



health innovation manifesto

Capitalising on science and technology to build a more effective and efficient NHS

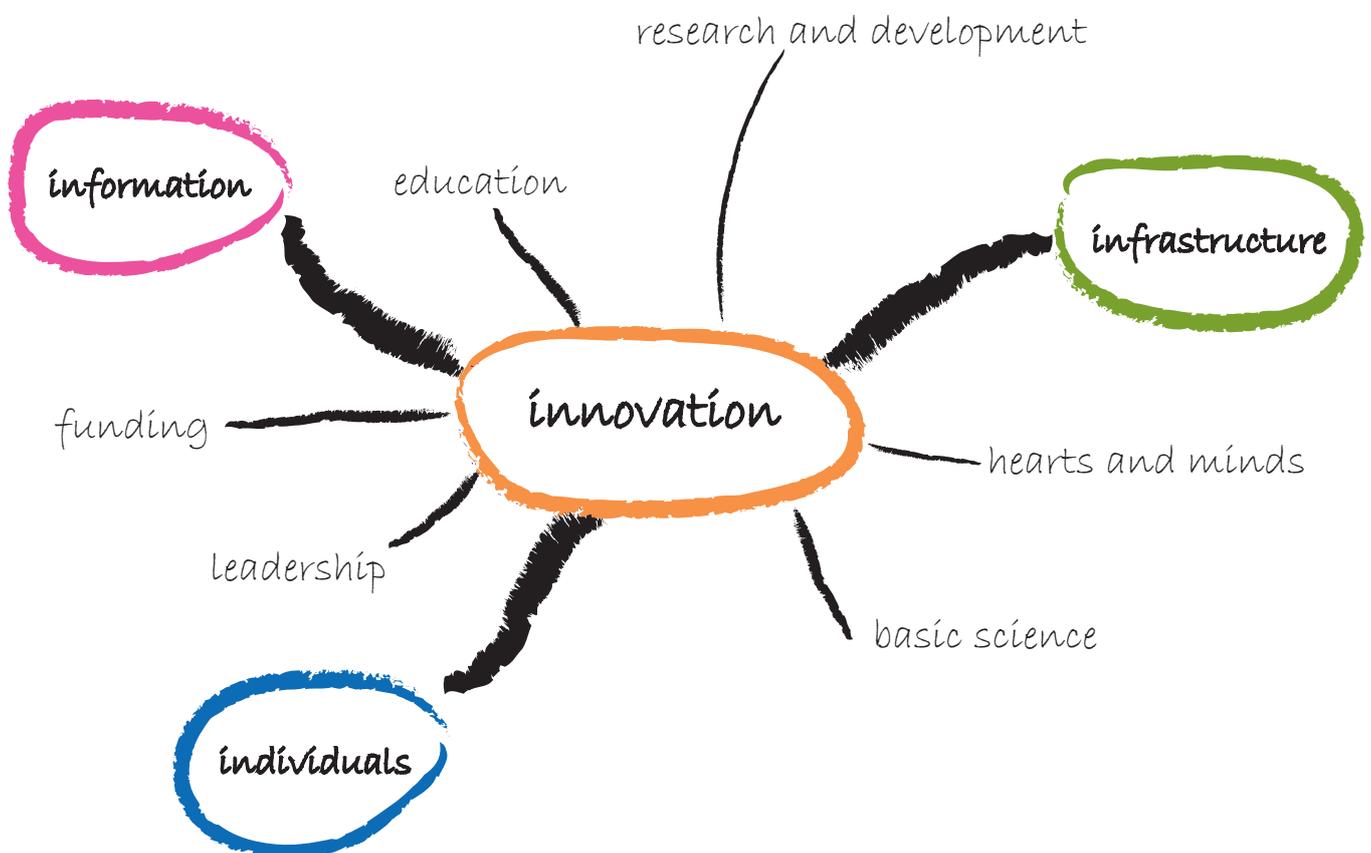
Getting more out of what we have

Despite being a world leader in science and technology, the UK is not as effective it should be at translating its huge investment in research into improving health and wealth. At the PHG Foundation, we believe that harnessing innovative technologies will not only create wealth that can help fund the NHS of the future, but also be part of the solution to ameliorating an impending healthcare crisis.

