Good Governance Institute

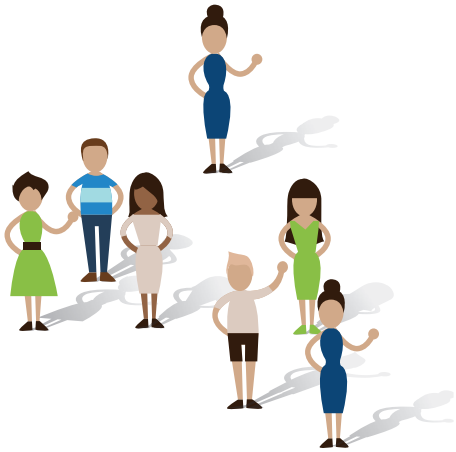
IBM Watson Health

HOW POPULATION HEALTH MANAGEMENT WILL DELIVER A SUSTAINABLE NHS

February 2018

The Good Governance Institute
IBM Watson Health

www.good-governance.org.uk



Good Governance Institute

IBM Watson Health

How population health management will deliver a sustainable NHS

Title:	**How population health management will deliver a sustainable NHS**
Date:	**February 2018**
Authors:	**Andrew Corbett-Nolan, Chief Executive, GGI** **Divia Mattoo, Consultant, GGI** **Laura Tantum, Project Manager: Knowledge and Research, GGI**
Reviewed by:	**Darren Grayson, Director of Delivery, GGI**
Designed by:	**Emiliano Rattin, Creative Manager, GGI**

Good Governance Institute

This report is part of a growing series of reports developed by the Good Governance Institute (GGI) that consider issues contributing to the better governance of healthcare organisations. GGI is an independent organisation working to improve governance through both direct work with individual boards and governing bodies, and by promoting better practice through broader, national programmes and studies. We run board development programmes, undertake governance reviews and support organisations develop towards authorisation.

Other recent GGI reports and board development tools have considered integrated governance, governance between organisations, scrutiny and assurance, system transformation and new models of care, enablers in the delivery of system transformation, the future of the NHS, and of course good governance.

GGI is committed to develop and promote the Good Governance Body of Knowledge
Published by GGI Development and Research LLP, London
ISBN: 978-1-907610-45-5

© 2018 Good Governance Institute

Good Governance Institute, The Black Church, St Mary's Place, Dublin 7, D07 P4AX, Republic of Ireland

info@good-governance.org.uk

Follow the Good Governance Institute on Twitter: https://twitter.com/GoodGovernInst

www.good-governance.org.uk

GGI exists to help create a fairer, better world. Our part in this is to support those who run the organisations that will affect how humanity uses resources, cares for the sick, educates future generations, develops our professionals, creates wealth, nurtures sporting excellence, inspires through the arts, communicates the news, ensures all have decent homes, transports people and goods, administers justice and the law, designs and introduces new technologies, produces and sells the food we eat – in short, all aspects of being human.

We work to make sure that organisations are run by the most talented, skilled and ethical leaders possible and work to fair systems that consider all, use evidence, are guided by ethics and thereby take the best decisions. Good governance of all organisations, from the smallest charity to the greatest public institution, benefits society as a whole. It enables organisations to play their part in building a sustainable, better future for all.

IBM Watson Health

Each day, leaders, advocates, and influencers in health make powerful progress toward a healthier future for individuals, families, communities, and work places. However, in an industry riddled with complexity and uncertainty, these professionals still face significant headwinds on their path to progress.

IBM Watson Health provides customers with the technology and expertise they need to power thriving organizations, support vibrant communities, and solve health challenges for people everywhere. It is supported by the proven innovation of IBM, the dynamic intelligence of Watson, and its collective expertise in and commitment to improving the health industry.

Providing unmatched visibility and connectivity across the industry, Watson Health helps unlock nontraditional data sets—social, physiological, genomic, economic, and more— so that professionals can uncover critical insights into the determinants and implications of modern and holistic health.

Equipped with these insights, professionals are poised to take action -- creating new capabilities and ways of working that help them keep pace with the changing landscape and:

- **Pursue remarkable outcomes.** Leverage innovative capabilities in analytics, workflows, and insights to drive better health economics and productivity, so they can more quickly and effectively advance toward life-changing results.
- **Establish essential connections.** Easily tap into, and take advantage of health ecosystems by connecting to the knowledge, skills, and capabilities needed most.
- **Accelerate discovery.** Quickly identify the optimal path forward by utilizing advanced tools and intuitive solutions that expedite problem solving.
- **Achieve heightened confidence.** Decide and take action with increased certainty by uncovering unique sets of robust and actionable insights.

Watson Health offers best-in-class capabilities in five key areas across the health landscape, including:

- **Oncology and Genomics:** Working to help clients transform cancer care for patients and providers.
- **Value-based Care:** Working to help clients control costs and address quality by managing populations, engaging with consumers, and making more confident decisions.
- **Life Sciences:** Working to help clients advance more rapid and efficient delivery of targeted and effective therapies.
- **Imaging:** Working to help clients expand the role of medical imaging for better patient care.
- **Government:** Working to help clients improve the value of health and human services, lower costs, and have a meaningful impact on people's lives.

Watson Health is working to empower everyday heroes to transform health—creating a better today and a brighter tomorrow for patients, communities, and populations.
Are you ready to join us and start your transformation?

Foreword and acknowledgements

Part of our mission at the Good Governance Institute (GGI) is to help boards have insight into the key strategic issues of the day. We have previously developed reports and assurance tools for boards on telehealthcare, long-term conditions and new care models. Population health management has clearly become one such strategic issue and this is reflected in NHS England's latest planning guidance for 2018/19.

IBM Watson Health is a recognised global leader on population health management. In November 2017 GGI was approached by IBM Watson Health with a grant to develop an independent white paper for NHS boards on this topic. We have developed our thinking very much in collaboration with colleagues in the NHS, using an advisory board and around 35 interviews with those informed on the potential of population health management, and those connected to NHS boards who have no particular interest in the subject but who represent a typical range of NHS board members and their advisers. The paper was further developed at a round table of NHS, local authority and policy leaders held on 30 January 2018. IBM Watson Health has also brought their wealth of insight and experience to the report.

Our research was also underpinned by an in-depth literature review on population health and population health management. Several case studies are cited in the report to illustrate how population health management is being applied.

GGI would like to thank IBM Watson Health who came to us with the idea for this report, as well as all those who so generously contributed their time to take part in the advisory group, interviews and discussions which have informed our report, including all those who attended our 30th January round table and offered helpful ideas and debate.

Andrew Corbett-Nolan
Chief Executive
Good Governance Institute

Table of Contents

1. Introduction

1.1 The case for change

In common with all western healthcare systems, the UK's NHS has significant challenges to address. The success of public health and healthcare systems over the last half a century in terms of extending lifespans and supporting a large portion of the population to live many years with chronic illness, together with the pipeline of new treatments and therapies available, is putting enormous pressure on the system to remain sustainable and able to deliver accessible, high quality healthcare at low cost. It has been predicted that 2018/19 will be the most financially difficult year for the NHS in the current parliament, as well as one of the most challenging in NHS history, with funding for the Department of Health set to grow by only 0.4% in real terms. Meanwhile, social care remains in significant crisis, facing a funding gap of £2.5 billion by 2019/20.[1]

Policy makers believe that the inherited NHS model, designed to treat people episodically, often in hospital and when they become sick, is not sustainable in its current form. In its place, an agenda of integrated care and prevention is being seen as the way forward, as set out in NHS England's *Five Year Forward View* (5YFV). Presenting the vision of a sustainable NHS which makes most efficient use of scarce resources while delivering more co-ordinated care to healthier communities, this key national policy paper outlines why the NHS needs to change to close the triple gap of health and well-being, care and quality, and funding and efficiency by introducing new models of integrated care.[2] Perhaps most significant of this move towards integration are the Sustainability and Transformation Partnerships (STPs) that build on the collaborative work that began under the NHS Shared Planning Guidance for 2016/17 – 2020/21, to support the implementation of the 5YFV. Delivered through 44 geographical 'footprints' in England, STPs provide a vehicle to support the full integration of health and social care. The driving force behind STPs is the need to create a system capable of optimising health and well-being by aligning multiple players across health, social, and other key sectors.[3] NHS England has announced ambitions for STPs to gradually evolve into Accountable Care Systems (ACSs) and later Accountable Care Organisations (ACOs) within several years.[4] NHS England has developed thinking for new models of care, for example by developing Multispecialty Community Providers (MCPs) and Primary and Acute Care Systems (PACS), the first of which have been launched with vanguard status. In the most recent guidance of February 2018, NHS England sought to further accelerate this policy, giving ACOs and ACSs the umbrella term of Integrated Care Systems (ICSs)[5].

Integral to the creation of STPs is a focus on prevention, keeping people well for longer, treating them in the community, and reducing admissions into acute hospitals. Doing this successfully will depend upon a strategy that is capable of aligning multiple players in common purpose and working towards well-defined goals to create communities that foster health-promoting behaviours and broaden health care to promote health outside of the medical system.[6]

1.2 Population health management

Population health is the health outcomes of a group of individuals, including the distribution of such outcomes within the group.[7] The shift happening in the UK, as well as numerous other countries around the globe, is one away from health systems designed to better manage chronic disease care towards systems designed to enhance population health. Population health management, or PHM, aims to optimise the health of populations over individual life spans and across generations.[8] Population health management is the nexus that brings together an understanding of population need (public health) through big-data, patient engagement and healthcare delivery to embrace the triple aim of experience of care, the health of populations and cost-savings (see figure 1).

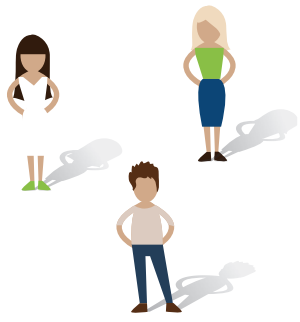


Figure 1 - Dimension of population health management

At this time of great increase in healthcare needs, itself driven by the success of healthcare in turning many previously fatal conditions into long-term conditions (LTCs) and continuously increasing life expectancies, the NHS stands at the edge of an ocean of possibilities presented by new technology. These new technologies hold the triple promise of developing effective ways of risk-driven targeting of healthcare interventions to those who need it most and at the moment when it will add the most value to the patient's life; the involvement of the patient in an informed and authentic way in their own care and continuously improving healthcare services themselves. The ability to look simultaneously at morbidities across a given population, and at the same time identify the status and needs of an individual within that population, opens up the possibility of being able to manage the increasing care needs of citizens in a way that is simply not possible within the current NHS-provision model.

