making science work for health | PHG FOUNDATION

PHG Foundation
Annual review 2025

UNIVERSITY OF CAMBRIDGE

From Pete Mills

At the beginning of the year, we published our new strategic direction, which will focus our attention for the next five years on three linked areas: emerging health technologies, the digital systems needed to support them, and the shifts towards more personalised and preventative health care that they enable.

This turned out to be very well aligned with one of the major domestic events of the year for us, the publication of the UK Government's much anticipated 10-year plan for health in England, in July. This represents a major endorsement of PHG's long-term mission to draw attention to the opportunities for genome-based technologies to support improvements in population health.

In keeping with our strategy, PHG is well placed and fully prepared to work with clinical, scientific, regulatory and policy colleagues to define the pathways to realise this ambition.

Beyond the UK, PHG was the principal convenor of a major international meeting on genomics and population health in an era of data driven care, that took place in Canada in September. This represents the completion of an arc that began 20 years ago in Bellagio, Italy, that was influential in establishing the modern field of population health genomics. But it was also a new departure, provisioned by what we have learned over 25 years, into the very challenging circumstances we now face globally.

Throughout the year the PHG team has delivered insightful briefings, analysis and recommendations for our partners and clients in the UK and abroad. We have convened experts and built consensus with a view to fulfilling our overall mission: to ensure that the latest scientific understanding can be used, ethically and equitably, to achieve improvements in population health.

Pete Mills
Director, PHG Foundation

Ayer’s Cliff

The Ayer’s Cliff summit in Canada, co-hosted with the Centre of Genomics and Policy at McGill University and the WYNG Foundation, brought together international leaders and experts in public health genomics, research, health care, and policy.

The objective was to explore the profound implications of data-driven developments in genomics across clinical medicine, public health, bioethics, and policy.

The summit also served as a moment to reflect on its origins, taking place two decades after the Bellagio meeting (Italy) where many of the Ayer’s Cliff delegates began the initial conversation around the role of genomics in public and population health.

A key outcome was a consensus on shared aims and challenges, emphasising the need for collaboration across nations. The summit also recognised the importance of proactively recruiting and mentoring future leaders to sustain and drive this vital enterprise. We are optimistic and committed to facilitating actions that realise the potential of genome-based technologies for global population health.

Climate change and human genomics

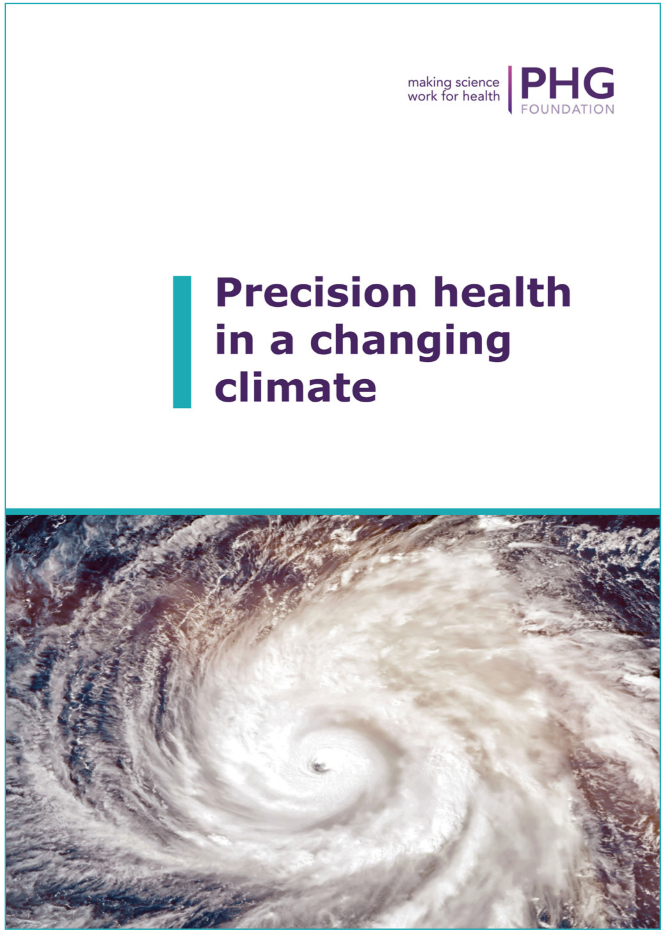
Climate change is an immediate and growing global health emergency. Its effects are becoming frequent and primarily harm the world’s most vulnerable people.

