme within PHW. Subsequently, the Genomics Partnership Wales Programme Board provided its assent, and a recruitment process was undertaken for a Head of Programme; this role started on 1st of February 2023.

Over the last twelve months, the Public Health Genomics Programme has had several successes (Annex 1) including playing a key role in the move to collocate PenGU in a new £16M facility with other GPW partners, standing up the Programme itself, including developing its vision, ambition, key structures, and future plans.

3. Description

3.1 Overview of programme vision, ambition, and structure

As presented at KRIC in 2023, the Programme has agreed on a vision:

To drive the development of genomics services delivered at every level – from patient to population - to protect and improve health and well-being and reduce health inequalities for the people of Wales.

And based on this vision, the Programme has identified an ambition for Wales to be a world leader in the use of genomic data to inform public health action. Genomic data can play a valuable role in patient management, response to incidents/threats from communicable diseases, prevention of ill-health, population health screening and as a basis to inform wider policy. Both our ambition and vision are directly aligned to the duty of quality, and reflect the fact that genomics has the potential for positive impacts on all the domains of quality and has a role in all of the enablers of quality.

We recognise that to realise the potential of public health genomics, we will need to change how we work, build new capabilities, enhance the expertise in our workforce, and we will need to improve the speed at which we generate data and make it available across the public health system. We also recognise that genomics is at the cutting-edge of public health practice, requiring us to undertake research – alone or in collaboration – to enable us to develop evidence to guide action for the wider system, as best practice for genomics is still emerging.

We recognise that to realise our ambition, we will need to work across PHW, and that there is a lot of work to do, particularly with respect to digital/data aspects and with respect to research capacity in this area in Wales.

To achieve our vision, we have created a matrix structure for the programme which identifies the areas of activity that will form part of the programme (Figure 1. This structure is, at present, an ambition, and we do not have the staff/resources to do everything. Some elements do not exist yet, and so this structure should also be viewed as an ambition for where we want to get to.

Our structure includes a research and development arm (encompassing a range of activities including academic research, evidence generation and R&D for services), two enabling arms (bioinformatics and data and core operations) and two arms that are focused on delivering services.

Each arm potentially comprises staff from across the organisation, and so alongside our matrix structure, we have identified a set of operational components that will enable us to deliver that structure (Figure 2). Collectively the arms define broad areas of activity, while the operational building blocks relate to the delivery of that activity.

