Cities as places of wellbeing

Smart Cities
Health & Wellbeing
Introduction

A Smart City for health and wellbeing is one that takes an integrated approach to the use of digital technologies to increase the connectedness of people to the information and city functions that improve health and wellbeing, reduce inequalities and support a higher quality of life for all its citizens.

The Government, cities, businesses and universities are increasingly joining forces to ensure the UK adopts the technology and practices required to make our cities smarter. The data flowing from our information-rich cities have the potential to allow us to respond effectively to changes in society in ways that will increase our prosperity, address inequalities and improve our wellbeing.

The Smart Cities Forum has invited the city of Leeds, through Tom Riordan, the Chief Executive of Leeds City Council, to make recommendations to advance the adoption of Smart Cities approaches to improve the health and wellbeing of citizens.

Sir Alan Langlands, the Vice-Chancellor of the University of Leeds, has chaired the Leeds Task and Finish Group that has overseen the publication of this report.

The report considers how cities can best use data and digital technology to establish a new relationship with citizens, and to create personalised approaches to delivering care in transformational ways that will measurably improve outcomes.

The Leeds Task and Finish Group membership has included senior representation from universities, the NHS, Leeds City Council, industry, NHS England, the Health and Social Care Information Centre and the Department of Health.

We have made two kinds of recommendation in the report – recommendations for Government and recommendations for cities that aspire to take a Smart approach to health and wellbeing.
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In the UK, around 80 per cent of our population live in cities.

The Department for Business, Skills and Innovation established the Smart Cities Forum in late 2013. The Forum’s brief is to develop plans to support cities in the UK to harness real time data, gathered from the urban environment, both to enhance the quality of life for citizens and to create economic growth. The Smart Cities’ market is estimated to be worth more than $400 billion globally by 2020.

Five cities - Birmingham, Bristol, Glasgow, Milton Keynes and Leeds - have been invited to provide advice and recommendations to the Forum. Here in Leeds, in recognition of our city’s strengths and natural assets in health data and technology, we were asked to look at how smart cities might support improvements in citizen health and wellbeing.

Our discussions have focussed on how health and wellbeing might be enhanced through the more efficient and effective use of data and the use of intelligent technology, and how such innovation might create new jobs and wealth for our city-region and for the UK more widely.

We have reflected on the perceptible shift in societal values and attitudes in the UK over recent years – and how this shift has impacted both on how people use technology and on how they interact with the services sector.

It is now common practice to use mobile technology to book holidays, to manage bank accounts and to search the internet for information. At the same time, many people who use public services are becoming more informed and wish to be more involved in the decisions and choices which affect their lives.

If we can combine increased public expectations of and involvement in health and social care services with technological innovation, the potential to improve health and simultaneously provide economic benefit could be considerable.

The rate of innovation in this field is breathtaking. Almost daily, we see new breakthroughs with the potential to improve health and wellbeing – from wearable technology which monitors activity, such as fitness trackers, to telehealth technology, enabling remote consultations between patients and clinical specialists. Techniques such as citizen sensing which links activity to place and the use of crowdsourced data have the potential to provide new insights in a fast moving world.

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Foreword

by Sir Alan Langlands

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This report argues that we should start with the citizen – only when we understand properly what people, including those who are digitally disadvantaged, need and want from our public services, and only when people are engaged and excited by the possibilities of a smart city will we achieve the full potential of what is possible.

This report also argues for closer working between the various statutory organisations which exist across any city – in the way they interact with citizens and in the appropriate sharing of data for the public good.

Our discussions have been fascinating. I sense that we are in the foothills of new approaches to improving health and wellbeing but that very rapid progress is possible over the next few years.

The Leeds Task and Finish group was able to draw on a range of expert opinion from Leeds City Council, from the NHS, from the Department of Health, Higher Education Institutions and from business. I am particularly grateful to Tim Straughan for progressing this work and for the huge contribution he has made in preparing this final report.

I commend the recommendations of the Leeds Task and Finish Group to the Smart Cities Forum and I hope that our work will enable cities across the UK and the government to make rapid progress in this area.

Sir Alan Langlands  
Vice-Chancellor, University of Leeds
Preface

by Tom Riordan

Rethinking the way that technology can be used to improve health outcomes is an essential challenge for cities such as Leeds, as we look to address the changing demographics in our population and the reducing size and budget of the public sector.

In 2012, in our Commission on the Future of Local Government, we developed the concept of ‘civic enterprise’, and proposed that local government needed to become more enterprising, businesses more civic and citizens more engaged. This applies particularly to how we work together across the city to improve the lives of the most vulnerable, designing services with people rather than for them, through a whole city approach that brings together different organisations.

Developing a Smart City for health will be vital to the design and implementation of future care services, and I hope the recommendations of this report will begin a process of using technology better to deliver what is needed for Leeds citizens. The opportunities are considerable, as will be the challenges.

I would like to thank Sir Alan Langlands, Vice-Chancellor of the University of Leeds, for his efforts in the production of this report. I know he has provided a great deal of personal insight, expertise and energy to this process as the Chair of the Task and Finish Group, and has been supported by a very knowledgeable and gifted team.

Tom Riordan
Chief Executive, Leeds City Council
The UK has one of the largest semi-integrated healthcare systems in the world – a system that has been collecting and managing data for decades. These data tells us a lot about illness, but very little in comparative data terms about what makes people and neighbourhoods healthy, and what contributes to their wellbeing.

The technology now exists to make available targeted health, wellbeing and social care services directly to citizens through tablet computers and smart phones. The increasing availability and personalisation of health services, delivered through digital technology, is inevitable.

The challenge is to ensure that services are shaped by well-informed, digitally connected and engaged citizens and communities, and that those developing these services take proper account of the needs of citizens and communities.

We have structured this report to examine the topic of health and wellbeing in Smart Cities from the point of view of the citizen; neighbourhoods and communities; the city; and national government. We have considered the issues in terms of what the citizen will demand from their Smart City, what the community and city can supply and what Government should do to enable new ways of working.

Citizens are without question the biggest asset cities have. They must be at the heart of driving the change necessary to help deliver a radically new Smart approach to health and wellbeing, and to delivering the outcomes that people and cities need and want.

A citizen-driven approach to health and wellbeing must begin with individual citizens by gaining a greater understanding of their perspectives; what is important to them, how they want to live their lives and how their communities operate.

A mindset of understanding and acting on ‘what matters to you’ is the predominant approach Smart Cities need to adopt to use data and digital technology effectively and advance the health and wellbeing of citizens. This requires identifying the common ‘stress points’ in people’s lives that have the biggest impact on wellbeing. And cities must be sensitive to the needs of those sections of the community considered to be digitally excluded, to ensure they are not left behind.

Neighbourhoods and communities will pay an increasingly important role in Smart Cities as we aim to shift more health and social care out of hospitals and promote self-help, peer support models in settings closer to home.

Smart Neighbourhoods and Smart Communities could achieve a step change in health and wellbeing of their citizens. Data and digital technology could be used within existing social networks for community based learning to solve problems found in managing a range of health and social care issues. This learning could be facilitated by health and technology professionals and enable communities to act in more collaborative and reciprocal ways. This could lead to the recognition and reward for the contributions made by individual citizens to the wellbeing of their neighbourhood or community.
The scale of the challenges facing cities in supporting health care provision and fostering wellbeing is forcing them to rethink their strategies. The aim is to innovate in order to deliver more, and improve quality with fewer resources.

Meeting these challenges will require cities to be more joined-up by integrating service provision and delivery. This will be problematic for institutions that have traditionally developed responses in a siloed manner. Meeting these challenges will require a change in mindset and culture in institutions at the city level.

To start acting and behaving as a single integrated system for health and wellbeing Smart Cities need to provide an information sharing and integration platform using recognised standards, a Smart workforce, a Smart asset register and new Smart City governance and leadership roles.