Our position statement on climate change describes its effect on the health landscape and the role genomics could play as a useful tool in supporting climate change health responses, helping to identify and protect those at greatest biological risk.

Genomics reveals the biology behind climate health risks, identifying the specific gene-environment interactions that drive vulnerability. This allows us to understand why some are more susceptible to threats like heat and disease, enabling more effective interventions.

The position statement was supported by a campaign that connected with like-minded individuals, aiming to build a network of understanding regarding the role of individual biology in climate health and encouraging the integration of genomics into climate-health conversations.

Read: Precision health in a changing climate



Working with others

Building on our strong track record of successful collaborations, we actively engaged in multiple large-scale initiatives and expanded our client base. These collaborations with groups and organisations such as the MHRA, the WYNG Foundation, and EXPRESS, allowed us to explore, suggest, and challenge new ideas in healthcare and data innovation.

Working with the Medicines and Healthcare products Regulatory Agency (MHRA), we developed a first of its kind report on key regulatory considerations when using synthetic data for development of AI as a medical device.

Synthetic data has potential to form an important part of the evidence package supporting AI as a medical device, for example in circumstances when it is unethical or unfeasible to obtain sufficient real world evidence.

Supported by the Regulators' Pioneer Fund we worked closely with MHRA colleagues and an expert working group to develop and iterate specific considerations for including synthetic data in regulatory submissions.

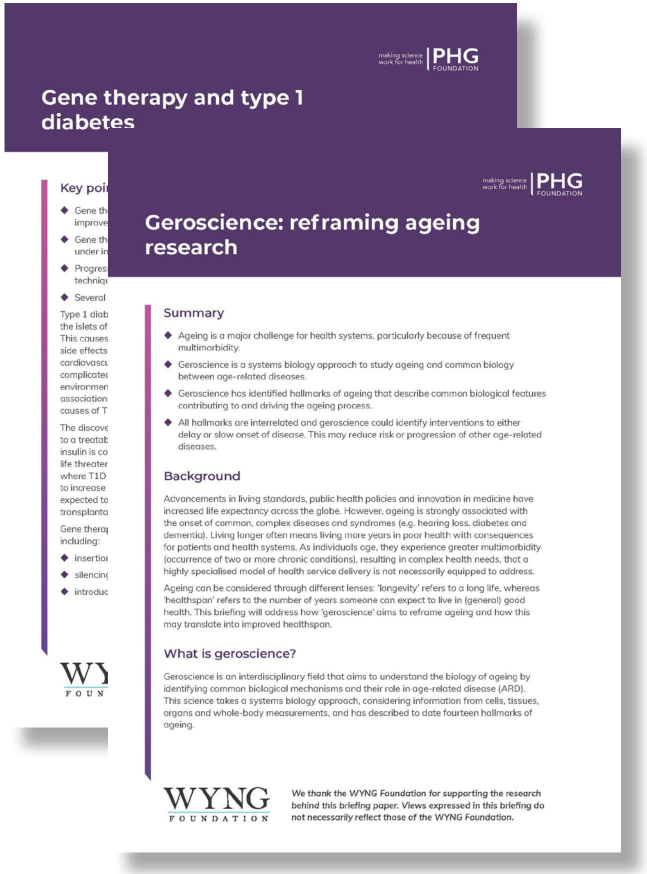
Our report provides authoritative and expert guidance for AI developers on key elements that they should consider when developing AIaMD using synthetic data.

In addition we were privileged to work with the AI Airlock team at the MHRA on their innovative regulatory sandbox for AIaMD.

We supported them by convening and facilitating a simulation workshop focused on post market surveillance of AIaMD to develop a shared understanding of regulatory challenges and potential solutions for monitoring AI systems once they are in use.

Our resulting report details key insights, responsibilities, and challenges identified during this process.

Read: Synthetic data for development of AI as a medical device (AIaMDs)


Gene therapy and type 1 diabetes

Geroscience: reframing ageing research

Summary

- Ageing is a major challenge for health systems, particularly because of frequent multimorbidity.
- Geroscience is a systems biology approach to study ageing and common biology between age-related diseases.
- Geroscience has identified hallmarks of ageing that describe common biological features contributing to and driving the ageing process.
- All hallmarks are interrelated and geroscience could identify interventions to either delay or slow onset of disease. This may reduce risk or progression of other age-related diseases.