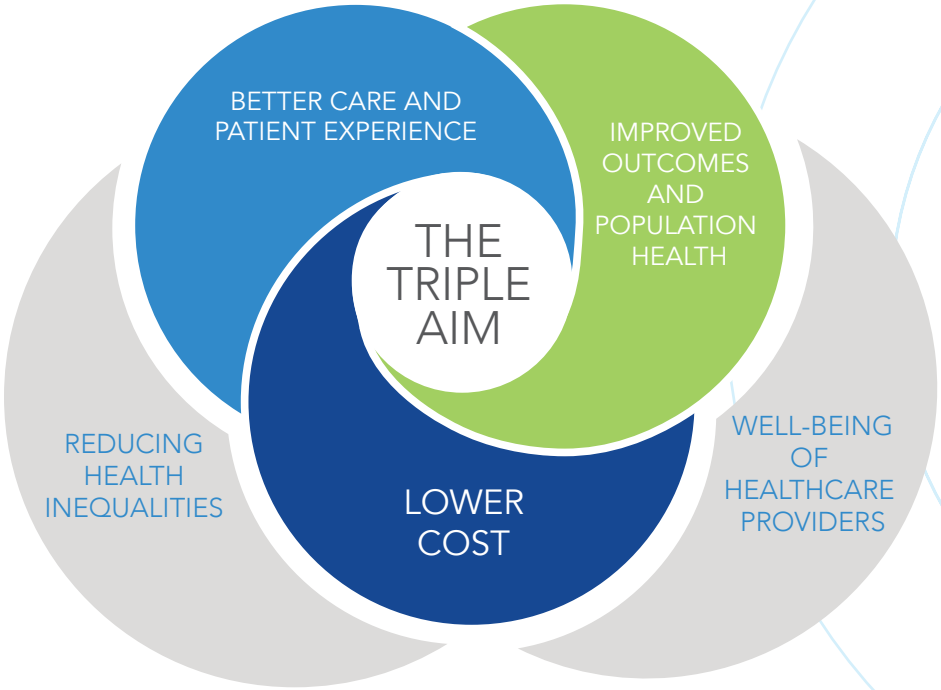
Population health management in the years ahead will go beyond the analysis of data to pick up on group and individual risk in a way that triggers an intervention. New technologies will be able to assimilate research data and, together with an understanding of an individual patient's somatic status, be able to (in mere seconds) develop a risk-assessed, tailored treatment plan and care pathway. In contrast, it is estimated that to stay up to date with research articles would take a physician 627.5 hours a month of reading.[9] Already, algorithms are beginning to outperform radiologists on diagnosing pneumonia.[10] Telehealthcare, including the patient's own impressions of their healthcare status (for example, pain-levels felt or confidence levels in their own well-being), is becoming both more sophisticated and less expensive. We are near to a time when robots will be routinely used to perform surgery with great precision and speed. Together with population health management, the use of technology in the coming years will change opportunities for patients and the way in which we routinely experience interventions in ill-health, in just the same way as it will change all other aspects of how humans live on this planet.[11] The key issue is how those responsible for healthcare services today will ensure the speediest and most effective introduction of new possibilities for the maximum benefit of NHS patients.

2. Developing a population health management system

2.1 Examples of innovation from the United States

The United States has a long history of accountable care dating back to the 1980s and 1990s. The development of ACOs has been accelerating in recent years following earlier managed care initiatives in which medical groups and integrated networks of providers worked to deliver care under risk-based, largely capitated contracts. However, these early initiatives focused mainly on cutting cost, rather than improving quality.[12] Since then, following the example of pioneering ACOs such as Kaiser Permanente, ACOs in the US have been employing population health methods as a central facet in achieving the Institute for Healthcare Improvement's 'triple aim' of improving the patient's experience and improving health outcomes for patients, while decreasing the cost of care (see figure 2). In the US, recent thinking has focused on the 'quadruple aim' adding the goal of improving the work life of health care providers to the original three aims[13]. In the NHS context, the triple gap discussed in the NHS FYFV encouraged thinking to focus on reducing health inequalities as the fourth or 'quadruple aim'. Whatever the difference, there has been consensus around the focus on the triple gap and triple aim in both countries.

Figure 2 - The Triple Aim



In the US, the focus on a holistic approach to healthcare is not new. To achieve their vision of the quadruple aim, healthcare organisations realised that they needed to expand beyond their own four walls and the more traditional approach of episodic care.[14] Organisations involved in population health could therefore include, in addition to healthcare providers, care management services, providers of ancillary services, educational services, and providers related to wider well-being, for example communication devices, supplies for new mothers, and healthy food.[15] The emphasis is on improving all aspects of the patient's health and well-being, and the health of the community as a whole.

In the case studies below, we explore how two healthcare providers in the US have been working to improve the health of the populations they serve. It is worth noting that the current tendency to look to the US for lessons in progressing system maturity has led to some concern in the UK because of the very different contexts in which the US and UK healthcare systems are based. There are clear differences between the socialised system of the NHS and the dominance of private healthcare provision in the US. Therefore, lessons from the US cannot be neatly or identically transferred into the UK context. Nevertheless, the US examples, with their greater maturity, do provide both extremely helpful insight as well as mature management tools that are useful as NHS organisations move forward with implementing population health management.

Case study: Mercy Health, Ohio, US[16]

Mercy Health is a healthcare provider based in Cincinnati, Ohio which serves communities throughout Ohio and Kentucky, through more than 450 health facilities, including 23 hospitals. Mercy Health delivers a range of services from maternity to senior care, and its net operating revenue in 2015 was $4.3 billion. Mercy Health Select, LLC is an expanded network that supplements the organisation's 563 directly employed primary care providers (PCPs) with a further 89 'affiliated' PCPs. In 2016, the care of nearly 150,000 patients in at-risk contracts was managed by Mercy Health Select.

To ensure that it is delivering a value-based patient care model, Mercy Health Select is proactive in identifying and intervening with patients whose health is at risk. However, not all of the affiliated PHPs through which the provider operates use the same electronic health record platform, which has created challenges in sharing information about at-risk patients among different facilities. The decision was therefore made to implement an AI system (the IBM Explorys Platform from IBM Watson Health) to facilitate its improved delivery of value-based patient care, using the platform to quickly gather any pertinent claims and clinical information about its patients. It then uses analytics to quickly identify and prioritise high-risk, high cost patients. If, for example, a patient who was not previously high risk has had a stroke, clinicians do not have to wait for up to several months to find that out and are able to follow up much more quickly.

The use of data analytics supported by AI has delivered tangible improvements in performance for Mercy Health Select. Enabling care managers to quickly identify and prioritise patients whose risk scores have increased allows more rapid intervention for these patients, reducing the risk of episodic admissions to hospital in the case that avoidable illness eventually develops. Meanwhile, Mercy Health Select received an ACO score of 97.1% from the Center for Medicare and Medicaid Services in 2015, which is some 5.7% higher than the average among MSSPs. This secures a higher portion of shared savings for Mercy Health Select, and in turn a better standard of care for at-risk patients.

Case study: Orlando Health, Florida, US[17]

Orlando Health is one of the state of Florida's most comprehensive private, not-for-profit healthcare networks. It serves nearly 2 million residents of Central Florida through 8 hospitals and 1,780 beds, as well as around 4,500 international visitors nationally. Orlando Health is also Central Florida's fifth-largest employer with more than 14,000 employees, including 500 employed physicians.

In order to manage the challenges facing the health sector, Orlando Health realised early that it must act differently and early on planned to adopt a population health management solution. However, having reviewed the availability of data to help make this transition to both population health management and value-based billing, Orlando Health had two options: either to manually aggregate the records for its population across various EHR systems being used, which would be impractical, or to rely on claims data which could be out of date.

As an alternative measure, Orlando Health implemented the IBM Watson Health population health management platform, which automated as much of the process as possible, including acting as a pseudo-health information exchange (HIE) to aggregate data from all the EHR, and automating functions such as building registries, identifying care gaps, engaging patients to close the gaps in care, and running quality performance reports. Then, in order to encourage patients to seek recommended care, patients who were identified as meeting certain criteria were engaged with through a platform which automated outreach and contact with patients.

Within one year, the introduction of population health management had demonstrated significant results:

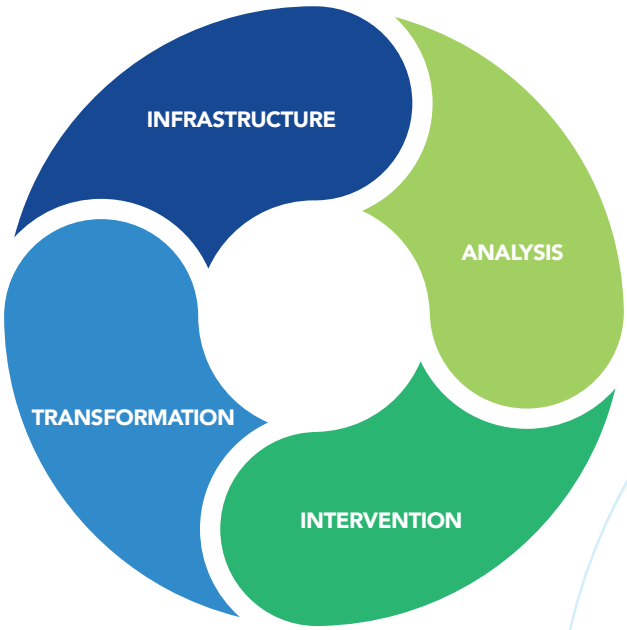
- Increased the number of its diabetic patients who received HbA1c tests by 7%
- Increased preventative mammogram screening by 10%
- Increased colorectal cancer screening by 9%
- Increased the number of patients overall who closed care gaps by 22%
- Generated $6.6 million in shared savings

These improvements are expected to be further enhanced as the programme continues to move forward.