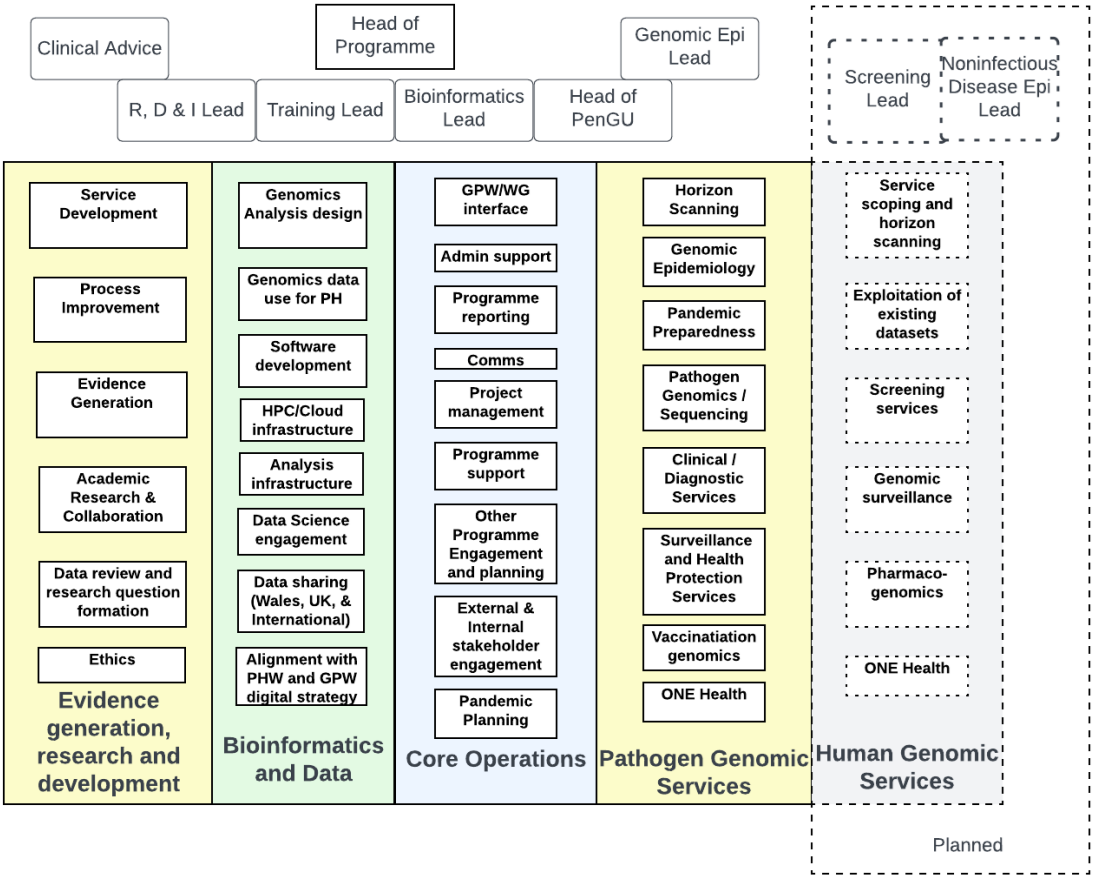

Figure 1 Matrix structure of Public Health Genomics Programme, outlining the five arms of the programme, and including some of the areas of activity that are expected to occur within each arm.

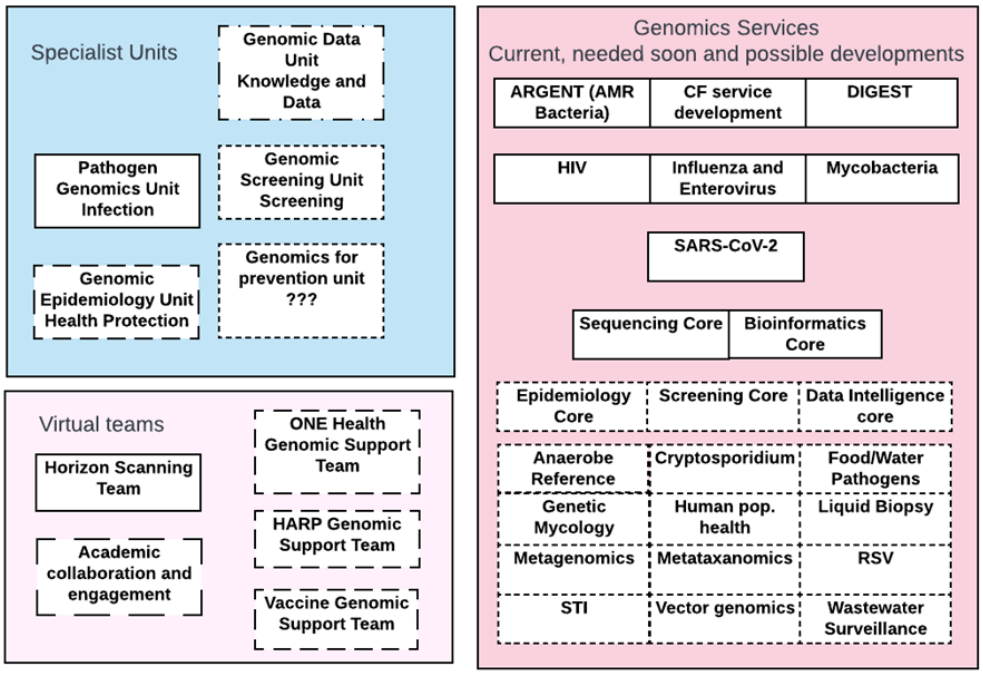

Figure 2 Operational building blocks of the Programme, including potential areas of activity and host location/division for Units. Boxes with dotted or dashed lines on their outside are planned or future possibilities and will be subject to development and approval but are included to emphasise potential areas of work.

The operational building blocks of the Programme:

- **Specialist Units** are a group of specialist genomics professionals who support and deliver genomics services and are the organisational subject matter experts on genomics who support internal and external stakeholders. Units are embedded within divisions/directorates, and form the core of the staff working to fulfil the Programme's workplan.
- **Virtual teams** are groups of staff from across the organisation who come together to form what is effectively a working group, without an end point. These entities undertake joint, recurrent work within a formal management/accountability structure. Learning from the pandemic, virtual teams could also include external experts.
- **Genomics services** are modular activities that are focused on doing something and delivering it as a service. These range from core services (generic sequencing or bioinformatics) to end-user services, such as those that track SARS-CoV-2 or characterise Mycobacteria. Services are led by a subject matter expert and are supported/delivered by a multi-faceted project team.