The role of government will be to enable Smart Cities to deliver on the health and wellbeing agenda. To do this government must reconsider existing legislation with respect to data sharing and data protection. Getting the legislative framework right on this issue is critical in enabling cities to develop the low cost targeted services that will be required in the near future. Procurement regulations are a major barrier to the adoption of much needed disruptive innovation in Smart Health and more must be done to enable small and medium-sized enterprises (SME’s) in particular to enter the market. National and local government must strike the right balance in the devolution of powers, particularly in the context of statutory Health and Wellbeing Boards and interoperability standards for data platforms and services.

We are keen to ensure that the national recommendations from this report are fully considered by government and wider stakeholders. As part of this process we suggest that a National Smart Cities Forum for Health and Wellbeing is established for cities to work with government to expand on each of the national recommendations and develop an appropriate implementation plan.
Local Recommendations

Local Recommendation 1
Identification of ‘stress points’ and benefits

Overall our work has shown that most people have very little understanding of the concept of a Smart City and how Smart digital
technology can benefit them. To many people Smart City feels like a meaningless term, particularly in relation to health and wellbeing.

*It is therefore recommended that further work is undertaken by cities to understand the unique ‘stress points’ that their citizens experience in relation to their overall health and wellbeing. Cities should then consider how existing and emerging Smart City approaches could be adopted to address these issues.*

Local Recommendation 2
Public engagement on the benefits of sharing appropriate information

More work must done both locally and nationally to engage directly with citizens on the benefits and risks of sharing personal data. We need to learn the lessons of the national programme ‘care.data’, which demonstrated that the public have real concerns about privacy and confidentiality.

*It is recommended that cities should engage in a genuine dialogue with their citizens about the value and benefits of the appropriate sharing of health and care data, and the implications for consent and privacy.*

Local Recommendation 3
Community health and wellbeing problem solving

By being much closer to the needs and wants of citizens, Smart Neighbourhoods are in a much better position to solve local problems and supply more cost effective and innovative solutions for the bespoke and personalised needs of their citizens.

*It is therefore recommended that cities should establish responsive multi-disciplinary innovation partnerships to collaborate with communities to identify understand and resolve health and wellbeing problems. The partnerships should record, communicate and share their successes, which could then be replicated through city-wide facilitated health and wellbeing networks.*

Local Recommendation 4
Establishment of a Smart asset register

Much of a city's data and information assets are often unknown and uncoordinated. In short, cities need to ‘make every asset count’. By identifying and using these assets, cities can begin the process of the integration of service provision and begin to act like a Smart City.

*It is therefore recommended that cities develop a self-organising Smart City Assets Register (including people, projects, places, organisations and datasets) that is open for all to access and use. This will allow all relevant city resources to be identified and managed to begin the process of service integration.*

Local Recommendation 5
New Smart city governance structures and leadership roles

Most cities still tend to operate in silos based on sector and specialised organisations and roles. They do not take an integrated approach to the challenges and benefit of Smart based system wide approaches across a geographic area.

*It is recommended that cities accept the challenges and recognise the benefits and risks of connected and innovative digital technologies. Consequently, cities must explore the creation of new Smart City governance structures, roles and partnerships that span all sectors; in particular much closer working between health and social care is essential.*
National Recommendations

National Recommendation 1
Changes to data legislation
There is currently no standard consent wording used across government or generic legal gateway to allow appropriate data sharing and linkages between different government departments, health and social care bodies and statutory agencies. This has detrimental implications on both the efficiency and effectiveness of product/service development and delivery.

*It is therefore recommended that the government should urgently consider changes to legislation to enable appropriate data sharing and linkages between different government departments, health and social care bodies and statutory agencies. Any changes must strike the right balance between data sharing and the need for privacy and confidentiality, be based on more realistic and forward-looking, explicit consent models and result from pre-legislative engagement with the public on this issue.*

National Recommendation 2
Changes to procurement regulations
Small and medium-sized enterprises (SME’s) have an important role to play in the creation of disruptive and innovative healthcare solutions. Current regulations and existing frameworks make it very difficult for SME’s to engage and transact with the public sector, which is restricting the pace of service improvement and transformation.

*It is therefore recommended that the government change procurement regulations to make it easier for the private sector to do business with the NHS and other providers of care. A primary objective of any changes must be to enable SME’s, which are developing disruptive digital technologies and services in health and social care, to compete effectively in procurement processes.*

National Recommendation 3
Additional responsibilities for Health and Wellbeing Boards with respect to Smart Technology and Open Data standards
Health and Wellbeing Boards have a key leadership role to play in the creation of health and wellbeing in Smart Cities. These boards currently lack the powers and responsibilities to establish and implement the necessary local Smart design principles and standards necessary for a Smart City to operate effectively.

*It is therefore recommended that Government review the responsibilities of Health and Wellbeing Boards in the context of Smart Cities. This should consider the role of the Boards in relation to the implementation of care enabled by Smart digital technology, and emerging Open Data standards based approaches for record keeping and data sharing.*

National Recommendation 4
National Social Care Interoperability Data Standards
Whilst good progress is being made in the development of health data interoperability standards, social care data standards are a long way behind. This is a barrier and constraint to the full integration of health and social care, with huge efficiency and effectiveness implications for services targeted at individual citizens.

*It is therefore recommended that National Government in partnership with Local Government accelerate the development of social care data standards that will not only facilitate interoperability with health but also support the implementation of PAS 182:2014 - Smart City concept model – a guide to establishing a model for data interoperability.*
1. The challenge, opportunity and approach

Context

The UK has one of the largest integrated healthcare systems in the world – a system which has been collecting and managing data for decades. These data tell us a lot about illness, but very little in comparative data terms about what makes people and neighbourhoods healthy, and what contributes to their wellbeing.

The technology now exists to make available targeted health, wellbeing and social care services directly to citizens through tablet computers and smart phones. The increasing availability and personalisation of health services, delivered through digital technology, is inevitable.

The challenge is to ensure that services are shaped by well-informed, digitally connected and engaged citizens and communities and that those developing these services take proper account of the needs of citizens and communities.

This report does not attempt to describe in any great detail the digital technologies or data platforms required to fulfil the promise of Smart Cities, but instead to highlight the issue of ‘connectedness’:

- Connectedness between those who deliver services at the city level, so that traditional silos are broken down and citizens can receive higher quality services, in an integrated manner and at lower cost.
- Connectedness between city leaders and citizens which builds trust, so that through a process of genuine dialogue, citizens can shape, and where appropriate, play a role in delivering targeted services.
- Connectedness with those vulnerable citizens who are often viewed as digitally excluded, through support from family, friends, their neighbourhood and community.

Cities are complex systems and, for many of us, our health care needs are becoming similarly complex. Consequently, we need to approach health and wellbeing in Smart Cities in ways that embrace and manage these complexities, whilst also increasing the transparency and accountability of service delivery.

Technology itself is not the solution but its use can lead to the outcomes we wish to see, such as: better prevention of illness, personalised health and social care, reduced health inequalities and better living environments. The manner in which our data are managed and technology is used should build trust between citizens and their city, and not through a rigid arrangement of silos that so often characterise our current system.

In preparing this report, our engagement with individual citizens has emphasised that the concept of the Smart City is still fundamentally an abstract one. The language used is too often technocratic and inadvertently disconnects citizens from the debate.
Why Smart?

There are many definitions of a Smart City, but for the purpose of this report, we will define a Smart City for health and wellbeing as one that takes an integrated approach to the use of digital technologies to increase the connectedness of people to the information and city functions that improve health and wellbeing, reduce inequalities and support a higher quality of life for all its citizens.