2.2 Analysis and infrastructure for population health management

There are many lessons for the NHS that can be derived from the US experience. Examples taken from the US model have been organised around the following key enablers of population health management:

Figure 3 - Enablers for PHM

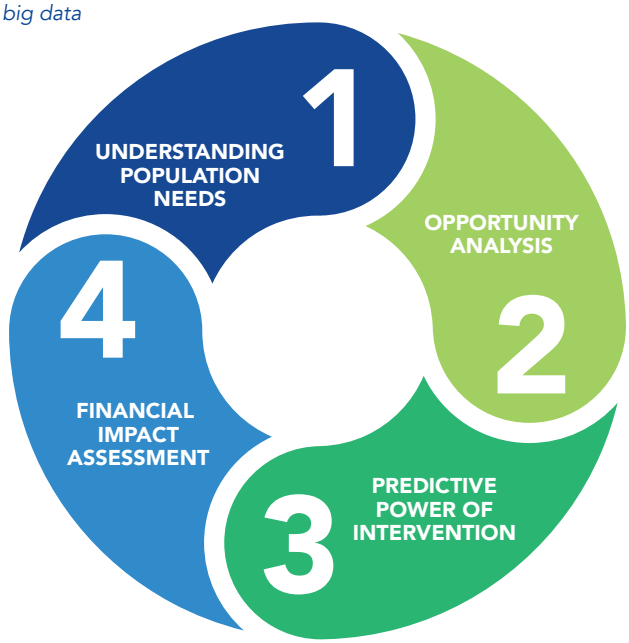


A data-driven approach to understanding the needs of individuals and cohorts of people is key in order for population health management to be successful. Necessary infrastructure needs to be developed, and in-depth analysis of the population undertaken using big data. Both intervention and prevention then become possible resulting in long-term system transformation that creates savings which can be re-invested back into supporting the infrastructure for PHM.

The approach to the analysis of a given population using insights from big data revolves around four aspects as illustrated below:

i. understanding population needs
ii. opportunity analysis
iii. predictive power of intervention
iv. financial impact assessment.

Figure 4 - PHM analysis using big data



Each element is comprised of the following steps and would require reliable and interconnected data pools:

1. **Understand the needs of the population:**

    a. Joint Strategic Needs Assessment (JSNA), undertaken in partnership between the NHS and the local authority
    b. Individual patient timeline creation
    c. Patient pathways in real life
    d. Unwarranted variations (underuse / overuse of services)

2. **Opportunity analysis to improve the quality of care:**

    a. Find duplication in healthcare costs, any gaps in care, triple fail events (instances where all three aspects of the triple aim fail to be achieved) and address them

3. **Predictive power of intervention:**

    a. Impactibility modelling: identify those who will and will not respond to preventive interventions before intervening

4. **Financial impact assessment:**

    a. Assessing financial viability in the long-term and capturing multi-sector financial impacts outside of healthcare costs. This enables a single budget for a broad scope of healthcare services

Analyses in more advanced population health management systems have supported population data analysis through harnessing big data techniques. Once all the healthcare data available has been aggregated, methods such as risk stratification are harnessed in order to identify individuals and sub-populations most likely to benefit from targeted interventions. Data can be filtered to sort patients not only by their health characteristics, but also by functional abilities, housing situation, employment or education situation, among others. Solutions can then be implemented that meet the needs of individual patients facilitating person-centred care.[18]

Joint Strategic Needs Assessment (JSNA): a definition[19]

JSNA is an exercise undertaken in collaboration by local authorities and NHS Clinical Commissioning Groups (CCGs), in order to understand and agree the needs of the people that make up the area they serve. The JSNA was introduced in order to create stronger partnerships between communities, local government and the NHS, and to ensure that commissioning is shaped to address local needs. Led by health and well-being boards, JSNAs explore the current and future needs and assets of the area, including the wider determinants of health. The results should then be used in the development of a health and well-being strategy for the area.

Interventions are therefore evidence-based and co-designed with patients and clinicians, as well as the various organisations involved in the delivery of population health management.[20]

2.3 A framework for infrastructure

In order to conduct this kind of analysis, having the necessary infrastructure is key. Based on their experience of supporting the implementation of population health management in the US, IBM Watson Health has developed a framework for infrastructure based around four key components:

- Governance and decision-making
- Technical preparedness
- Clinical transformation
- Funding and incentives

Below, we explore in more detail each of these components, and consider how the NHS will need to be reshaped in order to facilitate effective population health management.

Governance and decision-making

The NHS is currently operating in the environment created by the Health and Social Care Act 2012, which encouraged competition between organisations and championed the commissioner/provider split . With the development of STPs, health and social care organisations are being asked to collaborate more closely, and to do so in a system un-reformed by primary legislation. This creates a host of practical and important governance challenges, as local leaders are asked to work collectively on their STP while still being held to account and regulated as individual organisations. Nevertheless, system leaders need to work together to develop shared risk arrangements, ensure appropriate organisational representation, engage stakeholders, and to consider funding and regulatory requirements all while working openly. Success in achieving this will largely depend on a change in culture, reflecting the shift away from competition in the NHS.[21] In introducing population health management, system leaders will need to be prepared to go beyond this in enabling its success. Indeed, the February 2018 planning guidance from NHS England specifically identifies population health management as a key sustainable improvement and seeks local leaderships to embrace this approach. Importantly, local authorities will need to be as engaged in the STP process as their NHS partners, which anecdotal evidence suggests has not always been the case so far. It is local authorities who employ the vast majority of public health specialists who will have a central role in the development of population health management. Governance and decision-making arrangements will need to involve Health and Well-being Boards sufficiently, which should continue to provide leadership in prevention and proactive health and well-being. As a marker of success, a well-defined governance model and strategy will align partner organisations and their stakeholders on a shared vision of population health management and patient engagement.

Technical preparedness

While the development of both artificial intelligence (AI) and digital health is quickly progressing in the healthcare industry, numerous reports have found that healthcare in the UK is behind other industries with regards to its embracing of the opportunities technology can bring.[22,23] Nevertheless, there is a huge amount of healthcare data available to providers. It was estimated in 2014 that the volume of global healthcare data is 153 exabytes. To put this into perspective, one exabyte equals one billion gigabytes, and five exabytes is equal to all the words ever spoken by humans. Furthermore, this figure is continuously growing, with the projected growth rate in 2014 being 48% annually. If this is accurate, the number would grow to 2,314 exabytes by 2020.[24]

It has been established that effective population health management will require comprehensive data analysis. However, this level of data realistically cannot be processed and turned into intelligence by human minds. Therefore, a robust digital infrastructure will be necessary to ensure that the benefits population health management can bring are fully realised.[25] Embracing 'big data' techniques has the power to increase the efficiency of population health management as well augmenting the range of data that clinicians and other care providers can use in determining solutions and interventions. Furthermore, as machine learning and cognitive analytics read and evaluate unstructured data through natural language processing, risk stratification and patient profiling will become even richer and more precise.

Despite the opportunities that digital health can bring, the NHS, often described as 'data rich but intelligence poor', has been slow to catch on. Despite a number of STPs pledging to establish the sharing of data in their footprints, progress on this has often been slow in the past, while attempts to realise the benefits in technology in the past have been challenged, with, for example, the National Programme for Information Technology ultimately failing in the hospital and community sectors.[26] Instead, it has often fallen to individual providers to introduce new technologies. This has led to a piecemeal approach, although with some positive examples emerging, often in the form of partnerships between individual organisations and the global leaders in AI: [27]

- Harrow Council is working with IBM Watson Health, using a care manager system to enable individuals and care givers to select the most appropriate provider to deliver services (see case study in section 3.2)
- Alder Hey Children's NHS Foundation Trust is collaborating with IBM Watson Health to develop a 'chatbot' that allows children to ask the system questions about hospital admissions[28]
- Moorfields Eye Hospital is working with Google DeepMind, using an algorithm to identify disease on imaging of the back of the eye
- North Central London CCG is partnering with Babylon to trial in instant triage service to replace NHS 111

One interviewee, a director of a health and care partnership, told us that the ability to move fast is limited by the 'joined-up-ness' of data, with lots of variability. He suggested that making progress in terms of data 'requires a population health management approach to really fly'.

The Chief Executive of NHS England, Simon Stevens, has pledged that NHS England is to invest more in AI in 2018, in addition to rolling out new regional patient data schemes: 'we need to get smart about how we use artificial intelligence and machine learning with those data sets to improve the quality of patient care.'[29] STPs and the integration of care provide a significant opportunity to accelerate, more systematically, the sharing of data and rolling out of new technologies and AI in order to support population health management. Public engagement and patient voice will be needed to gain the necessary confidence in the safe and appropriate sharing of patient data, while system leaders will need to ensure the necessary governance mechanisms are in place. *The Understanding Patient Data Initiative* in the UK aims to keep the public informed on the use of patient data such as through the electronic patient health record (EPR) and for research and aggregation purposes[30]. The aim is to have an open dialogue with the public in line with the upcoming EU Data Protection Regulation being released in May 2018 and the Data Protection Bill being considered by the UK Parliament.

Clinical transformation

Moving away from the more traditional approach of delivering care in the NHS, which focuses on treating people in hospital when they become sick, population health systems will need to go beyond STP aims of improving co-ordination of care and managing care out of hospital whenever possible. The emphasis needs to move to preventative care, and improving the wider health and well-being of communities. This implies enhanced, evidence-based care management backed up by robust analytics. Performance of healthcare providers will be measured by the outcomes being achieved for patients.

Funding and incentives

It will be necessary to introduce new funding models in order to support the development of population-centred, outcome-based care, something which frameworks for new models of care are already beginning to explore. Instead of the 'payment by results' model, which can create perverse incentives that may not be best for the patient, for example unnecessary treatments and hospitalisations, and does not encourage healthcare organisations to tackle the wider determinants of health,[31] payment models which are linked to quality and outcomes for the patient should be considered. Capitated budgets and risk contracting could be explored.