We recognise that research and digital elements are critical to the delivery of the Programme, but have, historically not been considered as explicitly within the planning of genomics activity as should have been the case. Therefore, we are seeking to embed these elements into the programme from the start, as they are going to be central to the development of our services as we build the Programme. *More detail about programme structure is contained in Annex 4.*

3.2 The wider genomics research and data context

Genomics sits at the leading edge of biological and biomedical sciences research, and it has been one of the major catalysts for the transformation of biology into a data intensive area of research. In most cases, best practice for genomics is not established yet, and new methods and analytical approaches are being developed all the time, which could have uses or implications for clinical or public health practice. Establishing a conveyor belt for taking research innovation through to clinical or public health service is critical, with the current ISO accredited PHW Pathogen Genomics services all being based, originally, on research activities and research outputs.

3.3 The genomics research and data challenge

There are several significant and persistent obstacles that stand in the way of the of the translation of bioinformatics and genomics research outputs into clinical and public health services. These obstacles cover both the deployment/deployment of assays for use in the wet lab and in the bioinformatics/digital arena. The challenge of genomics translation is significant, as without the ability to generate sequence data, you have nothing to analyse, and without the bioinformatics/digital elements to analyse the data,

you have no 'result' to derive insight from, or act upon. The ability to fully use the genomics data we generate, and our ability to analyse that data in a timely way are fundamental challenges to the implementation of genomics in routine service. A sequencing instrument has the capacity to generate huge quantities of complex data every day, and so digital and data considerations are central to the sustainable development and delivery of genomics services. This challenge is compounded by the difficulties associated with training/workforce development, a lack of suitable career model for genomics professionals, and a lack of defined 'best practice' across genomics as a whole.

Alongside the data and digital challenge is the challenge of translation of research into practice. This depends on enduring partnerships and collaborations with academia. PHW has a key role in moving from innovation to translation into public health and clinical practice. Research is clearly central to this, particularly in areas such as genomics, where best practice does not exist yet, and disruptive technologies are emerging that have the potential to be used in many ways within public health and clinical diagnostics. For the Programme we need to define our relationship with research and explain how we in PHW are going to lead the generation of genomics research outputs – evidence, software, data – in Wales, in support of our organisational mission.

4. What is needed in Wales – key activities for 24/25 and beyond

We have identified a set of needs with respect to Public Health Genomics in Wales, which we outline below. Collectively these activities are targeted to overcome current challenges to the translation of genomics research into practice or to develop foundational enablers to allow us to overcome that challenge in the future.

Beyond our organisational considerations, it is also important to recognise that in all cases, we must align with the Welsh Government Genomics Delivery Plan for Wales, and to ensure that our approach is joined up with the key data/digital and research activities undertaken as part of the wider GPW grouping.

4.1 Develop a digital blueprint for Genomics

In genomics data is the fabric of the enterprise, and without high performance computation and storage, it is simply not possible to generate analysis outputs. From a service perspective, this means that if there are failures in our digital systems, our service stops. It also means that there is currently a requirement to refresh expensive equipment on a ~5 yearly cycle, without which, the service cannot be provided. There is also a need to be able to use the data that we generate for different purposes. Different analyses performed on the same underlying genomic data can yield insights that are useful in different places and different scales. Within our SARS-CoV-2 data, we can perform analyses to inform patient management at an individual level, analyses to identify outbreaks at a hospital level, analyses to characterise

transmission at a regional level and analyses to summarise trends at a national level – all using the same underpinning genomic data. We also need to be able to share our data for research, and with other relevant stakeholders for public health purposes. These requirements need to be baked into future digital infrastructure from the start, and so also need to be recorded and considered in future.

The current genomics systems have been built in a stepwise way and have several dependencies and interactions inside PHW and externally. This development has followed service need, operating within PenGU, with limited need for engagement outside of Infection division. However, as our genomics activity increases this will change, and it is vital that we have a baseline blueprint for the digital elements of genomics to, support and enable data analysis and data sharing (within and outside of PHW), inform the development of our infrastructure (including a move to the cloud), and ensure the right enablers are in place for us to achieve our vision and ambition. Why a blueprint? Because what is needed is something fundamental to build from – plans may be developed for aspects of what we want to do, and strategies may be formed for the larger objectives of work that we want to undertake, but the digital blueprint will include the underlying principles and will be thing that we are going to build from. It is foundational, and essential for the development of the Programme.

