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Public Health
Wales

Name of Meeting
Knowledge, Research and
Information Committee

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Agenda item:
9

Introducing the Public Health Genomics Programme

Executive lead:	Professor Fu-Meng Khaw, National Director, Health Protection and Screening Services / Executive Medical Director
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Author:	Professor Tom Connor, Head of Public Health Genomics Programme
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Approval/Scrutiny route:	Document accompanies deep dive of programme presented to KRIC. Document pertains to development of the Public Health Genomics Programme, which is monitored via the Programme Oversight Team within HPSS.
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Purpose

Following the recruitment of a Head of Programme, The Public Health Genomics Programme is now being stood up. As part of this work, the programme team are engaging across PHW to share and develop the vision for the programme. In particular, the programme team recognises that genomics is a data-intensive field of activity, and that there are therefore considerable cross-organisational aspects to the activity of the programme itself.

This document, and the slide deck/presentation that are provided are an early step on this journey and are intended to;

1. Introduce senior leaders in the organisation to genomics and its potential, providing a high-level view of genomics in Wales.
2. Highlight key data/infrastructure and research aspects of genomics.
3. Solicit advice and input with respect to building the programme.
4. Develop truly cross-organisational entity that will design, oversee, and enable new services and capabilities to protect and improve health and wellbeing, and reduce health inequalities for the people of Wales.

Recommendation:

APPROVE <input type="checkbox"/>	CONSIDER <input checked="" type="checkbox"/>	RECOMMEND <input type="checkbox"/>	ADOPT <input type="checkbox"/>	ASSURANCE <input type="checkbox"/>
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The Knowledge, Research and Information Committee is asked to:

Note: Our proposed vision of '*Driving the development of genomics services from patient to population, to protect and improve health and well-being and reduce health inequalities for the people of Wales.*' for the Public Health Genomics Programme.

Consider: The potential of public health genomics and the key issues that are identified in developing the programme, **noting** the fact that IT/Digital elements are at the heart of genomics activities. **Advise** on key stakeholders who should be included within the programme structure.

Consider: Our efforts to develop collaborative working within PHW and establish the programme as a truly cross-organisational entity. **Advise** on next steps and suggest an appropriate timescale for the presentation of a plan outlining the ambition and objectives for the programme.

Link to Public Health Wales [Strategic Plan](#)

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	6 - Supporting the development of a sustainable health and care system focused on prevention and early intervention
Strategic Priority/Well-being Objective	7 - Building and mobilising knowledge and skills to improve health and well-being across Wales

Summary impact analysis

Equality and Health Impact Assessment	This paper describes the development of a programme, therefore there is no specific EHIA to complete.
Risk and Assurance	This paper is predominantly for information and provides an early step on the journey to stand up our Public Health Genomics Programme. It is anticipated that over the long term the programme will help to mitigate Strategic Risk 5 and 6.
Health and Care Standards	This report supports and/or takes into account the Health and Care Standards for NHS Wales Quality Themes All themes
Financial implications	The work described is currently funded via Genomics Partnership Wales. There will be future financial costs to the programme, however the focus of the paper is to lay out key background and potential focuses of the programme. Financial implications are outside the scope of this document.
People implications	This document describes the background to the standing up of the Public Health Genomics Programme. There are therefore no direct people implications from the contents of this document.

1. Purpose / situation

The creation of the Public Health Genomics programme is covered by two previous BET papers from 2021 and 2022. Recruitment of the Head of Programme was completed in February 2023, and we are now in the process of engaging with stakeholders and laying out the scope and ambition of the programme.

Although the Public Health Genomics Programme grows out of a specialist laboratory within the Infection division of Health Protection and Screening Services (HPSS), genomics has a critical dependency on data and analytics, meaning that to achieve its aims the Public Health Genomics Programme must work across the organisation.

This document, and the slide deck/presentation that are provided are an early step on this journey and are intended to;

1. Introduce senior leaders in the organisation to genomics and its potential, providing a high-level view of genomics in Wales.
2. Highlight key data/infrastructure and research aspects of genomics.
3. Solicit advice and input with respect to building the programme.
4. Start the programme as we mean to go on – developing a truly cross-organisational entity that will design, oversee, and enable new services and capabilities to protect and improve health and wellbeing, and reduce health inequalities for the people of Wales.