There are compelling reasons for cities to adopt Smart technology and practices in the context of health and wellbeing, namely:

1. the need to improve the health and wellbeing outcomes of citizens
2. increase citizen and community participation in shaping and delivering health and wellbeing services
3. deliver services at lower cost, but of increasing quality, at a time of continued increasing demand
4. personalise and target healthcare provision in ways that increase self-care, the prevention of illness, and reduce health inequalities across cities
5. increase the integration of service provision at the city level that address the wider factors that affect health and wellbeing of citizens (e.g. planning, transport, housing, recreation etc).

Tackling inequalities

“In spite of the innovations and progress in healthcare that have taken place since the founding of the NHS, health inequalities have widened as society itself has become more unequal in terms of income differentials and opportunities. Successful action to reduce inequalities and to promote health can only be taken with the active participation of the communities and individuals that have been excluded from the benefits available to more affluent members of society.”

Nuffield Trust
The challenge

The pressures facing our cities that impact on health and wellbeing are well documented.

Firstly, as detailed in the 2012 white paper on the reform of the care and support system, *Caring for our Future*, the proportion of older people in our population will continue to grow. The consequent increasing demand on health and social care services, coupled with additional pressures on carers, means we need a radical rethink about how care services are delivered.

Secondly, more of us are developing long-term health conditions. The Department of Health estimates there are 15 million people in England with these conditions and their care accounts for 70 per cent of the health budget. The number of people suffering from long-term conditions is expected to increase to around 18 million in the next 20 years and currently accounts for:

- 50% of all GP appointments
- 64% of outpatient appointments
- 70% of all inpatient bed days.

By 2018, service provision for long-term conditions may require around £5 billion of additional NHS expenditure.

If we do nothing, rising demand will result in a continued increase in spending on health and social care. Within the national £30 billion funding challenge identified in the *NHS 5 Year Forward View*, the Leeds health and social care economy has a £500 million financial pressure to address by 2020, which accounts for a 25 per cent real terms reduction. Projected budget cuts will also see local authorities like Leeds City Council become 40 per cent smaller over a similar period.

In addition, there is a limit to the number of skilled professionals available to the health and social care sector. In the NHS alone there are over 1,000 different employers, employing 1.3 million people in over 300 different types of jobs. Demand on the care workforce is constantly changing, and the time it takes to train health and social care professionals means that it is difficult to respond quickly to changing needs.

Most significantly, the expectations of citizens has risen in recent years, largely as a result of:

- a number of serious service failings in NHS and social care – e.g. Mid Staffordshire NHS Foundation Trust, Winterbourne View
- action to increase public involvement in decision-making
- the use of ‘choice’ as the means by which individuals can become ‘empowered’
- user, consumer and community organisations providing a challenge to professional and expert authority and such groups are increasingly playing a part in health decision-making at different levels
- widening access to information, previously dependent on professional gatekeepers, which has enabled individuals and groups to pose questions to health professionals, rather than always being supplicants for information.

These challenges have rightly led to a focus on measuring the effectiveness, safety and user experience of healthcare.

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1 Source: *Department of Health Long Term Conditions Compendium, 2012*
The opportunity

Contributing to improvements in health and wellbeing is now emerging as the next big opportunity for the digital technology sector.

The growth of health related digital technology is already apparent – for example, with the release of new smartphone health applications every week. Developments such as high performance computing, and wearable technology, Open Data and the ‘Internet of Things’ (IoT) will serve to push technical innovation in health and wellbeing to even higher levels. For example, wearable technology and the IoT have the potential to allow clinicians to remotely monitor the condition of patients in real time across wireless networks and alert them to any significant changes. It is highly likely that within ten years, mobile digital technology will have completely transformed medical provision across the world, enabling us to take much greater responsibility for our own health.

Similarly, technological developments have opened up a new world of possibilities for cities. Connected digital technology and the increasing use of Open Data promises the potential of greater integration of city services than ever before. As Mike Bracken, the Head of the UK Government Digital Service has identified:

“The internet has changed everything. Digital is the technological enabler of this century. And, in any sector you care to name, it’s been the lifeblood of organisations that have embraced it and a death sentence for those that haven’t”

Mike Bracken, Head of the UK Government Digital Service

This is as true in the area of health and wellbeing as it is for any services a city currently delivers to its citizens. Citizens are better equipped to engage with innovations in Smart technology for health and wellbeing. For example, according to recent research by Ipsos-Mori 71 per cent of the UK adult population now have a smartphone and 29 per cent own a tablet computer.

Combined with the lower relative cost of hardware and applications, this provides huge scope for disruption and transformation in the provision of services in health and wellbeing.

The development of products and services in the Open – where anyone can freely access, use, modify, and share ideas – the rapid growth of the publication and use of Open Data and the application of new technologies across our cities will require changes in how we work. For example, we will have to find new ways of operating across current city services; new ways of connecting people to the services they need and new ways of procuring those services.
Organising principles

The organising principles we have identified as being important in the development of a Smart City for health and wellbeing have been informed by the recent Independent Service Transformation Challenge Panel report. These principles have led our approach to this issue. They have also been used to test against the recommendations made in this report, to ensure that the work is consistent and benefits all our stakeholders in government, cities and communities:

1. Citizen driven
   enabling more bottom-up, citizen-led innovation and change rather than top-down, city-imposed practice; and greater control over our own health and wellbeing

2. Citizen trusted
   so that people have confidence that their personal data and privacy are being properly managed in accordance with their specific requirements, as well as their wider best interests

3. Collaborative and reciprocal
   valuing the opportunities for everyone to contribute to the wellbeing of their communities, as well as making use of services provided by others

4. Reduce inequalities
   targeting the most needy and vulnerable in our neighbourhoods and communities

5. Making every asset count
   valuing data and people as Smart City assets, and not liabilities

6. Transparent, inclusive and open
   should be default settings for Smart Cities

7. Integrated and interoperable (connectness)
   removing traditional service silos through joined up and connected systems and services

8. Focused on wellbeing and prevention
   not just curing illness, but including mechanisms to enable effective behaviour change through appropriate use of payments, rewards and incentives to public bodies and citizens.
The approach

We have considered how our organising principles can be applied to individuals, neighbourhoods, communities and cities using the factors such as lifestyle, local economy and environment identified in the Health Map (Barton and Grant 2006)\(^2\). The map was developed for the UK Public Health Association and has been used by the Local Government Association. This health map offers cities an integrated approach to health and wellbeing which recognises the social, economic and environmental conditions that influence the health and wellbeing of individuals and communities. Of course, the health of individuals is often also determined by age, gender and genetic factors.

The Health Map

![Health Map Diagram](Barton and Grant 2006)

We have, therefore, structured this report to examine the topic of health and wellbeing in Smart Cities from the point of view of the citizen; neighbourhoods and communities; the city; and national government. We have considered the issues in terms of what the citizen will demand from their Smart City, what the community and city can supply and what Government should do to enable new ways of working.

We have used the PAS 181:2014 Smart Cities Framework as a guide to establishing strategies for Smart Cities and communities, and have not duplicated any of the recommendations made in that document.

In addition to our work with the Leeds Task and Finish Group, we have held a number of workshops, shared drafts of our work online and had numerous meetings with different local, national and international experts and stakeholders to supplement our desktop research and to test out our findings. We also participated in the Smart City Conference in Barcelona in November 2014, which was attended by over 400 cities.
Citizens are, without question, the biggest asset that cities have. They must be at the heart of driving a radically new Smart approach to health and wellbeing.

What does ‘good’ look like?

For citizens, a Smart City is a place where:

- all citizens feel digitally connected to city systems, and where service provision is integrated across all city functions
- city services strike the right balance between wellbeing, prevention of illness and treatment
- life is added to years, not years to life – people live longer, have a continued high quality of life, and live independently in their own homes for longer
- citizens can interact digitally with the healthcare system and other services that impact on their wellbeing, have more choice, receive more targeted services, are empowered to take responsibility for their own health and consequently reducing inequalities
- connected citizens can influence decision making at the city level through genuine dialogue, which increases transparency and the accountability of the provision of health and wellbeing related services.