2.4 Developing system maturity

2.4.1 The integration continuum

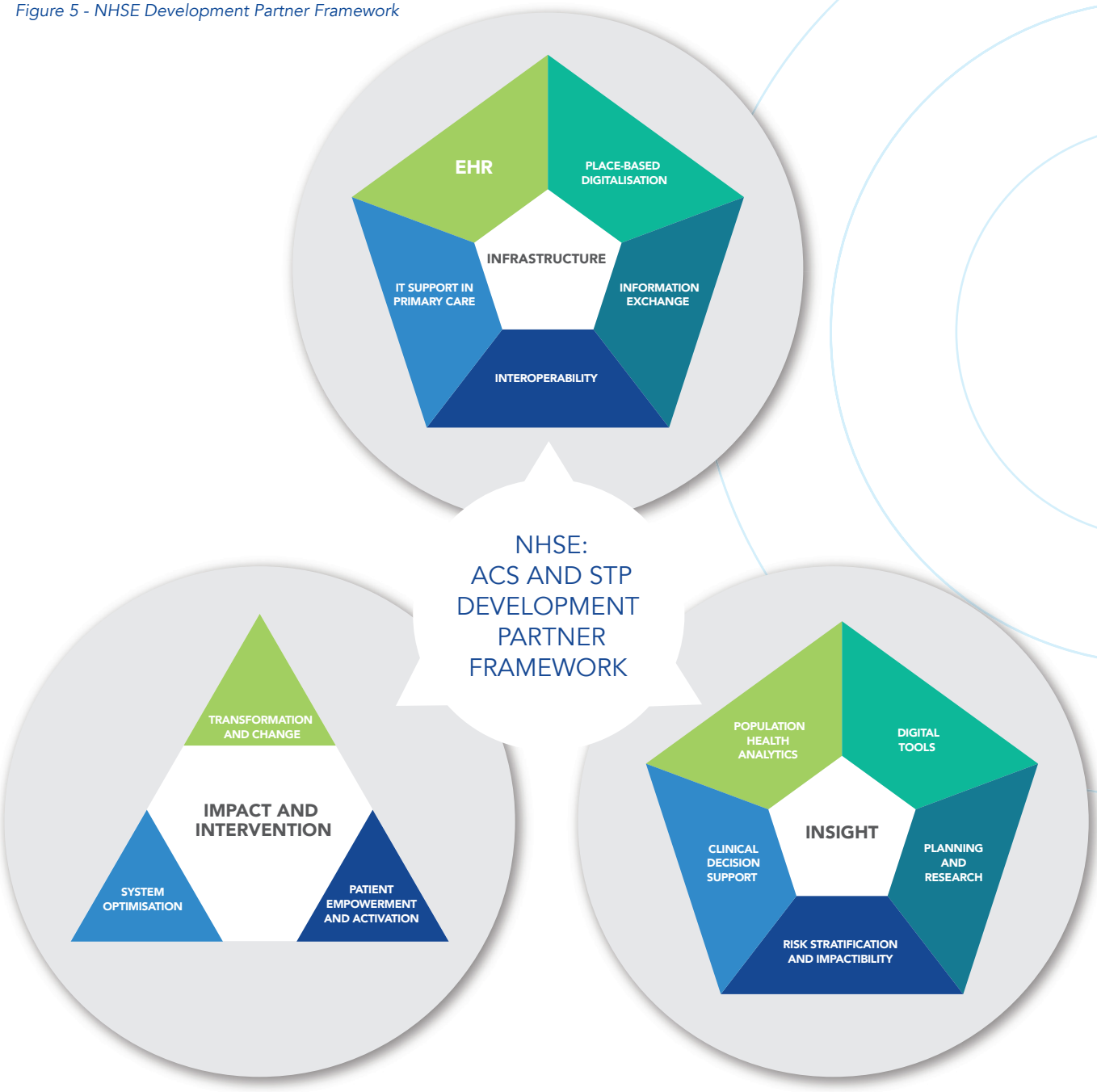
As the below graphic illustrates, the NHS is at an early stage of the journey toward integration. While STPs and the joint working they entail are ground-breaking in the context of the competition and provider/commissioner split embodied by the Health and Social Care Act 2012, organisations will still retain a relative degree of autonomy and in many cases traditional rewards-based funding models remain in place. However, STPs are accelerating the progress of integration, and several STP footprints are making plans to evolve to an ACS, with the first wave of ACSs being confirmed in June 2017 by NHS England. Together, these systems will serve around one in six people in England.[32]

This ongoing journey towards closer integration of care will be closely interwoven with a shift towards population health management. However, in the NHS, the primary focus of integrated care so far has been on encouraging collaboration between different parts of the NHS, as well as bringing together health and social care providers. These initiatives often aim to bring more care into the community, particularly for those with long-term conditions, and to improve co-ordination of care for older people.[33] Meanwhile, anecdotal evidence suggests that difficulties in building relationships between the NHS and local authorities remain a barrier in the STP context.

To build a meaningful population health system, STPs, and eventually ICSs, will need to go further than simply integration and will need to ensure that efforts are fully aligned with public health initiatives.[34] This will require a significant change in how the NHS operates, including its governance structures, funding models and ways of working, as well as how it engages and collaborates with local authority partners. The wider social determinants of health, for example rewarding employment, housing, and access to fresh and healthy food will also be of critical importance, and will require the involvement of third sector and voluntary organisations, housing providers, the education system, and uniformed services, among others. This will allow systems to ensure that they are actively improving all aspects of the health and well-being of the population they serve, while also supporting the reduction of health inequality. Extensive patient and public engagement will also be vital, particularly given the public distrust in the STP process and around the use of technology data sharing that currently exists.[35]

NHS England is currently developing an ACS and STP Development Partner Framework which supports systems in assessing their capabilities in achieving transformation, including in identifying high risk patients, data and information sharing, patient engagement, and clinical workflow. The framework is being structured around three areas:

Figure 5 - NHSE Development Partner Framework



2.4.2 Evaluating system maturity for PHM

As the population health management agenda progresses in the NHS, health and social care organisations will need to demonstrate competencies in the areas listed in Figure 5. As integrated systems progress in maturity from the STPs currently being developed and implemented into ICSs, this will encompass closer collaborative working and partners taking collective responsibility for delivering care, managing resources and improving health outcomes of the population they serve.[36] This will mean that there will be questions and concerns about how to best adopt and develop population health management on a system level.

A strategy capable of aligning multiple players will be crucial in a successful move from STPs to ICSs and an introduction of population health management. This strategy must be both aspirational so that people can think outside the constraints of the current system but also grounded in evidence so there is a solid foundation for taking next steps.

To address some of these concerns early on GGI, in collaboration with IBM Watson Health, have developed a maturity matrix to evaluate system maturity in introducing and developing population health management.

This maturity matrix is specifically designed to support the leadership of STPs. It is a practical and forward looking developmental tool which provides a structured means of assessing system performance and preparedness for population health management against a range of indicators. These are based on IBM Watson's experience of systems reform in the US and GGI's knowledge and evidence gained from working with integrated systems around the UK. The matrix can be used as a framework for reflective self assessment as leaderships move forward with the integration of care, and allows progress to be assessed in a nuanced, consistent and effective way over time. The maturity matrix can be used in collaboration with the assurance questions referred to later in this paper for board members to challenge both their own and partner organisations.

The maturity matrix can be found in Appendix 5.1.

Integrated Care System (ICS): a definition[37]

Collective term for both devolved health and care systems and for those areas previously designated as shadow accountable care systems (ACSs). An Integrated Care System is where health and care organisations voluntarily come together to provide integrated services for a defined population.

3. Population health management in the NHS

3.1 Setting the scene

It is to the UK's advantage that it has a long tradition of public health. Following the widespread influence of reports such as the Marmot review,[38] the wider determinants of health and the impact they have are now well recognised.[39] Now that public health is in the remit of local authorities, new initiatives necessitate input from a range of sectors. Public health efforts in the UK have accounted for significant contributions towards the increase of life expectancy. Vaccination schemes, early screening and quitting smoking programmes are just some examples. Data published in September 2017 reported that success rates for quitting smoking were at their highest for over a decade, at 19.8% for the first six months of the year, against an average for the last ten years of 15.7%. This success also applies to those from less well-off backgrounds, with it being concluded that smokers in manual occupational groups had virtually the same chances of quitting as those in white collar jobs.[40]

This long-standing public health agenda is being fed into STPs, with most plans demonstrating a commitment to prevention and addressing the problem of heath inequalities and the adverse impact they create for communities. However, a theme that was raised consistently in our interviews was that public health is often dealt with in a siloed manner in these plans and efforts are not yet joined up in improving the health of local communities as a whole. For example, digital health, management of patients with long-term conditions and co-morbidities, patient engagement, and self-management are often treated as separate issues. Efforts are not yet being joined up, and it is population health management, supported by technology, that provides the tools to make this possible.

Furthermore, there is great variability in the progress that different STPs are making and many are still at the stage of attempting to build trust and relationships between the NHS and local authority partners. One interviewee from a local authority background raised the fact that while STPs involve *'many people who know about politics and many people who know about the health environment, there are very few people who know how to meld the two'*, and what works well for NHS organisations may not work so well for local authorities. Navigating this could potentially be challenging politically, and it was suggested to us that partners in the integration process need to find a common language and nomenclature 'that does not raise hackles'.

However, population health management could be employed as a catalyst in breaking down organisational barriers and current attitudes of organisational self-protection. Wider organisational development programmes will be needed to underpin STP and ICS development, a significant part of which should address population health management.

While NHS England is still working on a common definition of population health, two central aspects combine regional analysis of precisely defined populations with person-targeted analysis to provide preventive care and improve general well-being. In the words of one interviewee, *'it's about promoting well-being for society as a whole.'*

NHS England have been working with the new care model vanguards throughout England to establish population health management systems which, being accountable for the health and well-being of their defined populations, seek to achieve the triple aim for healthcare alongside an important fourth element, the reduction of health inequalities. This will help to avoid a potential ethical complication of population health management, in that, through risk stratification, interventions often target sub-populations that are most likely to respond well rather than those that are more challenging to engage with. This would lead to the exclusion of vulnerable groups who, whilst more challenging to engage with, are in potentially greater need of interventions that target all aspects of their health and well-being.

These systems would use data analysis and evidence to both understand the health needs of the wider population and identify opportunities to improve the quality, efficiency and equity of the health and care in the area. This would aim to inform the planning, design and implementation of a range of interventions that are co-ordinated, evidence based and cost effective. Importantly, these interventions could be continuously monitored and evaluated to establish what is most effective to facilitate constant improvement in the quality and value of care.

Addressing the 5YFV's 'triple gap' through population health management

The health and well-being gap

- Data analysis and risk stratification to enable targeting those at risk of developing multiple long-term conditions and take preventative measures before they become ill
- Support efforts to improve the wider health and well-being of at risk and vulnerable groups in the population, through their education, diet and nutrition, physical activity levels, and access to secure and rewarding employment

The care and quality gap

- Use of AI to make diagnostics and treatment quicker and more precise, standardising high quality care for patients in every postcode
- Sharing of data between providers and other sectors to support the co-ordination and integration of care, reducing duplications and enhancing patient experience

The funding and efficiency gap

- More comprehensive prevention, self-care and care management of complex conditions, reducing risk of high cost hospital admissions
- Reducing the duplication of care for greater efficiencies

3.2 Examples of early innovation

Although population health management is still a very new concept in the UK and without one uniform approach, we have come across numerous examples of population health management initiatives that have had a good uptake and success and that, moving forward, can be scaled-up using the technology and tools of population health management. All of them address the triple aim of improving the experience of care, improving health outcomes, and lowering per capita costs while also incorporating the fourth aim of reducing health inequalities. We expand on a few innovative and forward-looking examples below, which interestingly are not labelled as population health management programmes but which do exhibit all the features of the approach.