2. Background

Genomics capacity was first established in PHW in 2016, and, with the publication of the Welsh Government Genomics for Precision Medicine Strategy in 2017, PHW took the leading role in the development and delivery of Pathogen Genomics services in Wales. Delivered by the PHW Pathogen Genomics Unit (PenGU), PHW moved from delivering 2 ISO 15189 accredited pathogen genomics services with a capacity to sequence **~8,000 patient samples per year** in early 2020 to delivering five services (including SARS-CoV-2) and a capacity to sequence over **8,000 samples per week** by 2022.

The utility and potential of genomics in public health is evidenced in our pandemic response. PHW exploited Wales' advantages in terms of size, collaborative working, and data linkage to maximise the utility of genomics data to respond to the pandemic. Since the summer of 2020, genomics data has been an integral part the examination and control of outbreaks and is now a core part of the health protection toolkit for pandemic response. Data generated by PenGU is routinely analysed within

Communicable Disease Surveillance Centre (CDSC), shared in real time via public dashboards and results communicated to consultants in communicable disease control and Healthcare Epidemiologists across Wales. This capability was built upon pre-existing services and collaborative working relationships, established, and developed over many years.

Alongside the significant growth of PenGU, wider activities in Wales have been underway to build on the Genomics for Precision Medicine Strategy. Starting in 2019, Genomics Partnership Wales (GPW), the overarching group charged with implementing the strategy, has led the development of a new Centre of Excellence for Precision Medicine. This new facility, based at the Cardiff Edge science park will see the co-location of PHW/PenGU staff with the All-Wales Medical Genomics Service (who provide human genome sequencing services) and academics from Cardiff University. This co-location is intended to unlock potential, sharing equipment and expertise, and driving investment into Wales. Through efforts to build joint computational and data infrastructures for genomics, the move to Cardiff Edge creates opportunities to exploit data and co-create and co-produce new services. Building on the Cardiff Edge move, the Genomics for Precision Medicine Strategy and the wider Genome UK strategy led by the UK government, Welsh Government published its Genomics Delivery Plan for 2022-2025, the first part of the development of a strategy that has a 10 year+ horizon.

The delivery plan envisages a significant expansion in the generation of both human and pathogen genomic data in Wales. For PHW, the Public Health Genomics Programme has been created to spearhead these developments, building on the opportunity presented to realise the development of services that provide not just precision medicine, but precision public health, enabling “the right intervention, in the right population, at the right time”.

3. Description/Assessment

Genomics is not simply another lab process, and the raw sequence data generated is not simply a result-in-itself. In traditional diagnostic testing, a sample is taken, and a test run. There is limited ability to go back and then test that sample to answer a different question. Genomics provides a toolset that means once you have a genome, you can ask multiple different questions as required, with these tests being performed *in silico*, rather than in a physical laboratory. These tests can be designed to produce outputs that are applicable at a range of scales – from patient to population.

Thus, the delivery of public health genomics services requires a complex and extensive human and technological infrastructure, and the exploitation of genomics data requires careful service design and innovation. As we work to build the Programme, key areas of activity include:

- **Infrastructure.** Data is the fabric of the genomic enterprise, and its analysis, storage and reuse are critical to the use of genomics. This means that:
 - Until raw data is analysed, no 'results' are produced. Further, the same raw data can be analysed in different ways, to answer radically different questions.
 - Realising the potential of genomics requires data to flow across the organisation and into/out of the wider healthcare system.
 - Compared to services such as diagnostic services, genomics has a high dependency on IT infrastructure. This requires us to have the right systems/infrastructure and to recognise that IT issues will stop the delivery of the service.