Background

Advancements in living standards, public health policies and innovation in medicine have increased life expectancy across the globe. However, ageing is strongly associated with the onset of common, complex diseases and syndromes (e.g. hearing loss, diabetes and dementia). Living longer often means living more years in poor health with consequences for patients and health systems. As individuals age, they experience greater multimorbidity (occurrence of two or more chronic conditions), resulting in complex health needs, that a highly specialised model of health service delivery is not necessarily equipped to address.

Ageing can be considered through different lenses: 'longevity' refers to a long life, whereas 'healthspan' refers to the number of years someone can expect to live in (general) good health. This briefing will address how 'geroscience' aims to reframe ageing and how this may translate into improved healthspan.

What is geroscience?

Geroscience is an interdisciplinary field that aims to understand the biology of ageing by identifying common biological mechanisms and their role in age-related disease (ARD). This science takes a systems biology approach, considering information from cells, tissues, organs and whole-body measurements, and has described to date fourteen hallmarks of ageing.

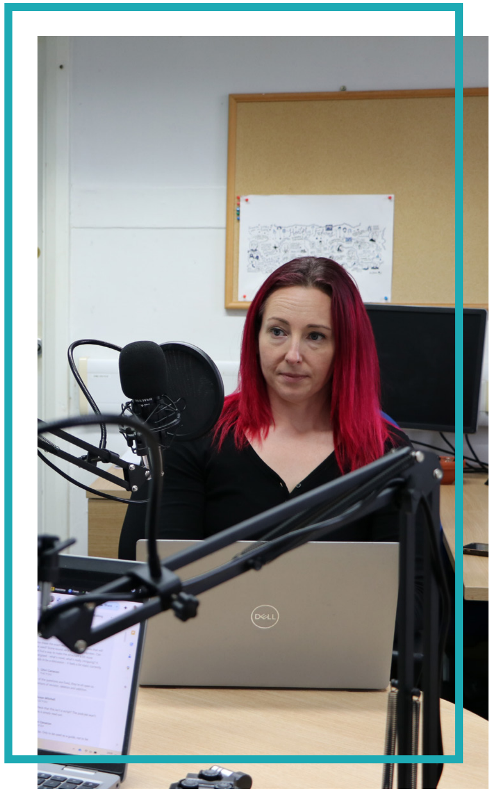
We thank the WYNG Foundation for supporting the research behind this briefing paper. Views expressed in this briefing do not necessarily reflect those of the WYNG Foundation.

We were generously supported by the WYNG Foundation to produce a series of policy briefings on hot topics in biomedical technologies.

In one briefing we investigated gene therapy as a promising, potentially curative, treatment approach for type 1 diabetes. This was accompanied by a podcast that discussed this personalised intervention and some of the challenges it faces such as achieving clinical utility comparable to current insulin therapy treatments.

For the second we explored geroscience, an emerging field that uses a systems biology perspective to study ageing and the shared biological factors underlying the challenge of age-related diseases and the presence of multiple chronic conditions in healthcare.

Read: Gene therapy and type 1 diabetes & Geroscience: reframing ageing research



The Optimising EXome PREnatal Sequencing Services (EXPRESS) policy report outlines key actions for strengthening the clinical implementation and research of prenatal exome sequencing within the NHS.

Developed from findings of the collaborative EXPRESS study, the report captures the opportunities and challenges of establishing this new genetic testing service, including the views of parents and healthcare professionals.

We collaborated on this study, led by Great Ormond Street Hospital, with partners including UCL, Antenatal Results and Choices, and other NHS Trusts, Breaking Down Barriers, and the Universities of Cambridge, Exeter, and Oxford.

Read: [Optimising EXome PREnatal Sequencing Services]

We have enjoyed working with these organisations, and others, this year and look forward to partnering with them again, as well as building new relationships.

WYNG FOUNDATION

Medicines & Healthcare products Regulatory Agency

FIND Diagnosis for all

EXPRESS Optimising EXome PREnatal Sequencing Services

Cambridgeshire & Peterborough Integrated Care System

The Physiological Society

Digital engagement

We've taken an active approach to broadening our social media influence and engagement. This year, we delivered lively campaigns designed to connect with audiences on critical topics.

Notable campaigns included raising awareness for World Sepsis Day, providing a look at the current state of polygenic scores, and our flagship communication effort focused on personalised health and its role in population health.