Case study: Harrow Council, London, UK[41]

Harrow Council is a local authority in the London Borough of Harrow in north west London, serving a population of around 250,000 people. One of the most religiously and ethnically diverse boroughs in London, Harrow's populations brings further complexity as it has an increasingly large population over the age of 85, a group that is expected to double in size over the next 20 years.

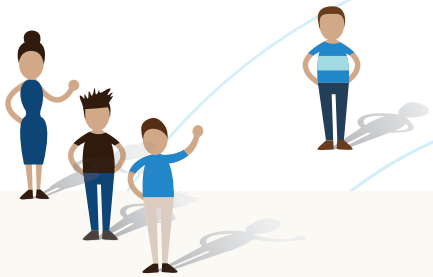
In recent years, Harrow Council has trialled a range of innovative programmes, one of which was launched in 2013, in response to increasingly tight budgets for local authorities. The ground-breaking My Community ePurse (MCeP) solution empowers service users by offering them greater control and choice over how they spend their social care personal budgets. This solution has given people access to more than 750 providers across a wide range of services, with the large marketplace helping to drive down costs and increase the quality of services available to personal budget holders.

However, in 2014, the Adult Social Services directorate of the Council learned that they needed to decrease costs by millions of pounds over a four-year period. Looking at where MCeP was already reducing costs, they identified where they could scale it up and build on existing improvements. The team concluded that by making MCeP available to a wider audience by adding a health care component, they could gain further savings while helping eligible citizens to manage and control their own health and care budgets.

To assist with the integration of health and care, while supporting a focus on individual choice, Harrow Council implemented the IBM Watson Care Manager solution which gives care managers and caseworkers a broad understanding of the people they serve. The platform pulls data from various aspects of a person's assessments and care plans, using its natural language processing capabilities to search and analyse unstructured text for key concepts to help social care and health service workers quickly access information relevant to each individual to provide tailored services.

Using this platform, GPs can also have a 'dashboard view' of the patient's access to and experience of social services, which can help identify behaviours that may point to depression, potentially avoiding a deterioration of mental health and hospital admission in the future. It can also help to encourage prescribing behaviour that is both more beneficial to the individual patient while reducing the cost of over-prescribing.

In addition to this improvement in health and well-being outcomes, the programme has also delivered significant savings. Since MCeP was first implemented by Harrow Council, it has already seen year-on-year savings across its adult social care budgets of £1 million. Now the scope of the programme has been expanded and is supported by AI, it is expected it will lead to further cost reductions by optimising patients' health data and through better integration of health care and social care services focused on prevention.



Case study: LEAP initiative, Lambeth, London

The Lambeth Early Action Partnership (LEAP), is an innovative programme aiming to better the lives of children in the London borough of Lambeth, focusing where it is needed most in the four most deprived wards, Stockwell, Coldharbour, Vassall and Tulse Hill, where the interventions used could make the most difference. The programme focuses on all aspects of the lives of babies and children. This includes specific health needs, and aims to support social, emotional, communication and language development, diet and nutrition, as well as the health and well-being of parents and their social networks, communities, and wider environment.

Funded in part by the Big Lottery, LEAP is hosted by a range of partners in collaboration, including National Children's Bureau, Lambeth Council, Lambeth Clinical Commissioning Group, Public Health, King's Health Partners, alongside local voluntary organisations, community groups, parents, schools, nurseries, and local police leaders.

LEAP aims to bring about these improvements in outcomes by enhancing existing and implementing new evidence-based, science-based and innovative interventions that are evaluated through a 'test and learn' approach. LEAP has a number of long-term outcomes which represent key programme performance indicators (KPIs) against which the programme will be measured. The LEAP evaluation addresses the following elements:

- Measure how powerfully it works (outcome)
- Describe how it works (process)
- Understand why it works (theory)
- Determine the return on investment (economics)

The evidence from this evaluation will be used to inform decision-making about individual interventions and to generate and spread learning and good practice.[42]

The LEAP programme is running alongside other measures to improve the health of the Lambeth population, including work on obesity, sexual health, and fighting food poverty through the use of food vouchers for fresh vegetables and opening a community shop in Gipsy Hill.[43]

3.3 Outlook for NHS boards

Now more than ever population health management carries within it the possibility of optimising the health of populations over an individual's life span and across generations, while creating greater efficiencies in the healthcare system. The prospect of community integrated healthcare will necessitate greater collaboration between partner organisations and more significant patient engagement. Integrated health care networks partnering with public health and community organisations to both reduce community health risk factors and provide coordinated illness care will be crucial to the success of the STP and later integrated care system.[44] It is the boards of individual organisations that face a window of opportunity like never before to address key issues and move towards greater collaboration and integration of health and social care services.

One of the aims of this report was to find out, through interviews and research, how NHS boards are gearing up to face the challenges that are coming their way and focus on the long-term outlook of building an integrated health and social care system. As put by one interviewee,

"[at the moment] population health management means what the person using it wants it to mean… strategies will be paying a lot of lip service to it but I'm not sure of the extent that we can actually press ahead without a common understanding."

While the need for a common understanding is key, as is the development of a common framework around population health management, there are numerous ways in which boards of organisations can be better informed. As another interviewee points out,

"There is huge enthusiasm in the NHS and I believe NHS England is working on a common definition of population health management. There is also some scepticism, especially about the speed and scale of change. It is here where boards can stay ahead of the curve by being forward-looking and being informed."

GGI interviewed board members about their knowledge and readiness to embrace PHM. Responses ranged from great enthusiasm to scepticism about the scale of changes required. Although boards of NHS commissioner and provider organisations are, understandably, currently focused on the myriad of issues and challenges currently facing the health and care system, in the longer term, population health management should be the inevitable solution to these challenges. Therefore, boards should be preparing now to ensure that they will be equipped in coming years to implement population health management in a meaningful manner.

One interviewee, who leads a public health led approach to data sharing, offered the following three 'top tips' for introducing population health management and integrating data:

1. Establish the level of organisational and system maturity and understand the questions that need to be asked. Adopt a systems mind-set and a population health approach.
2. Be an intelligent customer and employ critical appraisal methods for using analytics. This is sometimes currently lacking in the NHS and analytics taken at face value.
3. Be aware of the complex supply chain in bringing together data for population health management.

Based on the interviews we conducted, GGI identified key assurance themes around population health management which will help keep boards informed and up to date to support the transition towards a community-integrated health system which the shift to STP working represents (see figure 6).

These themes revolve around the following aspects:

Figure 6 - Key challenges for NHS boards

Using these themes, GGI has compiled a set of assurance questions for every board to evaluate preparedness for population health management. These can be found in Appendix 5.2. We would encourage all board members to use this as a developmental and forward-looking tool to establish how able they are to respond credibly to these questions.

4. Conclusion

4.1 Recommendations

In this paper, we considered the need to raise the level of debate and to build a common language around population health management in the NHS context. We spoke to a diverse range of people from policy makers and academics to practitioners. We included insight and input from NHS board members, clinicians and STP leads. What emerged is a clear need to build a common consensus and work toward a shared vision which is inclusive of a variety of stakeholders and has strong leadership. This should be representative of all parties, and able to build on a track record of partnership working. It should be informed by what is shown to work in other settings and countries. We sense there is now the opportunity, indeed imperative, for NHSE and local authority leaders to take the initiative and to focus on collaboration, partnership and engagement. Below, we have compiled recommendations for policy makers, STPs and developing ACSs and for individual boards which have emerged as we developed this report. We have included some recommendations for GGI too.

Policy makers

Those helping to set the national policy context for the development of health and social care need to:

- Build a common language and understanding for PHM in the NHS. This should involve the input of those experienced in PHM in other settings
- Enable an environment for implementation of PHM with frameworks for engagement rather than prescriptive top down directives
- Ensure regulatory clarity around sharing data and data sets
- Promote patient engagement, dialogue and empowerment
- Encourage the joining up and connectivity of health, social care and an even broader set of partners (education, housing, recreation, etc)
- Encourage local authorities to become leaders in caring for their populations
- Foster a climate of permissiveness for STPs and ICSs to focus beyond immediate performance and funding issues
- Support for Health and Well-Being Boards as a key forum for driving local PHM development

STPs and developing ICSs

Those leading STPs and the development of ICSs need to:

- Ensure plans are focussed on medium-term solutions such as PHM, as well as the inevitable immediate concerns of performance and funding
- Build a leadership base that is inclusive of all parties
- Actively promote the development of capacity and capability to enable PHM to be introduced, ensuring the building blocks are right now being put in place in terms of skills, joint policies and plans, strategies and incentives
- Recognise leadership and focus at sub-STP and ICS level, for example at Primary Care Home level
- Use primary care as a key building block closest to communities and building bottom-up clinical engagement
- Step away from siloed working towards a culture that focuses on collaboration, partnership and engagement. A key to this will be at the initial stages joining up the various STP or ICS workstreams that relate to PHM. The formation of a PHM workstream should be considered
- Develop mature systems that are able to demonstrate clinical leadership on a broad level, including primary, secondary and public health
- Strive towards a system that promotes continuous learning and that is able to take and build on examples from elsewhere
- Be in contact with the work on PHM being carried out by NHS England and NHS Digital
- Stay in touch with the developing research-base around PHM
- Focus PHM around patient engagement and empowerment, ensuring there are resources and mechanisms for properly building this in at the earliest stages of any implementation of PHM

Individual boards and governing bodies

There is much that the boards and governing bodies need to be attending to right now. NHS commissioners and providers should

- Create a common understanding and terminology around PHM, and be cognisant of the work currently happening at NHS England
- Take responsibility for staying informed and up to date on and proactively engage in, the debate about PHM. Board members should all understand PHM sufficiently to be able to ask the right assurance questions about plans for implementing PHM. Every board and governing body should recognise the importance of PHM and devote at least one session from their board development programme to PHM and the local JSNA in the coming year
- Assess and agree the board's risk appetite for PHM-type solutions
- Ensure local policies and procedures enable the implementation of PHM across the whole system
- Recruit non-executives with relevant skills and experience around PHM, this to include technological transformation and implementation of at-scale IT-enabled change, public health, digital transformation, etc
- Check current strategies and other governance instruments, such as board assurance frameworks, around objectives and risks associated with at-scale technologically-enabled transformation
- Set aside time to think through the ethical aspects that will affect the implementation of PHM
- Step-up meaningful partnership and dialogue with other boards, building opportunities to come together to discuss ideas for collaboration
- Devote attention to ensuring the local population understands the potential of PHM, and build in patient engagement and empowerment to any PHM implementations
- Develop a clear vision and long-term outlook, informed by current debates and the regulatory environment, and ensure a proactive rather than a reactive mind-set
- Encourage clinicians and staff to take time out to be a part of the debate and discuss what is needed
- Ensure system level thinking bolstered by accountability and collaboration with STP plans