A fundamental change in the relationship between the citizen and the city is required if we are to realise the value and contribution citizens can make to improving health and wellbeing within a Smart City.

Our work has concluded that this relationship needs to be based on a partnership of two main organising principles:

- Citizen driven – giving people the information and tools to enable more bottom-up user-led innovation and change
- Citizen trusted – so that people have confidence that their personal data and privacy is being properly managed in accordance with their specific requirements as well as their wider best interests.

We now consider each of these principles in turn.
Citizen driven

A citizen-driven approach to health and wellbeing must begin with the individual – with gaining a greater understanding of his or her perspective; what is important to him or her, how he or she wants to live his or her life and how his or her communities operate.

“The goal is to change the clinical paradigm from ‘what’s the matter’ to ‘what matters to you.’”

Transforming Patient Engagement, Susan Edgman-Levitan – Executive Director, Massachusetts General Hospital

This mindset of understanding and acting on ‘what matters to you’ is the predominant approach Smart Cities need to adopt in applying data and digital technology to advance the health and wellbeing of citizens.

“Local leaders must work in partnership with people to reshape services, focusing on delivering the outcomes that matter to people as well as greater sustainability. They must also use the experience and insight of community and voluntary sector groups that support people’s health and wellbeing.”

The Kings Fund

This mindset also requires citizens to shift from being passive recipients of health and wellbeing services to active participants in these services. Advances in the use of data and digital technology provide a fantastic opportunity to enable self-managed care by individuals supported by their family, friends and communities.

“We must value support for self-managed care just as much as we value care managed by health and care professionals.”

The 2015 Challenge Manifesto: a time for action: NHS Confederation

A shift to prioritise wellbeing and prevention also aligns with the recent NHS 5 Year Forward View, government’s personalisation agenda and a drive to encourage self-management and self-care.

Many national and local organisations have attempted to identify what citizens need, but rather less has been done to identify what people really want Smart technology and services to do for them, particularly in respect of the wider factors identified in the Health Map that determine the quality of their health.

We know that citizens want to change the way they interact with the health and care system. This is demonstrated by national data from UK Trade and Investment that shows:

- 50% of people already use the internet to self-diagnose.
- 70% of the UK population already go online for health information.
- 80% of patients would like to view medical records online.
- 90% of people would like to use a digital service to ask a clinician a question.
However, our engagement with citizens in the process of developing this report has shown that there is currently very little understanding of the concept of a Smart City and how Smart digital technology can benefit them. To many people Smart City feels like a meaningless term, particularly in relation to health and wellbeing.

With the growth of the internet and digital technology, the power of consumers has increased. Improved access to information and the ability to share customer experiences easily and widely by social media, has had a major effect on many consumer driven sectors such as travel (e.g. Tripadvisor) and retail. The health and care sectors are likely to experience a similar increase in the ‘power of consumers’ in the coming years.

Inevitably, data and digital technology will be increasingly used by cities and other public and private service providers in areas such as health and social care. Therefore, there is an urgent need for Government and cities to begin a dialogue with citizens about the concept of Smart Cities, and their risks and benefits. This is necessary to ensure that Smart City projects are implemented in a consensual manner with the active participation of citizens in the use of their data and the targeting of services.

Technology should be introduced by cities in a manner that is relevant to citizens and with their consent. Therefore it is essential that cities understand what their citizens need and what they want from their Smart City. This requires a greater understanding of what people enjoy about city living, as well as identifying the common ‘stress points’ in people’s lives – those things that have the biggest impact on their wellbeing, such as:

- traffic congestion and urban air quality
- poverty and debt
- employment and working hours
- affordable energy and food
- social isolation
- securing appointments and access to essential services
- living conditions and the built environment
- access to parks and green space.

Smart Cities must actively involve citizens in service design and the design process to help drive integration across organisational boundaries and facilitate realignment of responsibilities within and between organisations. And cities must be sensitive to the needs of those sections of the community considered to be digitally excluded, to ensure they are not left behind.

**Local Recommendation 1**

**Identification of ‘stress points’ and benefits**

Overall our work has shown that most people have very little understanding of the concept of a Smart City and how Smart digital technology can benefit them. To many people Smart City feels like a meaningless term, particularly in relation to health and wellbeing.

*It is therefore recommended that further work is undertaken by cities to understand the unique ‘stress points’ that their citizens experience in relation to their overall health and wellbeing. Cities should then consider how existing and emerging Smart City approaches could be adopted to address these issues.*
Case Study: NHS Citizen

NHS England wants citizens to be actively involved: to help solve long-term problems, deal with ongoing issues, and take part in its decision-making.

NHS Citizen is a project that aims to answer a simple question: what is the best way for NHS England to take into account the views of all the public when it makes decisions?

Since October 2013 NHS Citizen Design Workshops have taken place across the country to develop the structure, function and governance of the NHS Citizen system. These events have brought together people from across the health and care sectors, external experts on governance, transparency, open data and public engagement to develop ways of extending participation beyond patient and expert groups into the wider community. Events are open to all, web-streamed and all materials are shared on the project website.

The current vision and system

NHS Citizen will be a system that listens to citizens through both online and offline channels, curating these conversations and exploring evidence. There are four elements of NHS Citizen:

- **The Discovery space** where information and opinions are gathered through social media, public comment, online and offline tools. This gives a picture of the “state of the conversation” on health, allowing issues of public concern to bubble up.

- **The Gather space** that will give people opportunities to work together around particular issues, either those that NHS bodies want public opinion on, or those that arise from issues in the Discovery space. These can be issues concerning experiences of patients, users or carers, or those that highlight more general challenges (e.g. how services are commissioned). In this space, a participant “raises a flag,” seeking others who are interested in taking action on that issue.

- **The Assembly meeting** will happen twice a year to consider the most important issues in an open and deliberative format, and hold the Board of NHS England to account. The Assembly Meeting will be able to commission Citizen Panels to consider particularly challenging and controversial issues as part of its way of working.

- **Relationships and culture change** – this will be a conversation about how we change culture in the NHS in England.

NHS Citizen is a work in progress, but it will eventually be a participation infrastructure for NHS England, where participants can become citizens of the NHS, not just consumers of its services. Through NHS Citizen, people will be able to hold the Board of NHS England to account, set the agenda for discussions, and find others with shared interests - all in an open, transparent and public environment.
Citizen trusted

Confidentiality has always been regarded as a central principle of health and social care provision.

Citizens have both a legal and moral right to assume that the information they disclose will not be shared without their consent. Where consent is given, any information shared should be limited in scope and restricted to people with relevant reasons for holding it. However, the rate of technological change is fast outpacing the policies, processes and systems for managing personal information. Most citizens have very little information or knowledge about what is, or is not, done with their personal health and care data, at either a local or national level.

One of the major issues identified nationally in the National Information Board Report Personalised Health and Care 2020, is building and sustaining public trust. The maintenance of privacy and confidentiality are fundamental to this.

More work must be done both locally and nationally to engage directly with citizens regarding the benefits and risks of sharing personal data. We need to learn the lessons of the national programme ‘care.data’, which demonstrated that the public have real concerns about privacy and confidentiality.

Appropriate data sharing, with proper consent, is fundamental to the operation of Smart Cities. Losing public trust and confidence in this area is probably the biggest risk to achieving Smart health and wellbeing.

We therefore recommend that all cities enter into a local conversation with citizens about their health related data, how data are used and the benefits of sharing appropriate information.

We suggest this engagement be led locally by a consortium that could potentially include representatives of national bodies such as NHS England, the Health and Social Care Information Centre (HSCIC), third sector representatives and Universities.

Local Recommendation 2

Public engagement on the benefits of sharing appropriate information

More work must be done both locally and nationally to engage directly with citizens on the benefits and risks of sharing personal data. We need to learn the lessons of the national programme ‘care.data’, which demonstrated that the public have real concerns about privacy and confidentiality.