4.2 Develop an agreed plan for Public Health Genomics research in PHW.

Alongside the development of a digital blueprint, we need to be clear on what we mean by 'research', what 'research' we will need to support/fund from within PHW, and where we should seek to capture research funding or undertake collaborative activity. We need an agreed research plan for genomics, and the right people in place to coordinate and deliver that. As part of this work, we will need to recognise that academic research, evidence generation, method development, service improvement/R&D, public health research and insight generation and translation are all distinct activities, which need to be funded and planned for in different ways. This work should also recognise that PHW has a responsibility to share genomic data where possible to enable research, but that this costs money and requires resourcing – and this needs to be explicitly planned for and agreed.

We also need to recognise that externally funded research provides a mechanism to build capacity, raise our profile and attract the best and brightest to the organisation, in addition to creating the opportunity for us to deliver world leading, excellent public health services. Conversely, releasing staff time for research within the organisation creates opportunities for innovation, improves staff happiness/wellbeing, supports career development, and may enable the development of outputs that can bring benefits to patients and the public through the generation of evidence, analysis of issues or identification of efficiencies. The development of this work runs in parallel to the development of a Genomic Data Unit and the growth of the Genomic Epidemiology unit – as both units would have a central role to play in the development of research capacity and activity with respect to genomics.

As part of the development of a research plan that captures our areas of research activity and priorities for Public Health Genomics research, we also need to plan to improve our record of publishing research outputs to share key findings and practice with the wider world. In addition to the direct public health benefits from the publication of work, it is also a key mechanism for us to develop our profile, attract staff and demonstrate our systems leadership in Public Health Genomics.

Finally, Welsh Government is leading the development of a Genomics Research Strategy as part of the Genomics Delivery Plan for Wales. We recognise that this needs to reflect our needs, and also that it is joined up with strategic research review work being undertaken within PHW. A tangible activity for the Programme is developing a research plan for the Public Health Genomics Programme, and through this process feeding into wider research strategy/planning efforts within PHW and Welsh Government (outlines of possible focuses of research activity are summarised in Annex 2, while information on collaborative research structures and challenges to leading funded research is summarised in Annex 3).

4.3 Develop a plan for a Genomic Data Unit

As part of the development of the Programme, we believe that the development of a Genomic Data Unit is required to ensure we are properly structured for the future. As envisaged, the Genomic Data Unit would sit within the Data, Knowledge, and Research Directorate, and would be line managed through existing structures within that directorate. It would be part of, and have accountability to the Public Health Genomics Programme, and would work as part of the programme, alongside the other Programme units.

In the next year, we plan to develop a proposal for a Genomic Data Unit, covering focus and required resource. Within Genomics Partnership Wales we have established Wales-wide data needs in research ethics and information governance, as well as a need for genomics-focused data science and visualisation expertise. There is also going to be a longer term need to integrate routinely generated genomic data into existing assets managed by Data, Knowledge, and Research (e.g., cancer genomic data being integrated into cancer intelligence and surveillance) as well as the evolution of existing services to use genomic data (e.g., newborn screening).

We recognise these longer-term activities will require appropriate planning from a data and digital perspective, and the Genomic Data Unit would provide this leadership for the Programme and wider organisation. Lastly, we would also envisage the Genomic Data Unit having a role supporting data sharing and data mining, which would also feed across into research activity and genomic research support.

For the purposes of this paper, we are sharing these plans and ask that KRIC advises on next steps to consider for the development of the Genomic Data Unit including

identifying the best person/people to support this work from Data, Knowledge, and Research.

4.4 Engage internationally and publish research

Finally, we recognise that in addition to our UK-wide engagement, PHW exists as part of an international network of public health institutes and research institutions. We recognise that it is important that we are seen to be research active to develop our reputation and ensure that gaps in knowledge/evidence are filled, as well as sharing findings for global public health action and information.