GGI

As a national resource, GGI should:

- Through GGI's knowledge management programme and ongoing work with boards, continue to play a part in educating the market about population health management
- Develop governance tools to help STPs, emerging ICSs and individual boards/governing bodies understand PHM and be empowered to constructively challenge strategies and plans for implementing PHM
- Help guide boards and governing bodies through the complex path of balancing current statutory requirements around organisational thinking with the development of whole-systems solutions
- Act as a conduit to help boards have access to the international research base around PHM, and share experiences from systems where PHM is better planted
- Extend GGI's repertoire to better support Health and Well-Being Boards as key forums for local implementation efforts around PHM
- Think through how PHM implementation needs to have community and patient engagement built in at every stage
- Promote an understanding of PHM in the non-health strands of GGI's work, such as with housing and sports, for example

4.2 How population health will deliver a sustainable NHS

The successful integration of care and implementation of new models of care, such as ACOs, will require a more robust approach to population health management. This is where boards of individual organisations can play a critical role. This paper looked at what it takes to develop a population health management system, focusing on examples from the US. It then offered a maturity assessment tool capable of capturing the readiness of a system to embrace population health management through the evaluation of its governance, technical preparedness, clinical transformation and funding. It discussed the long history of public health in the NHS and what makes our system in the UK unique, considering examples of early innovation that still lack the infrastructure to become full scale population health management initiatives. Finally, we looked at the crucial role boards of individual organisations can play and how they can help shape a strategy that is capable of aligning multiple players in common purpose and working towards well-defined goals to create communities that foster health-promoting behaviours. Optimising on the opportunities that population health management offers in a meaningful way will help to create the next, more sustainable version of the NHS.

5. Appendix

5.1 Introducing population health management maturity matrix

As integrated systems progress in maturity from the Sustainability and Transformation Partnerships currently being developed to fully fledged ICS systems that will encompass closer collaborative working and collective responsibility for delivering care, managing resources, and improving health outcomes of the populations they serve, there will be questions and concerns about how to best adopt and develop population health management on a system level.

To address some of these concerns early on, GGI in collaboration with IBM Watson Health, have developed a maturity matrix on system maturity in introducing and developing population health management.

This maturity matrix is specifically designed to support joint boards of STPs and is built around four themes (see section 2.3):

- **Governance and decision making:** Negotiating governance challenges created as a result of the change in national direction, and developing governance and decision making arrangements that facilitate the development and implementation of population health management solutions.
- **Technical preparedness:** Ensuring a robust digital infrastructure is in place, utilising technology, AI and data analysis to support population health management and ensuring that these are effectively governed.
- **Clinical transformation:** Redesigning the way in which healthcare is delivered, going beyond STP aims of improving co-ordination of care and managing care out of hospital whenever possible, to preventative care and improving the wider health and well-being of communities.
- **Funding, incentives and risk:** Introducing new funding models to support the development of population-centred, outcome-based care, while also developing arrangements for risk sharing.

The matrix is a practical and forward-looking developmental tool which provides a structured means of assessing system performance and preparedness for population health management against a range of indicators. These are based on GGI's knowledge and evidence gained from working with integrated systems around the UK, as well as research and benchmarks drawn from population health and accountable care both within the UK and internationally. The matrix can be used as a framework for reflective self-assessment as joint boards move forward with the integration of care, and allows progress to be assessed in a nuanced, consistent and effective way over time. The maturity matrix can be used in collaboration with the board assurance questions referred to in this paper for board members to challenge both their own and partner organisations.

Good Governance Institute

POPULATION HEALTH MANAGEMENT MATURITY MATRIX SERIES

IBM Watson Health

1. GOVERNANCE AND DECISION MAKING

PROGRESS LEVELS

INTEGRATED CARE SYSTEM

KEY ELEMENTS

	1 ORGANISATIONAL AUTONOMY (HEALTH AND SOCIAL CARE ACT 2012)	2 SUSTAINABILITY AND TRANSFORMATION PARTNERSHIPS	3 ACCOUNTABLE CARE SYSTEMS	4 ACCOUNTABLE CARE ORGANISATIONS
LEADERSHIP AND STRATEGY	Siloed working	Basic leadership chassis in place which supplements, not replaces, accountability of individual organisations. Organisations are tangibly working towards the delivery of their collective strategic objectives. A joint BAF has been created.	Performance against defined strategic objectives are recorded and improving. The strategy is regularly reviewed. Joint leadership is accountable for population health outcomes and local authority is empowered to play a key role. Clinical leadership demonstrated.	Well defined governance and leadership model and strategy with shared accountabilities. The organisations are able to evidence how population health management is recognised as leading the local health and social care agenda. Clinical leadership demonstrated widely and plays a key role in developing strategy.
PURPOSE AND CLARITY OF REMIT	Siloed working	Purpose and strategic vison affirmed in public. National targets, local priorities and KPIs identified and agreed. The organisations have established robust mechanisms for service redesign for population health management.	Cultural shift demonstrated. Focus on delivery of population health management, with performance against defined collective KPIs being recorded and improving. Emphasis on continuous evaluation and learning.	Population health management system influences national and international standards and is recognised for publishing and sharing examples of best practice. Success has allowed the system to redefine / extend remit.
PARTNERSHIP ETIQUETTE AND COMPLIANCE WITH COLLECTIVE DECISION MAKING	Siloed working	The population health management system has defined a joint etiquette for decision making based on parent organisations defining their individual risk appetite and tolerance for delegation. Local authority involvement. Working group beginning to consider ethical questions surrounding population health management.	Partner organisations have demonstrated an ability to hold to collective decision making processes with local authority strongly involved. Processes for evaluation and ethical impactibility of population health interventions are in place.	Collective decision making arrangements have been recognised as model system by external regulators. Decision making is evidence-based and integrated with evaluation of population health interventions.

This maturity matrix is based on IBM Watson Health's framework for assessing system maturity for population health management, constructed following their experience of supporting population health management in the US.

2018 © Good Governance Institute. WWW.GOOD-GOVERNANCE.ORG.UK

2. TECHNICAL PREPAREDNESS

PROGRESS LEVELS

INTEGRATED CARE SYSTEM

KEY ELEMENTS

	1 ORGANISATIONAL AUTONOMY (HEALTH AND SOCIAL CARE ACT 2012)	2 SUSTAINABILITY AND TRANSFORMATION PARTNERSHIPS	3 ACCOUNTABLE CARE SYSTEMS	4 ACCOUNTABLE CARE ORGANISATIONS
SYSTEMS AND STRUCTURES	Siloed working	Data and information governance standards are in line with regulatory/statutory requirements at an organisational level. Partner organisations are beginning to establish aligned governance structures and data systems. The system has a basic Electronic Health Record capability with some shared data. Introduction of solutions and technology that incorporate individual care attributes and needs.	Partner organisations are aligned and allow for the easy sharing of information, risk and assurance. Electronic Health Record, performance data, and patient data analytics and risk stratification available across the network.	Solutions and technology that incorporate individual care attributes and needs embedded. The system has shown it is able to share and use data intelligently to drive system-wide population health management. Data and information governance is a key component of the shared governance framework and partner organisations are committed to meeting data sharing standards. Data governance committee in operation.
INTERNAL STAKEHOLDERS	Siloed working	Staff are being engaged in developing the approach to population health management, and development sessions are being held to support staff in using data and new ways of working. Mechanisms for the collection of staff feedback are in place.	Appropriate group forums exist for staff to learn from improvement initiatives and interventions, and the use and sharing of data, and for staff to receive structured feedback. Primary and secondary care clinicians brought together to progress workstreams.	The population health management system has been audited and is recognised nationally as a collective learning network. Initiatives, interventions and improvements introduced by staff are shared within and beyond the network.

This maturity matrix is based on IBM Watson Health's framework for assessing system maturity for population health management, constructed following their experience of supporting population health management in the US.

2018 © Good Governance Institute. WWW.GOOD-GOVERNANCE.ORG.UK

3. CLINICAL TRANSFORMATION

PROGRESS LEVELS

INTEGRATED CARE SYSTEM

KEY ELEMENTS

	1 ORGANISATIONAL AUTONOMY (HEALTH AND SOCIAL CARE ACT 2012)	2 SUSTAINABILITY AND TRANSFORMATION PARTNERSHIPS	3 ACCOUNTABLE CARE SYSTEMS	4 ACCOUNTABLE CARE ORGANISATIONS
SYSTEM WIDE QUALITY IMPROVEMENT	Siloed working	Main focus on episodic care, improving access and managing demand. Improvement plans are in place recognising population and health economy priorities such as at risk subpopulations and service resilience. Gaining better understanding of local needs through engagement and education.	Outcomes based commissioning is being explored and joint strategic objectives have clear performance trajectories and recognition of risks that could compromise achievement. Evidence based care and interventions are being delivered, facilitated by data analytics and risk stratification. Focus on ensuring that preventive interventions do not adversely affect health inequities. Primary care engaged and involved.	Outcomes based commissioning firmly established. The population health management system's evaluation process demonstrates consistent improvement in outcomes. The network is able to promote its success regionally, nationally and internationally. Actionable analytics at the point of care with enhanced care management, preventative care and wellbeing activities. Primary care at scale a key building block.
EXTERNAL STAKEHOLDERS	Siloed working	Patients and the public are engaged in developing the approach to population health management in targeted areas of the footprint. Mechanisms for the collection of patient feedback are in place.	Effective partnership engagement working is in place and can be evidenced through improved outcomes. Guided by a community engagement plan and data analysis, engagement is undertaken through a variety of methods, including technology, to reach a wider range of communities. Workstreams are underway to increase public confidence in data sharing. Local authority expertise exploited.	A population health management steering group is in place through which stakeholders can influence proposals and decision making. There is widespread public confidence in data sharing and the use of AI, and population health workstreams are trusted by service users and the local community. The system actively contributes to the improvement of health and wellbeing throughout the population it serves.

This maturity matrix is based on IBM Watson Health's framework for assessing system maturity for population health management, constructed following their experience of supporting population health management in the US.