It is recommended that cities should engage in a genuine dialogue with their citizens about the value and benefits of the appropriate sharing of health and care data, and the implications for consent and privacy.
3. Smart Neighbourhoods and Communities

Smart Cities are made up of Smart Neighbourhoods – people sharing a common location - and Smart Communities – people sharing common interests.

Neighbourhoods and communities will play an increasingly important role in Smart Cities as we aim to shift more health and social care closer to patients and promote self-help and peer support models – mutual support by friends and acquaintances dealing with similar health problems in settings closer to home.

What does ‘good’ look like?

In a Smart City, Smart Neighbourhoods and Smart Communities will need to use data and digital technology to:

- recognise the value of the social capital – the social networks and shared values - that exist in neighbourhoods and communities, and the potential of these networks for community learning and problem solving
- become more collaborative and reciprocal by connecting neighbourhoods and communities through ‘facilitative community networks’ and the formal care system
- adopt models and systems of care that recognise and reward the contributions made by individual citizens to neighbourhood and community health and wellbeing, be it paid or unpaid.

Community learning and problem solving

Just as Smart Cities value their citizens, they must also realise the full potential of the knowledge within their communities, and to enable communities to address their needs and problems with the assistance of data and digital technology. Innovative models of problem solving are required that will enable cities, the Third Sector and Higher Education Institutions to collaborate with communities on data intensive projects.

Cities must work with neighbourhoods and communities to draw on the experience of people who have already solved the problems cities want to address. This approach focuses on sharing, discovering and acting on what already exists and what works. The solutions produced by this approach are often low cost and more easily replicated in other communities. Consequently, they are more likely to be acceptable than a high technology innovation arising elsewhere and being forced upon individuals or communities. The approach has already been successfully demonstrated in the care sector in the UK.

This also means that communities may no longer be bounded by geography, but can exist through the internet as ‘virtual communities of common interest’, where problem solving and learning can take place across community, city and even national boundaries.

Local Recommendation 3
Community health and wellbeing problem solving

By being much closer to the needs and wants of citizens, Smart Neighbourhoods are in a much better position to solve local problems and supply more cost effective and innovative solutions for the bespoke and personalised needs of their citizens.

It is therefore recommended that cities should establish responsive multi-disciplinary innovation partnerships to collaborate with communities to identify understand and resolve issues in health and wellbeing. The partnerships should record, communicate and share of their successes, which could then be replicated through city wide facilitated health and wellbeing networks.
Report of Leeds Task and Finish Group for the UK Smart Cities Forum
March 2015
Collaborations such as these can become a productive platform for research in data analytics, social science, behaviour change, innovation, and health informatics and will generate useful research and case studies which demonstrate improved outcomes in health and wellbeing.

Case Study: LeedsACTS!

Community learning could be facilitated by an organisation such as ACTS (Academic Collaboration with the Third Sector). LeedsACTS! is a partnership programme that aims to drive collaboration between the Third Sector and higher education institutions to support health, wellbeing and other social issues. This five year project is promoting and supporting closer relationships between academics, students and charities, voluntary organisations and social enterprises with the aim of bringing far reaching benefits to both the communities across Leeds and to the Higher Education sector in the city.

LeedsACTS! represents a step change in collaboration between the Third Sector and the higher education sector in Leeds. It is:

- a forum to build awareness of third sector priorities and higher education strengths to help meet them
- a bridge to bring third sector leaders and academics together and build working relationships
- a partnership to develop a shared five year programme of work to address priorities.

LeedsACTS! aims to make a real difference to communities in Leeds, Third Sector organisations and the city’s universities – all of whom face their own diverse challenges.

Third Sector organisations in Leeds are often commissioned to deliver contracts through competitive tender processes. These require extensive monitoring and evaluation of the impact of the services they deliver. To succeed, Third Sector organisations must develop innovative strategies, learn to pool resources, and learn to measure their own effectiveness.

LeedsACTS! enables Third Sector organisations to more systematically tap into the knowledge resources and academic capability of the city’s three universities. The universities can add value by making available expertise that Third Sector organisations may not have ‘in house.’ The linkages made can help charities, voluntary groups, and social enterprises develop more capability to measure the impact of their activities, enhance their effectiveness, and secure new resources.

For example, Carers Leeds is an organisation that aims to support all unpaid carers in the city by providing information, advice, social and emotional support.

By getting involved with LeedsACTS!, Carers Leeds has enjoyed the sharing of knowledge and the bringing together of our front line work within our carer communities, with academics and students at the University. This has helped us develop our service for carers by turning ideas into real opportunities and making academic resources more available to us.

I love throwing ideas around, thinking innovatively of new solutions, and working with LeedsACTS! has helped bring to life our work for our colleagues at the University of Leeds, making it real… whilst they are helping our organisation look ‘outside the box’ and challenge us a bit more about what we do and what we could do. I don’t mind that one bit… so far it has been a Win-Win!”

Val Hewison, CEO, Carers Leeds
More connected - facilitative community networks

The development of facilitative community networks allows citizens access to ‘someone like me’ – to teach each other how to live with diseases and help self-manage long-term conditions.

As these networks continue to develop there is great potential for some aspects of the formal care system (particularly General Practice and General Hospitals) to become much more dispersed and connected within communities. For example, by working with neighbourhood networks to pilot smart tech to help reduce social isolation and self-manage long term conditions at home.

Two community case studies as examples of what is happening in Leeds

Most cities, including Leeds, already have a very strong and vibrant Third Sector. However, it could be better supported, resourced, technologically-enabled and connected to increase the value and potential of Third Sector organisations to shape and deliver Smart services to communities.

Case Study: Neighbourhood Network Schemes

Neighbourhood Network Schemes are community based, locally led organisations that:

- enable older people to live independently
- participate within their communities by providing services that reduce social isolation
- provide opportunities for volunteering
- act as a “gateway” to advice/information/services that promote health and wellbeing and improve the quality of life of individual citizens.

Some facts:

- 32 Neighbourhood Networks are currently support over 21,900 older people in Leeds
- The number of volunteers doing this fantastic work has risen by over 200 in last 12 months, and now stands at 1,910
- The Networks have prevented 1,450 older people from going into hospital and supported 617 following their discharge from hospital
- 26 safeguarding referrals have been made to Leeds Safeguarding Units
- As a measure of how the Networks are appreciated by users, families and friends, 2,427 compliments were received over the past 12 months, with just 4 complaints.
Case Study: mHealth Habitat

The mHealth Habitat is a programme where people who access health services, NHS professionals and local developers come together to co-design digital solutions that contribute to better care. This could be developing an app for smartphones or tablets, introducing an app which someone else has created, designing a website, using social media, or finding some other way of using mobile technology for health to enhance the experience of people accessing a particular service.

The programme aims to create an environment for mobile health to flourish across mental health, learning disability and community services in the city of Leeds. It has a distinct focus on mobile and web applications which support self-monitoring, self-management and online peer support as well as online therapeutic interventions.

The mHealth Habitat operating model has four elements:

- **Catalyse** - by supporting clinical services with ideas, problems or hunches they want to investigate if digital can be part of the solution. This space involves discovery days, rapid prototyping and activities that bring people accessing services, clinicians, designers and developers together to share learning, explore and create.

- **Incubate** - An incubation space in which projects are defined and prototypes developed using agile project management methodology. This space involves market research, business cases and grant applications, contracting with suppliers, and managing the end-to-end app development process including various options from licencing through to build.

- **Adopt** - Supporting adoption of existing products in the market or products that have been developed in the Incubate space. This space involves adoption, deployment and iteration of mobile apps and includes evaluation, research and development.