We developed a diverse array of content, including blogs, LinkedIn articles, videos, podcasts, and infographics.

We were pleased to feature contributions from outside the immediate PHG team. These included our Trustee and professor of systems biology, Mike Inouye, and members of The Precision Health Initiative, Cambridge Public Health, and the International Health Systems Group: Tom Bashford and Brandon Smith.

Our campaigns have generated positive results, evidenced by a marked increase in subscriptions to our e-alerts.

63%

Increase of LinkedIn engagement during our personalised health campaign

18-26%

Increase to subscriptions to our e-alerts

90%

Increase of unique visits to our website during our personalised health campaign

322

Average monthly engagement of our LinkedIn content

Podcasts

We have continued to develop our skills and presence in effective multimedia communications. This has enabled us to engage not only with professional stakeholders but also with the wider community. Our podcast series, featuring PHG Foundation policy analysts, is aimed at this broader audience.

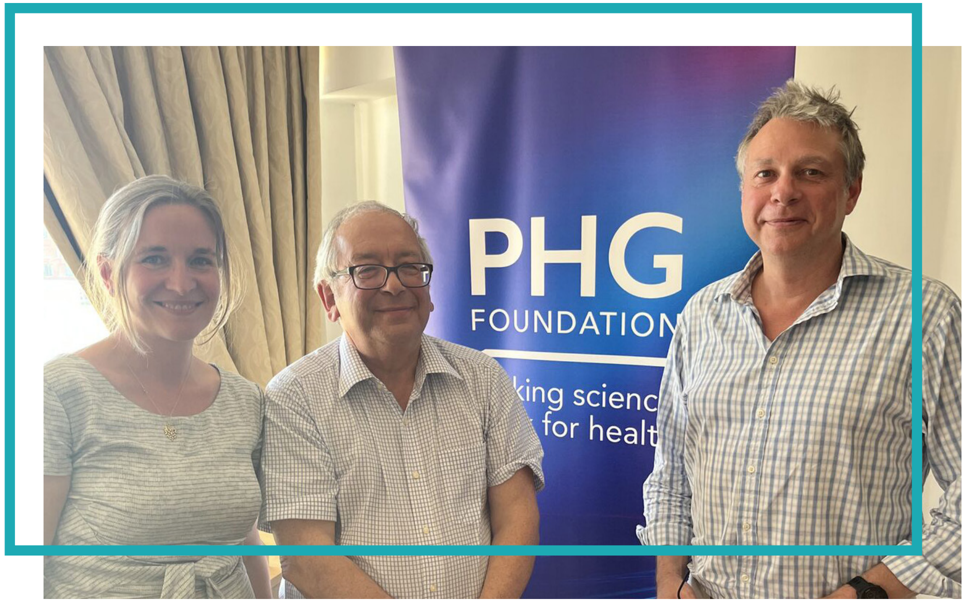
It sets out the latest topics in genomics and health clearly, explaining the real-world implications of new scientific developments for patients, health professionals, and the public. This year, many new podcast episodes have complemented our communication campaigns by putting a spotlight on critical topics.

Episodes released this year include:

- A look at gene therapy for type 1 diabetes
- Electrogenetics: another tool for precision medicine?
- Genome editing: a lot to think about
- Host genomics: lessons for infectious diseases
- Personalised health: treating the person
- Precision health in a changing climate
- AI-driven multiomics in health

Consensus building

Through the roundtables and workshops we have convened this year, we have shared and deepened insights on a range of topics, such as AI-driven multiomics in health, the changing nature of diagnosis, and cancer awareness. In these meetings we have brought together multidisciplinary groups of clinicians, researchers, academics, policy makers, and industry professionals. With over 100 attendees across all events, this collaborative dialogue was designed to encourage consensus building, resulting in a range of impactful outputs.