2018 © Good Governance Institute. WWW.GOOD-GOVERNANCE.ORG.UK

4. FUNDING, INCENTIVES AND RISK

PROGRESS LEVELS

INTEGRATED CARE SYSTEM

KEY ELEMENTS

	1 ORGANISATIONAL AUTONOMY (HEALTH AND SOCIAL CARE ACT 2012)	2 SUSTAINABILITY AND TRANSFORMATION PARTNERSHIPS	3 ACCOUNTABLE CARE SYSTEMS	4 ACCOUNTABLE CARE ORGANISATIONS
MECHANISMS FOR RISK AND FUNDING SHARING	Siloed working	System continues to use a payment by results system. Mechanisms for risk sharing are in place and the system uses scenario testing or similar exercises to develop a joint understanding of risk and opportunities.	Alternative funding models are being actively explored, including bundled payments and negotiation based on outcomes, aiming to reduce unnecessary tests and treatments. A high degree of risk sensitivity is demonstrable across the organisations and organisations are comfortable being held to account.	The system has a well-defined governance model which agrees on risk sharing and managing funds. Partner organisations are considering redesign of funding and incentives, for example capitation and risk contracting, linking system payments to quality and outcomes. The system is responsive to risk and sharing of risk has created extra value.
ASSURANCE OF DELIVERY ACROSS BOUNDARIES	Siloed working	Potential internal and external system failures are identified in a shared way, and these are jointly mitigated, with ongoing effective communication. Partner organisations are able to track improvement against strategic objectives and there are no surprises in outcomes data.	Supported by data analytics, issues are systematically identified and are addressed if necessary by organisation-commissioned deep dives. Incentive learning through better care delivery.	National standards and local targets for population health are consistently achieved across the system. System leaders are confident that they have intelligent analysis and assurance across the population area. Lessons learned and best practice are shared internally and externally.

This maturity matrix is based on IBM Watson Health's framework for assessing system maturity for population health management, constructed following their experience of supporting population health management in the US.

2018 © Good Governance Institute. WWW.GOOD-GOVERNANCE.ORG.UK

5.2 Key assurance questions for NHS boards

GGI would encourage board members to consider these key assurance questions, and establish how able they are to respond positively to constructive challenge around these themes.

KEY ASSURANCE QUESTIONS FOR NHS BOARDS

Question	Credible answer	Insufficient answer
How are you ensuring that the board understands the population health management agenda to help formulate the emerging strategy?	We are ensuring that we proactively engaging with the population health management agenda at an early stage to ensure we are prepared to take a leading role in formulating strategy. Board members are building their understanding through attending regional and national learning and development sessions, and are making sure to learn from key lessons at home and abroad.	Board member capacity is already taken up by current challenges, so we are waiting until population health management becomes more widespread before we fully engage with it. Currently, we see this as a matter for commissioners to be exploring.
How are you evaluating the skills and experience of the board and leadership team so that it can fully engage in decision making?	All board members are taking part in an individual and whole group self-evaluation against population health management competencies to establish where strengths and weaknesses are. Where weaknesses emerge, for example in implementing technology at scale, board members will take part in development sessions and seminars in order to grow their knowledge and skills in particular areas. Our next NED will be recruited against skills and experience of at scale implementation of technological transformation.	Our board members are already experienced in the health sector, so any further learning will easily be picked up as we progress.
How are you designing your governance arrangements to facilitate decision making and enable the system to deliver population health management?	We are working with partners to establish a shared vision and set of objectives for population health management, which is underpinned by a formal, well-defined governance model and strategy. The local authority and Health and Wellbeing Board are involved and engaged in decision making processes, supported by a strong culture of collaboration. We have agreed and formalised the delegation of authority from individual organisations to population health management workstreams, which is confirmed in a jointly-created high-level accountability framework. We are clarifying and developing arrangements for a shared understanding of risk and managing funds. We have set up a task and finish group to consider the ethical questions population health management may create, and is developing a framework for this.	We have implemented a basic support chassis to supplement accountability of individual organisations and rely on the strengths of relationships and personalities to drive change.

2018 © Good Governance Institute.

Question	Credible answer	Insufficient answer
How are you ensuring that the public and other stakeholders are appropriately engaged in decision making around population health management?	Our stakeholders are a vital part of ensuring the delivery of population management, and we involve them early enough that they can influence the plans we are developing. We have created a population health management steering group through which stakeholders can influence proposals and decision-making. We also employ appropriate methods to engage all communities within our footprint and undertake engagement in collaboration with local authority partners. This activity is guided by a comprehensive community engagement plan. We employ technology to enhance patient interaction and are engaging in a collaborative partnership approach for care decision-making and social support planning with patients and their families. We use evidence from our population risk stratification to inform methods of public engagement.	As a result of lack of capacity and timeline pressures, we will seek to engage the public and our stakeholders at a later point in the process. When we do undertake public engagement, it is reliant on face to face encounters and are happy to rely on commissioners to manage this process.
How are you ensuring that the system has sufficient understanding of its population to enact clinical transformation?	We are assured that system-wide working is being undertaken, supported by sophisticated analytics, to better understand our population. This includes which services are in most demand, which sub-populations are the highest risk, and what opportunities exist to manage this risk more effectively. We are working with our local authority partners to undertake a Joint Strategic Needs Assessment (JSNA) and a specific board development session will be devoted to the JSNA. This is being used to design clinical transformation workstreams which will enable management of at-risk patient populations by promoting wellbeing, enhancing care management patient engagement in their own care, and reducing health inequity.	We are assured that population risk stratification work is being undertaken, however, this is not yet integrated with clinical transformation and quality improvement workstreams. This is a matter for our commissioners to be leading on.
How are you engaging with national bodies and ensuring that learning from best practice sites is fed into decision making?	We have been in close contact with national bodies throughout the process to ensure our approach is in line with national expectations, and understand the importance of having an ongoing dialogue with the national bodies. We are assured that representatives of our system are attending regional and national development events to learn from other best practice systems. Our board members are well-sighted on the work of NHS England and NHS Digital around PHM.	We engage with national bodies as and when requested or required.

2018 © Good Governance Institute.

Question	Credible answer	Insufficient answer
How are you ensuring that your system has the sufficient technical preparedness to support population health management?	We are assured that our organisation is working with partners to develop an integrated health IT infrastructure which includes a comprehensive Electronic Health Record and has interoperability with other organisations. This provides a platform for aggregation of data and critical data analytics for population health management. Data and information governance is a key component of our shared governance framework and partners are committed to meeting data sharing standards. We have a system wide data governance committee in operation.	This matter is largely dealt with by our Director of IT We have a basic Electronic Health Record capability with some shared data. Our data governance is in line with regulatory requirements at an organisational level.
How are you ensuring that adequate resource and capacity is designated to population health management?	Recognising the demands on the senior leadership in our footprint, we have ensured that required milestones and workloads are clear, understood and manageable across senior teams. We have developed a workforce plan that takes into consideration the needs of individual organisations, and the change in skills that population health management will require. This has considered required individual roles and has highlighted areas, such as staff development, that will need further investment. This is jointly agreed and realistic.	We have leadership development processes in place and are confident these are adequate.
How are you redesigning funding and incentive models to facilitate effective delivery of population health management?	We are exploring with partner organisations how to redesign system wide funding and incentive models, for example, value-based models that link system payments to measures of quality and outcomes and encourage a change of behaviours in the acute sector. We are exploring the introduction of outcomes based commissioning. This is supported by our governance framework, which is developing arrangements for sharing risk, funds, and accountabilities.	At present, we are continuing to use a payments by results model.
How are you ensuring that the population health management framework and programmes are evaluated effectively?	We are using a 'test and learn' approach to evaluate our population health management programmes. We are investing in analytics to measure the effectiveness of interventions, including their improvement of outcomes and health inequity and value for money. This evidence is then used to inform decision making around future policies and interventions, ensuring continuous learning and improvement. Key lessons and outputs are discussed at board level.	As a result of lack of capacity and timeline pressures, we are putting off evaluating programmes until they have been implemented for a longer period of time.

2018 © Good Governance Institute.

5.3 List of contributors

GGI would like to thank all those who were involved in the development of this white paper, either through taking part in a formal interview, providing general counsel, or attending our round table event in London on 30 January 2018.