- **Deploy** - Ensuring the sustainability and alignment of mHealth with organisational and city strategic priorities. This space involves supporting city leaders to embed digital within transformation programmes and strategies. It entails cross-organisational bids to bring resources into the city that support mHealth innovation. It involves influencing national policy and ensuring mHealth in Leeds is in a position to influence nationally and internationally.
4. Smart Cities

The scale of the challenges facing cities is forcing them to rethink their health and wellbeing strategies. Most are aiming to innovate in order to deliver more, and improve quality with fewer resources, particularly by:

- outsourcing services using outcomes based contracts
- service integration, both back office and increasingly front line services
- delivering services online
- releasing data to enable new services to develop and citizens to make informed decisions, for example, providing real-time information on traffic and air quality to assist citizens in planning journeys
- reducing demand on services by, for example, promoting independent living to allow older people to live much longer in their own communities with less institutional support.

Meeting these challenges will require cities to be more joined up by integrating service provision and delivery in a more enterprising manner. This will be problematic for institutions that have traditionally developed responses in a siloed manner. To meet these challenges will require a change in mindset and culture in institutions at the city level, as described by the Commission on the Future of Local Government.

Smart Cities need to start behaving as a single integrated system and organise and apply all of their assets to address both the causes and effects related to health and wellbeing.

What does ‘good’ look like?

Smart Cities need:

- an information sharing and integration platform to provide a common infrastructure, using recognised information standards
- a Smart workforce, with the necessary data and information technology skills
- a Smart asset register, detailing all of the relevant resources at a city’s disposal – making every asset count
- new Smart City governance and leadership roles.
A shared platform for health and wellbeing

Smart Cities need to integrate their assets, resources and services to deliver improved outcomes in health and wellbeing. The model under development in Leeds is represented here.

Essentially this model connects professionally collected and held data – Hospital, GP, Social Care etc – with citizen-generated and held data, and Open Data using a common infrastructure.
Case Study: The Leeds Care Record

The Leeds Care Record comprises:

- **Health and Social Care Portals** – portal technologies that will be used to present information and services around the needs of practitioners from across the partnerships that will include, but not exclusively, local government, NHS, voluntary sector and Blue Light services.

- **Leeds Health and Social Care Systems** – the legacy systems of records that process day to day transactions and produce accurate and timely recorded information.

- **The Leeds Care Record Platform** – a suite of open source practitioner tools with underpinning technologies designed to be interoperable with professional clinical and social care systems. This is capable of supporting practitioners from all disciplines to provide more efficient and effective health and social care, interventions, support and services to citizens.

Smart workforce - people and skills

With the availability of enough people with the appropriate skills there is potential for data and digital technology to enable behavioural change. This holds significant opportunities for the health and social care sectors, and in improving wellbeing.

We are increasingly recording more of our daily activities and behaviours as digital data. New digital technologies can now provide product developers and service providers with feedback loops from users, where the behaviour of the users informs the refinement of the product or service, which then produces further changes in the behaviour of the user.

However the limiting factor for Smart Cities is not the technology or the processes; it is the ability of people to translate data and information into new forms of value. This will only be possible if the necessary data science skills are widely available. Cities therefore need to ensure their schools, Higher Education Institutions and employers are providing a workforce with the necessary skills. In addition the health and social care sectors will be in competition with other industries for people these skills so will require a skills strategy to ensure the sectors have the skilled people they need.
Making every asset count

Cities must recognise that the value of the information they hold is far greater than the sum of all the parts.

Smart City Assets may include:

- **Smart Data** - discovering and managing city data as assets, being mindful of the need to manage privacy and confidentiality
- **Smart People** - ensuring cities have the right capacity and capabilities
- **Smart Places/Smart Urban Spaces** - ensuring we have the necessary environments for enabling externally-driven, stakeholder-led innovation
- **Smart Institutions** - creating new city-wide organisations that create value by spanning traditional vertical silos
- **Smart Communities** - documenting voluntary, third sector, community interest companies, community groups that have a massive role to play in the informal care and wellbeing agenda
- **Smart Projects** - to develop concepts and innovative ideas into practical co-produced deployable solutions.

In Leeds, we have started to create a Smart Asset Register as an Open Data project based in the Leeds Node of the Open Data Institute (ODI). This will be done as a public-private partnership and interest has been shown to extend it to cover the whole of Leeds City Region.

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**Local Recommendation 4**

**Establishment of a Smart asset register**

Much of a city’s data and information assets are often unknown and uncoordinated. In short, cities need to ‘make every asset count’. By identifying and using these assets, cities can begin the process of the integration of service provision and begin to act like a Smart City.

*It is therefore recommended that cities develop a self-organising Smart City Assets Register (including people, projects, places, organisations and datasets) that is open for all to access and use. This will allow all relevant city resources to be identified and managed to begin the process of service integration.*
Transparent, inclusive and open governance structures and leadership roles

To realise the full potential of a Smart City, we need to consider the requirement for governance structures that are transparent, inclusive, and open and focused on the needs of citizens – not the needs of the city institutions themselves.

These new governance structures and roles must learn quickly, particularly from their own mistakes (‘fail fast-learn quickly’), which will lead to greater flexibility and resilience. They must align their interests with their users and the communities they serve. And their success will be measured on their outcomes.

We also need to step back and consider what a city is and what it does in an integrated way to support the health and wellbeing of its citizens.

The issues that cities face do not respect geographical or organisational boundaries, so city health and social care leaders must team up with other institutions that have a stake in the city and its future.

Organisations such as leading universities, healthcare institutions and philanthropic organisations are now partnering to address issues in the development of Smart Cities. And at the city level, we have vast collections of data available about all aspects of city life. This makes it possible for civic leaders to make better decisions. However, currently, there is no existing governance structure that can ensure these data – our data – can be used openly, transparently and responsibly to enable the development and delivery of targeted services to citizens.

“Working across organisational boundaries and in partnership with other organisations in the interests of patients, citizens, local communities and the wider population.”

The NHS Confederation 2015 Challenge Manifesto

We need to step back and consider what a city is and does in a holistic way to support the health and wellbeing of its citizens.
We therefore have concluded that there is a need for all cities to consider the following possible range of new ventures, collaborations and citywide governance structures for example:

- Digital Health Accelerators or Health Enterprise Accelerators
- Digital Health Institutes
- Academic Health Science Partnerships
- Medical Bioinformatics, Biosensing, Robotics Centres
- Data Institutes
- Shared Health and Social Care Intelligence Hubs
- Data Charities and Mutuals
- Health Innovation Social Enterprises
- eHealth Interoperability and Testing Labs

Historically, cities have defined their leadership roles within the parameters of politics and traditional public services. However, the most innovative civic leaders see their cities as businesses in their own right and have created citywide roles to achieve particular business or strategic aims. For example, the London Health Commission has recently recommended the creation of a citywide Commissioner role to encourage closer working between local authorities, clinical commissioning groups, Public Health England and NHS England and also oversee public health recommendations.

Examples of leadership roles that all Smart Cities should consider include:

- City Data Guardian
- City Chief Information Officer
- City Chief Data Officer
- City Chief Technology Officer
- City CCIO (Chief Clinical Information Officer)
- City Chief (Health and Wellbeing) Commissioner
- City Innovation Champions
- City Curators

Local Recommendation 5

New Smart city governance structures and leadership roles

Most cities still tend to operate in silos based on sector and specialised organisations and roles. They do not take an integrated approach to the challenges and benefit of Smart based system wide approaches across a geographic area.

It is recommended that cities accept the challenges and recognise the benefits and risks of connected and innovative digital technologies. Consequently, cities must explore the creation of new Smart City governance structures and roles that span all sectors, but including at least health and social care.
What is happening in Leeds?

Leeds has some excellent examples of businesses and organisations working in data management and analysis in the health, retail and financial technology sectors. The city is now building an infrastructure to enable the city to take a leading role in the new data revolution as a 'Data City'.

Using our city as a platform, we will solve our problems and create opportunities using data, turning these solutions and opportunities into products and services for others.