In particular, we think that the NHS could use the scientific and technological knowledge we already have much more effectively. We believe that a more efficient NHS is possible by using the power of genomics and digital health technologies to create individually tailored treatment and

disease prevention, and to empower citizens to have more personal control of their health and healthcare.

We are calling for future Governments to invest not just in research, but also in providing the leadership, motivation and infrastructure to put more of the fruits of scientific research within the reach of the citizen through modernised and more personalised healthcare.



innovation

The availability and use of technologies in the healthcare system

Our health is influenced by our environment, our social circumstances and our biology. An understanding of all of these factors will be necessary to enable personalisation of prevention and healthcare.

Today, we already have the genomic and digital technologies to:

- Achieve more personalised prediction and prevention of disease
- Diagnose disease more accurately and at an earlier stage in the disease process (by a wider range of less-specialist health professionals), improving accessibility
- Offer new methods of diagnosis which are less invasive
- Choose the most effective treatment option and monitor, and adapt to, the response
- Empower patients through self-testing and treatment, leading to efficiency savings

Some of these technologies are available across the NHS, but in general, the availability of a technology to the patient is not automatic, nor is it necessarily consistent or universal.

This is something that needs to change. We need high-level, strategic thinking in order to make the connections between genomic and digital technologies that are ready for implementation in clinical care, and the systematic changes that are needed to make them available nationwide on an equitable basis. We must therefore explore how such technologies can be implemented in the NHS with proper funding and support.

Strategic leadership is required to explore how new technologies can be better exploited to:

- Create more effective, efficient and cheaper healthcare systems
- Keep people healthier and out of hospital for longer
- Empower people to better manage their health

Translational *research* is not enough. We need practice-led 'pull' rather than just research-driven 'push'. We feel strongly that technology should not just be implemented on its own. The end goal should always be to improve health. Thus we support comprehensive evaluation of the potential benefits and widest clinical impact of new innovations, to ensure that science and technology make the NHS more efficient, and never act as a burden.

We recognise this is a massive undertaking. We therefore suggest three priority areas to deliver these health innovation goals:

information information

infrastructure infrastructure

individuals individuals



information

Big data: harnessing scientific, clinical, personal and other relevant data to improve healthcare

As a society, we generate vast amounts of data. The boundaries between 'health' and other types of data are becoming increasingly blurred – our supermarket till receipts and mobile phone records may give away more about our lifestyle habits than we dare to admit to our GP.

Health research is increasingly driven by data, and nowhere is this more important than in the field of genomics. The linking of the vast amounts of data generated by the sequencing of individual genomes to the healthcare records of NHS patients is vital to the better treatment of individuals, and will be central to future understanding of the cause and prevention of disease. We are only starting to realise what such knowledge could deliver for inherited diseases, cancer and infectious disease – as well as for the diagnosis and management of many common conditions.

But, if we are to use genomics within the NHS, we must also recognise that data – genomic or otherwise – is increasingly important in everyday clinical practice. The continuous fine-tuning of diagnostics and treatment will depend on health services creating, maintaining and learning how to use dynamic 'real-time' databases of patients that include genetic information, information about disease experience, treatment and natural history. Rather than viewing this as research, it is vital that it is regarded as an essential element of effective healthcare provision.