Building on this, increasingly, the genomics community is self-organising into networks that include research and service elements to define best practice and move the field forward. We already have an established link as part of the Public Health Alliance for Genomic Epidemiology and would like to join the **WHO International Pathogen Surveillance Network** (a network that is focused on pathogen genomic surveillance and developing global capability and best practice) and the **Global Alliance for Genomic Health** (a global network focused on data standards, data sharing and data interoperability for genomics).

In both cases, we would need to join 'as an organisation' – and although this places no obligations on PHW, there is a need for us to understand any additional approval process for joining these networks, if one exists. From this, we ask if KRIC could advise on the process, then this would help us move forward our international engagement with the global public health genomics community.

5. Conclusion and next steps

Over the last twelve months we have stood up and developed a structure, vision, and ambition for the Public Health Genomics Programme. Research and data are essential to the delivery of the Programme, and we have identified key needs in this space which we will be working on in the next year.

The potential of genomics is vast – and a key challenge will be maintaining our ambition while also building our capabilities in a stepwise and sustainable way. Data and digital is the key enabler in this – while research is the engine by which we will drive the development of new, world leading services. We believe we have the right structure to deliver impacts across all PHW's strategic priority – but will increasingly need support to develop the key elements to realise our vision.

6. Well-being of Future Generations (Wales) Act 2015

Note: This section is for inclusion in reports where a request is made to **approve** a particular course of action/a policy or procedure etc.

This section should also consider how the five ways of working have been / will be addressed to apply the sustainable development principle, and should be challenging and not a tick box exercise. If a way of working has not been met please explain why.

This work has been put together following the five ways of working, as defined within the sustainable development principle in the Act, in the following ways:

The focus of this paper is to plan key digital and research elements of the Public Health Genomics Programme. In developing the paper, we are explicitly focusing on putting in place systems that will be fit for the future, and which recognise the importance of long-term planning in delivering effective digital systems and research activity to support the realisation of the potential of genomics.

It is widely recognised that the healthcare system currently faces many challenges, particularly around service waits and poor outcomes. Genomics – and disruptive technologies that use genomics such as liquid biopsy – provide a new toolset that could enable earlier and better detection of disease, and these technologies are essential to provide personalised healthcare and better targeted therapies. In a public health context they also enable precision healthcare – broadly enabling the right intervention in the right population at the right time. To realise this potential, we need to ensure that the engine of innovation – research – can deliver the ideas to be translated for impact, and that we have the right digital systems to underpin all of our activities, and fully utilise the genomics data that we are able to generate. In these senses, prevention is at the heart of this paper.

We have developed an integrated, cross-organisational structure for our Programme within PHW. This is combined with a plan to develop our services and capabilities in a stepwise, sustainable way, ensuring that while we may move at pace, we do so in a co-ordinated and cost-effective way.

Ensuring that digital planning and delivery for genomics is sustainable and joined up is critical and speaks to the integrated way of working.

Research is fundamentally collaborative, and the work presented here is undertaken in partnership with Genomics Partnership Wales (in particular the All Wales Medical Genomics Service), Welsh Higher Education Institutions, other parts of the NHS, Welsh Government and UK and international stakeholders. The structure of the Programme is designed to facilitate collaboration across the organisation. Co-creation and co-delivery of services sits at the heart of the wider Genomics Partnership Wales, and this document is partly intended to spur development of collaborative partnerships with researchers – an aim that is directly aligned to the 'collaboration' way of working.

As part of GPW we have made use of opportunities to undertake patient and public engagement. As part of our work plan for this year, we are engaging the GPW Patient Sounding Board in relation to ethics and data use, and our structure includes explicit plans for involvement of patient representatives within programme groups, evidencing our commitment to the involvement way of working.

7. Recommendation

We appreciate that as a programme we are at the start of a journey bringing genomic research within PHW together under a single narrative – and that there is a large amount of work to be done. Based on our identified needs, specifically we ask KRIC to:

- **Note** the development of the programme to date and **Suggest** key staff from outside of HPSS who should be engaged as part of further development activities.

- **Note** our plan to deliver a digital blueprint for genomics in 24/25.
- **Note** the participation of the Programme in national and international networks.
- **Endorse** the aim to develop a research plan for Public Health Genomics.