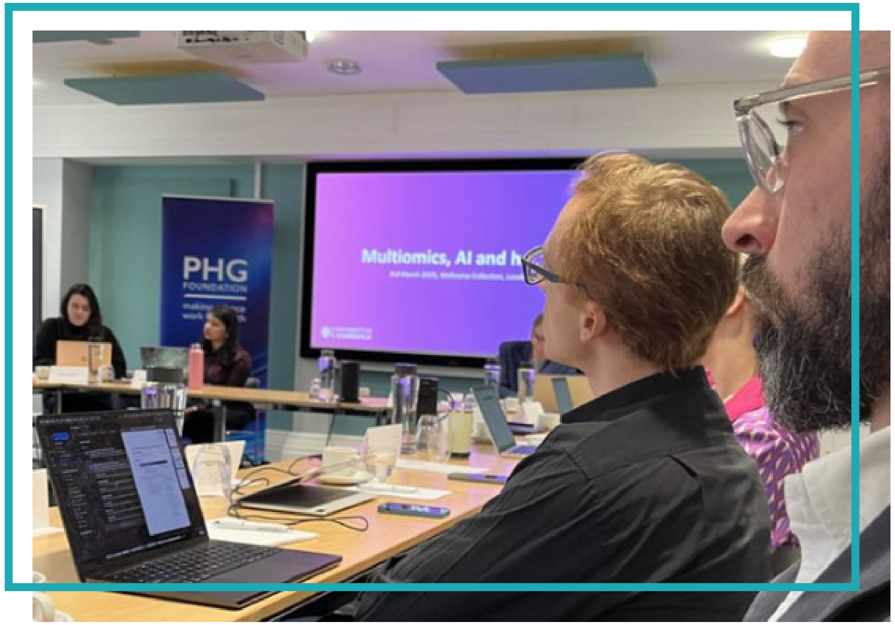
Dr Zoë Fritz, Dr Ron Zimmern and Dr Pete Mills at the changing nature of diagnosis roundtable.

PHG Foundation Fellow, Dr Zoë Fritz, led a multidisciplinary discussion of challenges in diagnostic practices driven by emerging technologies. The group identified research, policy, and practice priorities, synthesised into three areas for further action, which are explored in the associated report.

The report examines the impact of technological innovations, shifting diagnosis earlier or before symptoms arise and redefining our understanding of diseases, and the real world impacts on clinical practice.

This roundtable and its report represent an important first step in identifying the key challenges and areas for action arising from the evolving nature of diagnosis, a topic we remain committed to following.

Read: The changing nature of diagnosis



Another of our roundtables explored AI's role in multiomics and what it meant in terms of generating new insights in healthcare. The discussion focused on developing a working definition for 'multiomics' and AI's ability to identify new patterns from integrated multiomic data for clinical applications. Potential bottlenecks anticipated in the technical, regulatory and ethical space and what is needed to jump some of these hurdles were discussed in depth.

Our initial briefing set out the key themes and questions that arose from the roundtable discussion. To realise the potential of AI-driven multiomics in healthcare, a multi-stakeholder effort is necessary. This was something we discussed further in a long-read and podcast released at the end of the year.

- AI-driven mutiomics in health
- AI-driven multiomics: a vision for personalised healthcare

Knowledge sharing

Dr Laura Blackburn, Dr Colin Mitchell, Dr Pete Mills, Dr Su-vui Lo and Prof Gilberto Leung at the Genetics and Genomics Conference in Hong Kong

Members of the PHG team were invited to contribute their expertise and insights as presenters and panelists at prestigious events spanning the local, national, and global arenas. Highlights include:

TARGetAMR
AMR, Genomics and Policy: Opportunities and Challenges
(Laura Blackburn) Online

Cambridge Wearables Innovation Forum
Policy and Equity in the Age of Digital Health
(Susan Mitchell & Chaitanya Erady) Cambridge

Department of Public Health and Primary Care strategic workshop
AI and Policy
(Pete Mills) Cambridge

Department of Medical Molecular Genetics Seminar Series
Translating polygenic scores: from promise to practice
(Chantal Babb de Villiers) London

Reproduction & Sustainability: Individuals, Populations and Systems
The climate and our genes: a precision health challenge
(Chantal Babb de Villiers) Cambridge

Global Observatory International Summit
Modalities of Governance, from the Asilomar Conference to CRISPR Summits
(Pete Mills, Moderator) Cambridge, Massachusetts, USA