Making best use of our data will:

- Improve our understanding of diseases and treatments
- Improve patient care through more effective, targeted health interventions, yielding better results and fewer adverse health events
- Avoid inappropriate interventions that are harmful or ineffectual, saving money and improving efficiency
- Improve national screening programmes through greater understanding of benefits and risks
- Support the development of diagnostics that work better, and thus may have commercial potential

The new Government should:

1. Champion the use of personal data for the public good, subject to appropriate safeguards, and encourage transparency about data sharing and use so that professionals and public understand the potential benefits, risks and uncertainties
2. Mandate the development of NHS systems for comprehensive data collection, curation and access for clinical purposes, including a national genomic database
3. Provide incentives for data sharing within the NHS, and put in place proportionate and responsible safeguards *e.g.* data access agreements, sanctions for breaches and data safe havens



infrastructure

Strategies and frameworks for making the NHS innovation-ready

Our healthcare system strives to prevent ill health and disease, aiming to keep people healthy for as long as possible, and seeing that they receive rapid and effective diagnosis and treatment when they do become ill. In doing so, the imperative is to improve patient outcomes and experience, to minimise expensive healthcare interventions, and to reduce dependencies on families and care services alike.

Increasingly, biomarkers, electronic sensing devices and smart technologies can help us do this: to better identify susceptibility, spot early signs of ill health and trigger preventive or supportive care. But the full potential of using scientific and technological innovations in the NHS has not yet been realised. Unless the healthcare infrastructure adapts to such innovations, the NHS will fail to capitalise on the advantages that they could bring to the health and wealth of the nation.

Making that leap will involve incentivising the integration of genomics and digital health technologies into mainstream medicine, and creating pathways to take costs out of the system.

There must also be a recognition that implementation is not synonymous with translational research. Implementation requires the development of resources (such as clinical guidelines), and active working with commissioners and providers to explore potential barriers and opportunities. This will need to be explicitly funded.

The new Government should:

1. Put in place enabling measures for our health system to evaluate innovations in actual clinical practice quickly, and ensure the most effective are implemented widely across health services, not just in centres of excellence
2. Provide incentives to encourage the widespread integration of genomics and digital health technologies into mainstream medicine, including prioritisation of genomics education for the healthcare workforce across every clinical specialty
3. Provide patients with the knowledge and opportunity to make meaningful decisions about their healthcare



individuals

Personalised medicine: putting individuals at the centre of their healthcare, giving people a role in decisions and enabling access to health technology

The vision of personalised medicine is at the very heart of much current scientific endeavour and biomedical innovation. Genomic technologies offer a gateway to new personalised health services; whereas previously a 'one size fits all' approach to healthcare planning was the norm, we must now build health systems and national health policies that recognise individual diversity.

Risk of disease is, at least in part, genetically determined. New genomic tests mean that diseases themselves can frequently be broken down into many sub-types, calling for different treatments. Developments in cancer and regenerative medicine make it increasingly feasible to provide biologically tailored therapeutics.

But that is not all. Social, technological and cultural changes are driving greater individual autonomy and choice. People today live their lives in very diverse ways. Their priorities, attitudes, abilities and lifestyles are individual. When faced with disease risk, or symptoms or signs of disease, people respond in different ways. This actually represents an opportunity rather than a problem, but it does mean that health systems should be flexible, adaptive and responsive so they can provide the personalised approach which these differences demand.

There will soon be multiple ways of accessing health services, provided by a range of organisations and methods: it is thus essential that individuals be put at the heart of this process – to give them a bigger role in making decisions about their own health and healthcare. Availability of innovative technologies will be integral to shifting the power balance towards the individual. This may mean access to digital health technologies to, for example, self-monitor a condition, or being involved in a real choice about the route and method of care provided.

The new Government should:

1. Move towards a paradigm of personalised disease prevention to complement existing population-based approaches, building an NHS that supports people to make informed choices about the care that suits them
2. Educate the public on the impact of genomic medicine on their health choices and engage them in rational debate about the future organisation of health systems
3. Enable individuals to access new innovations in digital health



About the PHG Foundation

The PHG Foundation is an independent think tank with special focus on the implementation of genomics and other advances in science and technology to make healthcare safer, more effective and more personalised. As a registered charity we are not affiliated to any political or commercial party; our funding comes from philanthropy and charitable activities (sources are declared on our website and annual accounts)

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