Annex 1 – Achievement Highlights

Operational

- We led the digital User Acceptance Testing for the new building at Cardiff Edge, designing a UAT scheme comprised of over 100 digital tests to ensure that the site was fit for purpose from a digital perspective before moving.
- We played a central role in ensuring the Cardiff Edge move took place within the planned timescales, particularly in supporting the digital work required for the new site. The Programme then worked to deliver the move of PenGU with minimal disruption to services.
- We supported the re-accreditation of PenGU following the Cardiff Edge move –the UKAS inspection was very positive, with only four findings in total; this was an exceptional result, given the scale of the move.
- We completed improvements to existing services, including quicker turnaround times for the DIGEST service.
- We established a Horizon Scanning group, meeting every two weeks, to assess SARS-CoV-2 and Influenza genomic signals; this group feeds into health protection functions.
- We have developed the core Programme vision, ambition, and structure, presenting elements of this at directorate leadership team level and at KRIC over the last year.

Externally facing

- The Programme has published five academic papers in 2023 using genomic data generated by PHW and with its staff as authors, including contributing to one paper in Nature Communications and another in Science (both internationally renowned journals).
- We have publicly shared over 9,000 genomes since February 2023 to support global pathogen research efforts.
- We have engaged with the public through multiple school visits and involvement in events such as ‘Genomics after dark’ at Techniquest in Cardiff.
- We have presented our work at conferences; this included being invited to speak at the Festival of Genomics (the largest genomics conference in Europe) and the presentation of multiple posters and talks at leading conferences such as ESCAIDE.
- We supported Welsh Government at the BIO conference in Boston and have been supporting Welsh Government efforts to attract funding to Wales.
- We engaged with GPW, who undertook a communications article which highlighted four members of Programme staff as part of International Day of Women and Girls in Science.
- We have consulted with the GPW Patient Sounding Board in relation to public health ethics and data, and this work will be developed to inform our Programme design and development.
- We have introduced the Public Health Genomics Programme to multiple external partners, including the UKHSA chief executive and companies such as Illumina.

- We are an active contributor to the Public Health Alliance for Genomic Epidemiology, contributing to the development of international open pathogen genomics standards.

Building our genomics capabilities

- We were a co-applicant in a research grant award for genomics research funding.
- We undertook a rapid analysis of *E. coli* Bacteraemia from North Wales.
- We have developed a genomics module as part of HEIW MSc in Genomic Medicine.

We have developed a set of joint projects to foster further collaboration between PenGU and CDSC.

Annex 2 - Focuses of research

If we are to work to develop our research collaborations, we also need to have a clear focus on what research we intend to undertake.

Within Public Health Genomics we have identified a set of potential areas of research, many of which already cover activities within PHW, but which currently do not include genomics. Examples include:

- Evidence generation and collaboration around the use of Liquid Biopsy as a tool for population screening.
- Use of whole genome human genomics for screening and population stratification (e.g., as part of a newborn screening programme).
- Research examining the ethical use of genomic data for population/public health purposes in both research and routine service.
- Genomic Epidemiology research, using genome sequence data to examine pathogen transmission in our population.
- Genomic epidemiology research, using genomic data to risk assess patients.
- Research assessing the effectiveness of metagenomics as a culture-free approach to identify unknown pathogens ('disease x').
- Research working as part of the UK Forensic Microbiology Consortium to develop tools and approaches to detect deliberate acts of bioterrorism/exposure to pathogens.
- Research trialling the use of metagenomics for close-to-patient rapid pathogen characterisation to treat sepsis.
- Research examining the utility of metataxanomics as a marker of sepsis risk in neonates.
- Research seeking to use population genomic information to understand community-level risk factors around mental health.
- Research looking at population trends integrating genomic data and other data types to deliver better public health monitoring (including to improve healthcare system design, support cancer reporting and to examine landscape genomics and environmental exposure)
- Undertaking service R&D to reduce sequencing costs through the development of optimised laboratory processes.
- Undertaking service R&D to utilise new/different models of computation to reduce costs and improve sustainability.
- Use of AI to interpret genomic data on a population level for insight into trends and patterns that may require interventions.
- Investigating the use of wastewater surveillance as an early warning system for infectious disease.

These examples represent a small number of what would be possible now. However, as a Programme we require support to enable us to sift and identify the targets to focus

on now, and to ensure that these align with/are included as part of the PHW research strategy. As part of the Genomics Delivery Plan for Wales, there is a group that is developing a research delivery plan, which will be feeding into Welsh Government. There are also activities in other places – such as those liked to the UK Health Protection Oversight Group – which may also have a bearing on research activity and strategy. Understanding this complex landscape, we believe that having an agreed plan for Public Health Genomics will be helpful, as it will make clear where we stand and what our priorities are. Therefore, as a programme, we would like KRIC to advise on what the best approach is to develop a research plan for Public Health Genomics, and if resource may be available to support this activity.