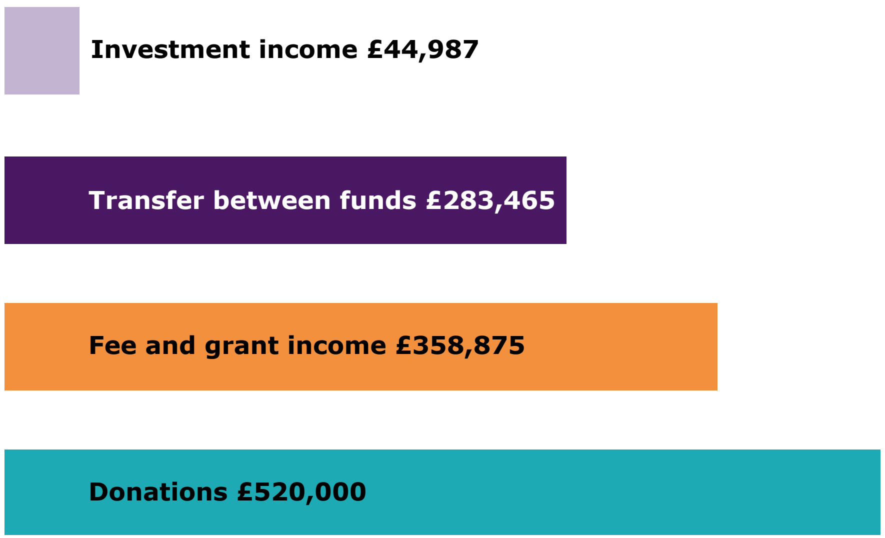
Integrated Cancer Medicine Symposium
The Cambridge Ecosystem and beyond: AI in Healthcare, implementation and policy
(Pete Mills) Cambridge

Genetics & Genomics Conference
Evolving responsibilities in genomics; Polygenic scores in healthcare: policy opportunities and challenges; The use and management of genomic information over a lifetime from an ethical, legal and governance perspective
(Pete Mills, Laura Blackburn & Colin Mitchell) Hong Kong

Financials

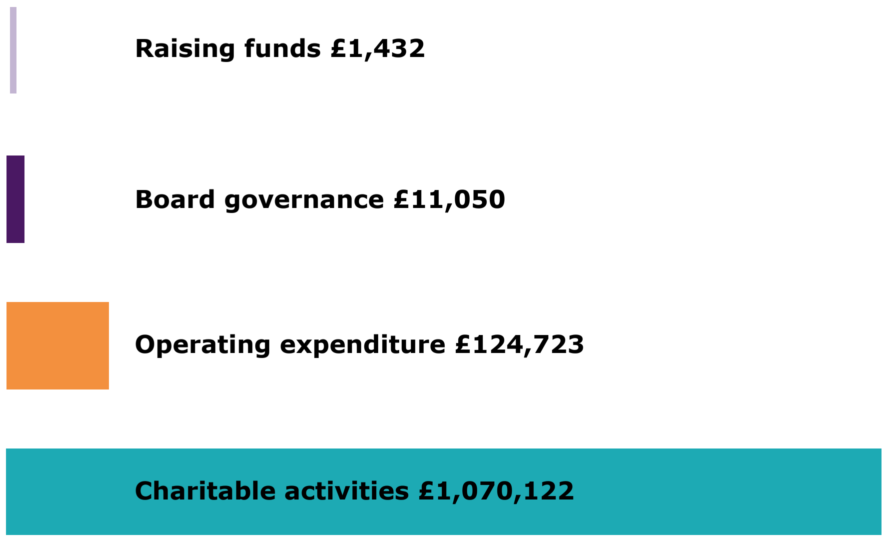
The PHG Foundation is funded by donations and grants, primarily from the Hatton Trust and the WYNG Foundation. We are not funded by the University of Cambridge. Other income is from commissions, collaborations, and commercial and public sector consultancy. We also have a modest investment portfolio. Most of our spending is on charitable activities, which includes our work programme and staff costs.

Income and transfers FY2024/2025



Total income and transfers: £1,207,327

Expenditure FY2024/2025



Total expenditure: £1,207,327

Governance

As a linked exempt charity of the University of Cambridge, we are proud to have a distinguished group of trustees providing support and strategic oversight to help us deliver our mission:

Our mission

We want science to work for health. We support the responsible development and adoption of technologies based on knowledge of the human genome, other biomarkers and health information.

We promote the conditions that enable such technologies to deliver genuine public benefit, while guarding against unethical or undesirable consequences for individuals or populations.

making science
work for health

PHG
FOUNDATION

The PHG Foundation is a health policy think-tank and linked exempt charity of the University of Cambridge. We work to achieve better health through the responsible and evidence-based application of biomedical science.

We are a registered company, no. 5823194.

UNIVERSITY OF
CAMBRIDGE