- **People.** Genomics is a data intensive area of activity, and its recent expansion means that for many, it will not have been adequately covered when staff passed through their relevant training. So, at the heart of realising the potential of public health genomics sit our people.
 - To analyse genomic data, we require expertise to build and run analysis pipelines, visualise data.
 - The digital infrastructure to store and manage genomics data is radically different to most IT that currently exists within the organisation. We require specialised staff to operate the systems that underpin our analysis, provide information governance and cybersecurity assurance and protection for the IT platforms we build and use.
 - We also need our workforce to be better aware of the analysis process, to be able to use the information that is generated for action.

- **Discovery.** Much of what we might specifically use genomics for isn't known yet:
 - In some areas, this means there is a need for evidence generation, which we may wish to commission or design.
 - In other areas there may be a need to translate work from research into clinical/public health (best) practice.
 - We need to be prepared to support/deliver research in collaboration with academia and industry, and we must also consider our own internal R&D capability.
 - We must also recognise that we generate data that is of value to researchers, and that by making our data available we contribute to global health research, which benefits all.

- **Strategic relationships.** The scope of activity to operationalise and deliver public health genomics services extends beyond Health Protection and Screening Services. It requires:
 - Collaboration, co-creation, and co-production within PHW. Organisational barriers and silos create major risks for the implementation of genomics. Within PHW, IT and data science planning could, for example, easily occur without considering the activities related to genomics. The dots within PHW must be joined up, and it is vital that PHW more generally recognises genomics as a data-intensive activity.
 - External to PHW, but within Wales, key relationships need to be built including other parts of the public health system, as well as initiatives such as the National Data Resource. There is a risk as it stands that strategic activities may not join up with the Public Health Genomics Programme as required.
 - External to Wales, organisations such as UKHSA are developing infrastructure and strategies that will impact the development and delivery of our public health genomics work.
 - Internationally, Wales must engage with communities such as the Global Alliance for Genomic Healthcare (GA4GH) and the Public Health Alliance for Genomic Epidemiology (PHA4GE), as well as international organisations such as WHO.

These four components sit at the heart of the programme, and will feed in, in the immediate future, to the completion of deliverables within the Welsh Government Genomics Delivery plan, published in 2022, including:

- The development of a Welsh Pathogen Genomics Delivery Plan and associated new services.
- Contributing to the development of plans for the use of genomics in screening activities.
- Identifying uses of routinely generated human genomic data for public health purposes.
- Contributing to genomics research.
- Supporting the development of key enabling digital and data infrastructure.

Beyond the delivery plan itself, the foundation that we put in place now will form the basis for an expansion of services that use genomics. This work is intended to enable us to achieve our vision for the programme of;

'Driving the development of genomics services from patient to population, to protect and improve health and well-being and reduce health inequalities for the people of Wales.'

We intend to achieve this through our role as a systems leader, working with stakeholders from across Wales and the wider UK to identify,

evaluate and oversee the implementation of genomics practices to prevent and control infectious, chronic, environmental, and occupational diseases in Wales.

4. Recommendation

We are in the process of recruiting staff and standing up the Public Health Genomics Programme. Alongside this, we are engaged in work to complete the Centre of Excellence in Precision Medicine at Cardiff Edge, and to finalise the move of key PHW Genomics capabilities to the site, to be co-located with other members of Genomics Partnership Wales.

We have identified a set of activities that are central to the realisation of the programme that have direct relevance to the Knowledge, Research, and Information Committee, and which have cross-organisational implications. As we are at an early stage, we are still developing our ambitions and plans for the programme, but we are committed to ensure that everyone who needs to be engaged with the programme is engaged at an early stage. Therefore, while this document and the accompanying slides are predominantly for consideration, we expect this is the first part of an iterative process, which will support us in our programme development, and provide the route to develop and join up the required expertise across PHW to realise the potential of genomics in public health.

Based on this, KRIC is asked to:

Note: Our proposed vision for the programme.

Consider: The potential of public health genomics and the key issues that are identified in developing the programme, in particular the fact that IT/Digital elements are at the heart of genomics activities. **Advise** on key stakeholders who should be included within the programme structure.

Consider: Our efforts to develop collaborative working and establish the programme as a truly cross-organisational entity. **Advise** on next steps and suggest a timescale for the presentation of a plan outlining the ambition and objectives for the programme.