Annex 3 – Collaborative research structures and issues

At the present time, structures to support and enable research collaboration in Genomics in Wales are limited – with HCRW investments in research networks being focused on higher education institutions, and no HCRW-funded health protection or pathogen genomics research networks, units, or centres at all.

This landscape contrasts with in England, where one of the main tools for supporting and enabling research collaborations in health protection/microbiology is the Health Protection Research Unit (HPRU). HPRUs exist to provide/create centres of excellence for multidisciplinary health protection research and provide an explicit mechanism for UKHSA to collaborate with academics and ensure access to academic expertise. There are a range of HPRUs that are relevant to genomics, as well as an HPRU that is dedicated to genomics in public health. No similar structure exists in Wales, and it is critical that if we are to engage with academics in a meaningful and long-term way, we will need to identify tangible mechanisms to enable this. As it stands, Wales cannot be a part of an HPRU, as they are England-only, and so, particularly after a pandemic that relied upon a research response, it is vital that PHW identifies how to build academic/research links going forward. Public Health Genomics is one area that can be clearly defined in scope and activity, and so provides an obvious starting point for the development of academic links/partnerships. It is also important for PHW to determine how we may strategically engage with HPRUs that are funded in England, and if there is resource available to support substantive collaboration with established HPRUs.

With respect to human genomic research, England also has Genomics England; a publicly funded body that works with NHS England to undertake genomic research and to support the translation of research into practice.

In both cases – research examining human and pathogen genomics – England has an explicit structure that is setup to enable research that explicitly brins together the NHS and English national Public Health Institute. We have nothing comparable in Wales. Genomics Partnership Wales is operated from the NHS but has no dedicated funding to support research or enable research. In Wales there is a real need for a dialogue to establish what is needed with respect to genomics research collaboration, and, in addition, clarity is required on the expectations of the key stakeholders (including PHW) in this area from Welsh Government. What is clear is that PHW should be playing a leading role in this, and that pushes to develop research capacity and research networks that bring together public health and academia in Wales should not be left to individual academics or universities – but should be led by PHW. There is also a need to establish how we can access/become involved in collaborations with established capabilities outside of Wales (e.g., HPRUs or MRC Centres), to develop the long-term collaborative links we will need to develop and deliver the genomics services of the future.

Structural challenges within PHW

At the present time, the current financial and contracting setup within PHW is a major impediment to the securing of research funding. For some funders (e.g., MRC or Wellcome) the financial setup within PHW would preclude us acting as the lead applicant of a consortium, as many funders require the lead organisation to develop a research collaboration agreement, and then, once the project starts, dispense funds to the collaborating organisations. Grants are also multi-year, and grant budgets are typically agreed for the whole period, allowing for flexibility in when money is spent. Collectively, PHW does not have a system that is well aligned to the needs of running large grants, which creates constraints on our ability to develop and grow research activity within the organisation.

In addition to the challenges with respect to the management of grants, PHW also does not have a standardised process for requesting research costings (which, in a university, also generally include an element of planning and approval around potential posts – to ensure office space, equipment etc is available). Moving towards a more standardised approach for the management of research covering pre- and post-awards is something which needs to occur for us to be able to start to pursue funding to support genomics activity. More broadly, the organisation has a varied approach to material transfer agreements and associated costs. Institutes such as the Institut Pasteur, which, like PHW, also hold large sample collections and data, maintain a standard process for material transfers. These processes include standardised costings and terms for commercial use of materials, and costings (including collaboration **requirements**) for the research use of materials. These policies also naturally sit alongside other policy such as publication policies, which seek to ensure that those who have contributed to the generation of data gain recognition as such in any published use of that data.

Many of these issues are abstract and difficult to describe until one has a practical example to work against. Genomics, because of its links to research, provides an area to focus on in developing processes and procedures. As part of our plan for the Public Health Genomics Programme, we are keen to support colleagues within PHW to put in place the elements required to enable research and would like to support the development of research support capabilities (as well as policies such as publication policies) that can be applied more generally across the organisation.

Annex 4 – Programme Anniversary Paper to BET