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Case Study: Leeds Data Mill

Leeds Data Mill is owned and managed by Leeds City Council as a Civic Enterprise in partnership with a Leeds-based digital content company. The aim of the data mill is to enable people and organisations to explore the different complex relationships between the city’s services and businesses, by collecting Open Data from multiple sources in a single website, offering a greater insight into the workings of the city than ever before. It is the Open Data Platform for Leeds and can be exploited through Open Application Programming Interfaces (APIs) produced by citizens, business and civic enterprise to deliver new value for the city including in health and social care.

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Case Study: Open Data Institute

Around the world, governments, businesses and communities are drawing on data and digital technologies to help respond to the challenges that surround us.

Open Data – the idea that certain data should be made freely available is a catalyst for innovation, new business opportunities and the creation of shared social and environmental value. Its role in the health and wellbeing of our cities and neighbourhoods is only just beginning to be explored. It has the potential to be transformational in its use and in fostering open innovation – the free exchange of ideas and knowledge between organisations to develop new products and services.

The Leeds Node of the ODI has recently been established as a physical innovation space, a “Civic Lab” and a project delivery vehicle. It brings together the ‘open data community’ locally, nationally and internationally to create shared value. For example, ODI Leeds is working with the ODI node in Chicago to explore use of common open APIs in health.
Case Study: Our Data Mutual

Our Data Mutual is an initiative of business and other organisations in Leeds City Region to form a mutual society for the management, monetisation, control, protection and ‘use for good’ of the data of its members. Members will be able to access a tool that lets them define how comfortable they are with the trading of their data - and with what types of organisation.

Business model
Our Data Mutual would like to broker deals with organisations so that members of the mutual can get value from their data. Our Data Mutual will hold these organisations to a code of practice to make sure members data is used responsibly according to their preferences.

The financial service sector gives an example of how Our Data Mutual could work. Mortgage lenders spend vast sums trying to sell mortgages at times when potential customers are already tied into multi-year deals. By sharing member’s data Our Data Mutual can let mortgage lenders know which members are ‘in market’. Then, at the appropriate time, Our Data Mutual can let mortgage lenders know that, for a limited period, certain members would like to receive offers from mortgage lenders with products suitable for member’s circumstances.

Currently a mortgage lender would pay around £150 to an intermediary for this information. Our Data Mutual proposes to take that money and use it for their benefit instead.

Data for good
Every day we leave a trail of data behind us; for example, data from posts on social networks, browser data from visiting websites and debit card data from the weekly shop. And the list grows daily. Currently each individual part of this data exists somewhere apart from the individuals who created it and controlled knowingly or unknowingly by a private or public organisation. But this data contains information that has the potential to benefit society. For example, it should be possible to tell to what extent a person is at risk of developing Type 2 diabetes from shopping data at their supermarket, or analyse Twitter data to track the spread of flu outbreaks.

Our Data Mutual will seek to actively support this work and influence research to focus on issues of concern to its members.
5. Smart Government

The global digital health and care market is expanding rapidly and revenue generated by Mobile Health (mHealth) applications is expected to reach £13.7 billion by 2017. The UK government has identified e-health (Smart Health) as a major growth area for the economy, and Smart Cities clearly have a fundamental role in this.

If we get the ‘enablers’ right, the UK has the opportunity to lead the way on this issue through a combination of world class data, connected people and the establishment of integrated city services.

What does ‘good’ look like?

The Department of Health, NHS England and other national bodies have established a comprehensive agenda to deliver radical transformation in health and social care in the following areas, to:

- enable people to make the right health and care choices
- give care professionals and carers access to all the data, information and knowledge they need
- make the quality of care transparent
- build and sustain public trust
- bring forward life-saving treatments and support innovation and growth
- support care professionals to make the best use of data and technology
- assure best value for money.

Much work is underway nationally to integrate health and social care services. However, as we increasingly move towards a wellbeing and prevention agenda the focus will shift more to consider the wider factors that affect our health. This will require a more integrated approach from all the services a city oversees e.g. housing, transport, energy, education etc.

More therefore needs to be done, for example as Belfast has through the wider planning system, to assist cities to join up and integrate this wider service provision and delivery to enable improvements in health and wellbeing. This has been the subject of recent guidance on planning for Smart Cities by the British Standards Institute.

We have concluded that whilst these actions are necessary, they may not be sufficient to enable Smart Cities to tackle the wellbeing agenda and focus on the wider determinants of health as illustrated in the ‘Barton and Grant Health Map’ shown in Section 1.

This section focuses on the main perceived process barriers to implement Smart change. In particular we have focused on certain ‘enabler’ issues that can only be addressed by cross-government and cross-stakeholder working.
What does Government need to enable?

The areas we have identified as critical to enable and accelerate the development of Smart Cities in a health and wellbeing context are:

- **Legislative issues** – in particular we have considered this in relation to data sharing and data protection. The consensus is that legislation in this area has not kept pace with the rapidly changing technological environment and the sheer volume of data now being created and flowing across the planet. There is obviously a balance to be struck between privacy and appropriate data sharing.

- **Commercial issues** – we have identified a number of commercial issues and procurement regulations in particular as a major barrier to the adoption of much needed disruptive innovation.

- **Devolution issues** – getting the right balance of local and national powers which we have considered particularly in the context of statutory Health and Wellbeing Boards.

- **Data and interoperability standards** – while good progress had been made in health there is still much to do at both national and local levels particularly in respect to social care.
Legislative Issues

As stated earlier in the report, confidentiality has always been regarded as a founding principle of health and social care. Professional codes of ethics provide guidance and set out the basic principle of confidentiality. The current legal framework (primarily encompassing the 1998 Data Protection Act, common law and the 1998 Human Rights Act) and administrative protocols provide for the further regulation and management of personal information.

The rapid advance of digital technology combined with the need to integrate services across many care settings is presenting new challenges and dilemmas in preserving citizen’s rights to confidentiality and privacy. Citizens can now expect their information to be shared across multidisciplinary teams caring for them. However many people do not understand what information is held about them and who has access to it.

Advances in digital technology provide huge opportunities to enable improvements in health and wellbeing. But these developments also become inextricably caught up in new potential threats to civil liberties as surveillance and monitoring of individuals becomes part of everyday life. Questions of proportionality and necessity become critical, as society tries to balance individual privacy with public interest.

Informed and prior consent to access and use citizens’ data becomes even more important than ever. Health and social care professionals need to ensure that citizens are effectively informed about how their information is collected and used, how to access their information, and about their rights to determine how their personal information is shared.

There is currently no standard wording used for consent agreements across government and no requirement that they should be written in a way that considers the possibility of re-use consent.

A common approach to the method of obtaining consent must be developed to improve the efficiency of consent procedures and permit wider sharing of such linked data. The UK Data Sharing Review report (Thomas and Walport 2008) and the Administrative Data Taskforce 2012 identified the need to create a generic legal gateway for research access to link between administrative data.

In summary, the rate of technological change is fast outpacing the policies, processes and systems for managing personal information and there is a growing view that existing legislation is perceived to be not fit for purpose for this new ‘information age’.

National Recommendation 1
Changes to data legislation

There is currently no standard consent wording used across government or generic legal gateway to allow appropriate data sharing and linkages between different government departments, health and social care bodies and statutory agencies. This has detrimental implications on both the efficiency and effectiveness of product/service development and delivery.

It is therefore recommended that the government should urgently consider changes to legislation to enable appropriate data sharing and linkages between different government departments, health and social care bodies and statutory agencies. Any changes must strike the right balance between data sharing and the need for privacy and confidentiality, be based on more realistic and forward-looking, explicit consent models and result from pre-legislative engagement with the public on this issue.
Commercial Issues

Business and enterprise recognise health and wellbeing as a major opportunity for growth. But new entrants to this market have historically found it difficult to do business with the NHS and other public sector health and wellbeing service providers.