- Sam Allen, Chief Executive, Sussex Partnership NHS Foundation Trust
- Sir Ian Andrews, Senior Independent Director, NHS Digital
- Dr Natalie Banner, Policy Advisor, Wellcome Trust
- Josh Berlin, Managing Partner, Watson Health Strtegic Advisory Practice
- Chris Bown, Senior Responsible Officer, Bath, North East Somerset, Swindon and Wiltshire STP
- John Brouder, Chief Executive, North East London NHS Foundation Trust
- Phil Brough, Delivery Partner, New Care Models Programme, NHS England
- Chris Carrigan, Chair, Independent Group Advising on the Release of Data, NHS Digital
- Mary Chambers, Professor, Mental Health Nursing and Director, Centre for Public Engagement
- Ben Choi, Associate Partner, Watson Health Strtegic Advisory Practice
- Olivia Clymer, Chief Executive Officer, Healthwatch Central West London
- Philip Confue, Chief Executive, Cornwall Partnership NHS Foundation Trust
- Gareth Davies, Partner, Mazars
- Judith Dean, Transformation Programme Director, NHS England
- Councillor Jim Dickson, Chair, Lambeth Health and Wellbeing Board
- Dr Rupert Dunbar-Rees, Founder and Chief Executive, Outcomes Based Healthcare
- Dr Durka Dougall, Senior Consultant, Leadership and Organisational Development, The King's Fund
- Bevleigh Evans, Head of Care Model Design, NHS England
- Ainna Fawcett-Henesy, Consultant, Republic of Ireland
- Andrew Fenton, Associate Director, Digital Transformation, NHS South Central and West Commissioning Support Unit
- Dr George Findlay, Medical Director, Western Sussex Hospitals NHS Foundation Trust
- Dr Debbie Frost, Chair, NHS Barnet CCG
- Hardy Geisler, Director and Co-founder, CFPro Ventures
- Mile Gilbert, Company Secretary and Assistant Accountable Officer, NHS Swale CCG and NHS Dartford Gravesham and Swanley CCG
- Simon Gilby, Chief Executive, Coventry and Warwickshire Partnership NHS Trust
- Dr Abraham George, Consultant in Public Health, Kent County Council
- Chris Graves, Chair, Evolving Communities CIC
- Angela Greatley OBE, Chair, Central London Community Healthcare NHS Trust
- Professor Martin Green OBE, Chief Executive, Care England
- Keith Griffiths, Director of Sustainability, East Lancashire Hospitals NHS Trust
- Gareth Hartley, Director, Attain
- Jonathan Hazan, Ambassador, Datix
- Nicholas Hodgkiss, Senior Manager, NHS RightCare
- Karen Howell, Chief Executive, Wirral Community NHS Trust
- Andrew Hughes, Director of Strategy and Development, North Staffordshire Combined Healthcare NHS Trust
- Ian Holmes, Programme Director, West Yorkshire and Harrogate STP
- Samantha Jones, Former Director for New Models of Care, NHS England
- Matthew Kershaw, Senior Fellow, The King's Fund
- Daniel King, Director of Primary Care, NHS Dudley CCG
- Dr Geraint Lewis, Chief Data Officer, NHS England
- Sara Lund, Vice President, IBM Watson Health, Strategic Solutions
- David Mallett, Head of Strategy and Reconfiguration, NHS England
- Dr Julian Mark, Medical Director, Yorkshire Ambulance Service
- Abigail Masterson, Director, Abi Masterson Consulting Ltd.
- Paul Maubach, Accountable Officer, NHS Dudley CCG and Lead, Dudley MCP Vanguard
- Kevin McGee, Chief Executive, East Lancashire Hospitals NHS Trust
- Dr Richard Milani, Chief Clinical Transformation Officer, Ochsner Health System
- Dame Julie Moore, Chief Executive, University Hospitals Birmingham NHS Foundation Trust
- Simon Morritt, Chief Executive, Chesterfield Royal Hospital NHS Foundation Trust
- David Nelson, Global Software Asset Management and Certified IBM Consultant, IBM
- Anne O'Brien, Chief Operating Officer, NHS Professionals
- Zoe Oakes, Senior Marketing Manager, IBM Watson Health Consulting
- David Pearson, Corporate Director for Adult Social Care, Health and Public Protection, Nottinghamshire County Council
- Nicola Perrin, Head of Policy, Wellcome Trust
- Trevor Purt, Vice President International Healthcare, IBM Watson Health Consulting
- Luke Readman, Chief Information Officer, East London Health & Care Partnership
- Sean Rennar, Health and Social Care Management UKI Sales Leader, IBM
- David Rogers, Chair, North Staffordshire Combined Healthcare Trust
- Dr Nabihah Sachedina, Director, London Health and Care Devolution
- Jason Seez, Director of Planning and Governance, Barking Havering and Redbridge University Hospitals NHS Trust
- Dr Leidon Shapo, Head of Programmes for Health & Social Care, Southwark Council (Public Health)
- Phil Shelato, Senior Managing Consultant, Watson Health Strtegic Advisory Practice
- Dr Rashmi Shukla CBE, Regional Director Midlands and East of England, Public Health England
- Heather Spillman, Associate Partner, Watson Health Strtegic Advisory Practice
- Paul Sutton, Interim Director EPPR, Public Health England
- John Tacchi, Programme Director of Integration, North Staffordshire Combined Healthcare NHS Trust
- Dan Wellings, Senior Fellow, Policy, The King's Fund
- Richard Wells, Director of Planning and Information, NHS England
- Rob Whiteman, Chief Executive, CIPFA, and Chair, East London Health & Care Partnership
- Dr Zoe Wyrko, Consultant in Elderly Care, University Hospitals Birmingham NHS Foundation Trust and Vice President for Workforce, British Geriatrics Society

5.4 Reference list

1) Nuffield Trust, The Health Foundation, The King's Fund, The Autumn Budget: Joint statement on health and social care, November 2017
2) NHS England, NHS England Five Year Forward View, October 2014
3) Project HOPE, Framework for Population Health, 2014
4) The King's Fund, ACOs explained, June 2017
5) NHSE/NHSI, Refreshing NHS Plans for 2018/19, February 2018, https://www.england.nhs.uk/wp-content/uploads/2018/02/planning-guidance-18-19.pdf
6) RWJF, Time to act: investing in the health of our children and communities, January 2014
7) Kindig, D, Stoddart G. What is population health? 2003
8) Project HOPE, Framework for Population Health, 2014
9) Brian S Alper et al, How much effort is needed to keep up with the literature relevant for primary care?, 2004 Oct; 92(4): 429-437. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC521514/
10) Stanford News, Stanford algorithm can diagnose pneumonia better than radiologists, https://news.stanford.edu/2017/11/15/algorithm-outperforms-radiologists-diagnosing-pneumonia/, 15 November 2017
11) Reform, Thinking on its own: AI in the NHS, January 2018
12) The King's Fund, Accountable care organisations in the United States and England: Testing, evaluating and learning what works, March 2014
13) Permanente Medicine, Permanente Physician Leaders Convene to Advance the Quadruple Aim in Health Care Delivery, October 2017, https://permanente.org/permanente-physician-leaders-convene-advance-quadruple-aim-health-care-delivery/
14) Watson Health, Redefining population health, 1 June 2017 https://www.ibm.com/blogs/watson-health/redefining-populationhealth/
15) Watson Health, Community Population Health Improvement: Lessons Learned In Real Time, 18 May 2017, https://www.ibm.com/blogs/watson-health/community-population-health-improvement-lessons-learned-real-time/
16) IBM Watson Health case study Mercy Health Select, LLC: The IBM Explorys Platform integrates disparate data sources to help identify at-risk patients, https://public.dhe.ibm.com/common/ssi/ecm/ww/en/wwc12374usen/watson-health-cognitive-solutionsww-case-study-wwc12374usen-20170816.pdf, 2017
17) IBM Case Studies, Orlando Health, http://ecc.ibm.com/case-study/us-en/ECCF-HLC03033USEN
18) Karen Handmaker, Incorporating social determinants into population health management, HFMA, March 2017
19) Department of Health, Joint Strategic Needs Assessment and joint health and well-being strategies explained: Commissioning for populations, December 2011
20) NHS Providers, Overview, https://nhsproviders.org/provider-voices-public-health/overview
21) GGI, System Transformation Board Assurance Prompt, August 2017
22) GE Healthcare, Big Data, Analytics and Artificial Intelligence: The Future of Healthcare is Here, 2016
23) Nuffield Trust, Delivering the benefits of digital health care, February 2016
24) GE Healthcare, Big Data, Analytics and Artificial Intelligence: The Future of Healthcare is Here, 2016
25) ibid
26) ibid
27) Reform, Thinking on its own: AI in the NHS, January 2018
28) ibid
29) HSJ, NHS England will invest in artificial intelligence, says Stevens, 12 September 2017, https://www.hsj.co.uk/technology-andinnovation/nhs-england-will-invest-in-artificial-intelligence-says-stevens/7020545.article
30) Understanding Patient Data Initiative, https://understandingpatientdata.org.uk/
31) Karen Handmaker, Incorporating social determinants into population health management, HFMA, March 2017
32) NHS England, Accountable Care Systems (ACSs), https://www.england.nhs.uk/accountable-care-systems/
33) The King's Fund, Population health systems: Going beyond integrated care, February 2015
34) ibid
35) Reform, Thinking on its own: AI in the NHS, January 2018
36) NHSE, Accountable care systems (ACSs), 2017, https://www.england.nhs.uk/accountable-care-systems/
37) NHSE/NHSI, Refreshing NHS Plans for 2018/19, February 2018, https://www.england.nhs.uk/wp-content/uploads/2018/02/planning-guidance-18-19.pdf
38) Fair Society, Healthy Lives: the Marmot Review, February 2010
39) The King's Fund, Population Health Systems: going beyond integrated care, February 2015
40) Public Health England, Press release: Highest smoking quit success rates on record, 27 September 2017, https://www.gov.uk/government/news/highest-smoking-quit-success-rates-on-record
41) IBM Watson Health case study, Harrow Council: Reducing costs and empowering citizens with help from IBM Watson Health, https://public.dhe.ibm.com/common/ssi/ecm/ww/en/wwc12377usen/WWC12377USEN.PDF, 2017
42) LEAP, Lambeth Early Action Partnership, 2018, http://www.leaplambeth.org.uk
43) Information provided by Cllr. Jim Dickson, Lambeth Council Cabinet Member for Healthier and Stronger Communities and Chair of Lambeth Health and Well-being Board
44) Project HOPE, Framework for Population Health, 2014

5.5 Further reading

Public health and prevention

- Derek Wanless, Securing our Future Health: Taking a Long-Term View, April 2002
- GGI, Healthy Living Centres, 2017
- Michael Marmot, Fair Society, Healthy Lives: the Marmot Review: strategic review of health inequalities in England post-2010, 2010
- NHS Providers, Public Health: Everyone's Business? October 2017
- Public Health England, Healthy High Streets: Good place-making in an urban setting, January 2018

Population health management abroad

- Anna Charles, Developing accountable care systems: lessons from Canterbury, New Zealand, August 2017
- The Commonwealth Fund, Using Community Partnerships to Integrate Health and Social Services for High-Need, High-Cost Patients, January 2018
- The King's Fund, Population health systems: Going beyond integrated care, February 2015
- The King's Fund, Accountable care organisations in the United States and England: Testing, evaluating and learning what works, March 2014

Population health management at home

- Chris Ham, Making sense of accountable care, The King's Fund, January 2018
- The King's Fund, What does population health really mean? April 2017
- NHS Providers, NHS Confederation NHS Clinical Commissioners and Local Government Association, New care models and prevention: An integral partnership, May 2016
- GGI and the Royal College of Physicians of Edinburgh, The Future of the NHS in Scotland, February 2018

Digital health

- Helen Arthur, Learning from technological innovation in the vanguards, June 2017
- McKinsey & Company, The 'big data' revolution in healthcare: Accelerating value and innovation, Center for US Health System Reform, Business Technology Office, January 2013
- Reform, Thinking on its own: AI in the NHS, January 2018
- GGI, Views on day-to-day service issues and the role of telehealthcare: A report from the Model for Optimising Scalable Telehealthcare programme, June 2014

STPs and new models of care

- Anna Charles, Accountable care explained, The King's Fund, January 2018
- Chris Ham et al., Sustainability and Transformation Plans in London: an independent analysis of the October 2016 STPs, September 2016
- Chris Ham, Delivering sustainability and transformation plans: from ambitious proposals to credible plans, February 2017
- The Health Foundation, Some assembly required: implementing new models of care, November 2017
- NHS England, Five Year Forward View, October 2014
- NHS Providers and Hempsons, Accountable care- the art of the possible, November 2017
- GGI, The innovative use of assets and flexible infrastructure in the world of STPs, September 2017
- GGI, Scrutiny: the new assurance? A good governance discussion document, September 2017
- GGI, System Transformation and Care Homes: A discussion document, October 2017
- GGI, System Transformation: Board Assurance Prompt, August 2017
- David Goldberg, Goldberg III: Can the NHS deliver integration? Lessons from around the world, GGI, December 2014
- David Goldberg, Goldberg IV: The challenge for the NHS, GGI, April 2016

Good Governance Institute

www.good-governance.org.uk

IBM Watson Health