Many people now recognise that the innovation necessary to make the step change within health and wellbeing is likely to come from outside the sector by applying the creativity and learning of new entrants to the market. Small and medium sized enterprises have a particularly important role to play in this but they are faced with many barriers to market entry, which are a combination of attitudes to risk and commercial regulations.

The development of innovative and disruptive health and wellbeing products and services and the application of new mHealth technologies across our cities will therefore require new:

- **attitude to risk by contractors and commissioners** – where it becomes more acceptable to try new things that may fail rather than just sticking with the status quo.
- **ways of connecting within and across all services and domains that impact on health and wellbeing** (e.g. the Health Map) – where information, data and insight are used more as a commodity and brokered and re-used across cities as more of a market place.
- **relationships with citizens who behave like consumers and are treated like customers** – where feedback and self-management is embraced within rapid feedback loops and citizens can co-create the services that they need. But this can only happen if they have more influence over where and how money is spent locally.
- **methods of procurement of innovative products and services** – where agile and evolutionary product and service development approaches are adopted. Using end-to-end prototyping, including users in the development process, and built-in service improvement feedback loops. This is in contrast to current procurement processes that are typified by significant investment in specification, procurement and management of a service, which by their very nature will fail to identify all risks, fail to engage users until deployment, fail to manage costs, but most importantly fail to build innovation eco-systems. These changes in procurement and contracts should make all non-personal or private data open by default. The creation and ownership of intellectual property rights is also seen as a key issue stemming from this innovation, which needs further clarity.

Many people recognise that the innovation necessary to make the step change within health and wellbeing is going to come from outside the sector.

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**National Recommendation 2**

Changes to procurement regulations

Small and medium-sized enterprises (SME’s) have an important role to play in the creation of disruptive and innovative healthcare solutions. Current regulations and existing frameworks make it very difficult for SME’s to engage and transact with the public sector, which is restricting the pace of service improvement and transformation.

*It is therefore recommended that the government change procurement regulations to make it easier for the private sector to do business with the NHS and other providers of care. A primary consideration in any changes must be enabling SME’s developing disruptive digital technologies and services in health and social care to compete effectively in procurement processes.*
Devolution

To accelerate the development of Smart Cities in a health and wellbeing context Government needs to consider devolving more powers to cities.

Health and Wellbeing Boards are statutory bodies introduced in England under the Health and Social Care Act 2012 and are the most likely body to take on the overall local leadership role in the creation of healthy Smart Cities. We have therefore looked at what new powers and responsibilities might be important for Health and Wellbeing Boards if they are to take on an even bigger leadership role in driving forward the Smart City agenda.

Health and Wellbeing Boards already aim to improve integration between practitioners in local health care, social care, public health and related public services so that patients and other service-users experience more ‘joined up’ care. They are also already responsible for leading locally on reducing health inequalities.

However, Health and Wellbeing Boards currently have little control over the necessary financial levers and incentives to bring about effective integration between health and social care and ability to invest in services where the payback will be realised in other parts of the care system.

The separation of social care budgets held by local authorities and NHS budgets held by Clinical Commissioning Groups creates in effect two different currencies in a city and the problems become exacerbated by the significant budget reductions of the former.

In Leeds, as part of our integration pioneer work we are aiming to create the ‘Leeds pound’ – one single currency across the city. However, to fully implement this would require the city, through the Health and Wellbeing Board, to have greater powers to manage a combined health and social care budget.

But this is not just about money. Health and Wellbeing Boards also lack the powers and responsibilities to implement Smart design principles and standards based approach to Health and Social Care infrastructure, record keeping and technology enabled care services as identified in Section 4 of this report.

The work of Health and Wellbeing Boards should also be reviewed in the context of city regions and combined authority structures. Accordingly Government needs to work with cities to explore new city/combined authority governance and delivery models as well as leadership roles to help drive and accelerate the Smart health and wellbeing agenda.

National Recommendation 3
Additional responsibilities for Health and Wellbeing Boards with respect to Smart Technology and Open Data standards

Health and Wellbeing Boards have a key leadership role to play in the creation of health and wellbeing in Smart Cities. These boards currently lack the powers and responsibilities to establish and implement the necessary local Smart design principles and standards necessary for a Smart City to operate effectively.

It is therefore recommended that Government review the responsibilities of Health and Wellbeing Boards in the context of Smart Cities. This should consider the role of the Boards in relation to the implementation of care enabled by Smart digital technology, and emerging Open Data standards based approaches for record keeping and data sharing.
Data and interoperability standards

Central to the successful operation of any Smart City is the standardisation of record keeping, messaging, datasets, platforms, systems and infrastructure interfaces.

In some instances, this standardisation has to be adopted formally using mandatory national and international industry-wide standards. In other cases standards could be created locally through informal use and driven by evolving need.

Therefore, to be effective, standards need to be developed in collaborative manner internationally, and between national and local governments.

If we get this right, then we will see the rapid local development of an almost infinite range of bespoke and personalised products and services that are able to exchange data through use of shared infrastructure and platforms. Failure to get this right will result in expensive systems that do not talk to each other, and the development of lots of separate data silos.

It is recognised that good progress has been made in the development of health standards nationally and internationally. However social care is a long way behind.

Standards continue to develop to bridge and integrate health and social care. However more needs to be done to develop common standards across all services that will need to interface and exchange data to address fully the wider factors that determine our health and wellbeing. This might include the consideration of greater use of common identifiers and formats for person centred data.

Furthermore, we have identified a requirement for a single international strategic approach for secure electronic data sharing. This should cover data standards, identity management, citizen consent and data sharing in a multi-agency environment.

We therefore suggest the government does more to collaborate internationally and build on work done by bodies such as the World Economic Forum who have developed a Global Health Data Charter.

National Recommendation 4
National Social Care Interoperability Data Standards

Whilst good progress is being made in the development of health data interoperability standards, social care data standards are a long way behind. This is a barrier and constraint to the full integration of health and social care, with huge efficiency and effectiveness implications for services targeted at individual citizens.

It is therefore recommended that National Government in partnership with Local Government accelerate the development of social care data standards that will not only facilitate interoperability with health but also support the implementation of PAS 182:2014 - Smart City concept model – a guide to establishing a model for data interoperability.
Throughout this report we have given some consideration to how in a Smart City all agencies will need to work together in an integrated manner to meet the challenges and benefit from the opportunities that data and digital technology can bring to transforming our health and wellbeing. What could this look like?

Enabling this transformation requires city leaders to establish a culture of openness and transparency which ensures that engaged and digitally connected citizens can articulate the health and wellbeing needs of their neighbourhoods and communities. This culture can then breed the trust that citizens will require to share appropriate data with the city organisations and institutions that inform the development, commissioning and delivery of targeted services through a number of routes; public, private and third sector. Services can be delivered conventionally or digitally as is appropriate to meet the need of citizens, although we should expect an increasing proportion of services to be delivered digitally. These services lead to the outcomes and impacts the city and its citizens want to achieve such as better prevention of illness and reduced health inequalities. These positive outcomes maintain high levels of citizen engagement and confidence to foster a city level system that delivers continued improvement in health and wellbeing.

As part of establishing a Smart Cities governance structure, cities could establish a city wide partnership forum to oversee the planning and coordination of a Smart City roadmap for health and wellbeing. The roadmap should consider the specific priorities of a city as articulated in their current Health and Wellbeing Strategy, mapped against themes discussed in this report of data, digital technology, citizens, city functions and governance.

Whilst some of our recommendations must be implemented at either national or local level, there are others, such as standards for operability, which will need collaboration between national and local government.

We hope that the findings and recommendations are of interest to other Smart Cities, which can decide locally what recommendations are relevant to them in the context of their own Smart City strategy and local action plan.

We are also keen to ensure that the national recommendations from this report are fully considered by government and wider stakeholders. As part of this process we suggest that a National Smart Cities Forum for Health and Wellbeing is established for cities to work with Government to expand on each of the national recommendations and develop an appropriate implementation plan.
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