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Creating a Sustainable 21st Century Healthcare System

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About the ILC-UK

The International Longevity Centre - UK (ILC-UK) is an independent, non-partisan think tank dedicated to addressing issues of longevity, ageing and population change. It develops ideas, undertakes research and creates a forum for debate.

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ABOUT SOS 2020

SOS 2020 was established by the ILC-UK with the aim to raise awareness of the need to adapt our economy and society to the big strategic challenges posed by an ageing population, and will outline the specific policy measures needed to achieve this goal. It will illuminate the issues that face us and develop fully considered and costed solutions that will act as a “call to action” to policy-makers and politicians.

SOS began with two projects: Health Sustainability – which focusses on fostering innovation in health and social care systems, and Financial Sustainability - which focusses on how we can deliver sustainable yet adequate retirement incomes.

This first report in SOS–Health has sourced a bank of robust innovative global case studies, identified significant trends in the global health environment, and assessed the key influencing factors in the success and replicability of these health innovations.

By identifying sustainable innovations in health and care from across the world and then trying to apply these in different country settings, we ultimately hope to offer robust and verifiable models that will improve performance (better health outcomes and reduced costs) at a time of growing pressure.

A report covering a subject area as wide-ranging as this, with a global geographical scope, would not have been possible without the guidance and support of the SOS 2020 advisory board. We are extremely grateful for their advice, enthusiasm and expertise. Without their ongoing support, this report would not have been possible.

The advisory board members are listed below:

Baroness Sally Greengross, Crossbench Peer and Chief Executive of ILC-UK,
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EXECUTIVE SUMMARY

There is now widespread agreement that all societies are facing the twin challenge of limited resources and an ageing population. It will happen at different times in different countries but this is arguably the biggest health and social care policy issue facing governments across the globe. This leaves the question of what needs to be done in response. This report *Creating a Sustainable 21st Century Healthcare System* by the International Longevity Centre - UK and supported by EY seeks to bring forward some potential answers to that question.

Challenges to meet, opportunities to embrace

We have identified 12 global health trends which are set to influence the present and future climate for healthcare, and which will affect the development of existing and new innovations. Non-communicable diseases, such as cancer and diabetes, are now the leading causes of disease globally and account for 63% of all deaths worldwide¹. This rise, in part due to medical developments, ageing populations and more sedentary lifestyles, has also resulted in greater numbers of people suffering from comorbidity – the presence of 2 or more chronic health conditions simultaneously.

The increased pressure on health services brought about by these rises is being exacerbated by a global shortage of healthcare workers. In 2013, there was a deficit of 7.2 million workers, a figure which is set to almost double in the next 20 years², with regional differences being made worse by internal and international migration. With the future need for long-term care services also set to grow as the number of older people increases, countries are likely to see greater pressures on family members to provide care.

The cumulative effect of these pressures is that global spending on health is predicted to rise by an annual average of 5.3% until 2017³, as governments spend more in order to maintain the current level of quality and provision. While

In Europe, only
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health
programmes**



a preventative approach to healthcare has the potential to reduce costs, there has been little investment in this area. In Europe, only 3% of healthcare expenditure is allocated to prevention and public health programmes, with some countries allocating as little as 1%⁴.

However, although there are certainly challenges ahead, the overall picture is far from bleak, with a number of global trends offering opportunities to make health systems more sustainable in the face of ageing populations. Advances in health technology have the potential to significantly influence patient's access to health care and the way that health care is delivered; for example through the convergence of medical devices and information technology. Simultaneously, humanity's increased ability to generate data, combined with the digitalisation of healthcare systems, has created an opportunity to revolutionise healthcare through the use of 'big data'.

These technological advances are helping to facilitate positive global trends in how people look after their own health and interact with health services. Increased access to health information through new communication technologies is raising people's health literacy, and contributing towards a shift to personal responsibility for health. Countries are beginning to embed support for self-management in their health care services,

and recognising that these services are more effectively integrated around the individual. Governments are also investigating how to integrate their health and social care services to create a more seamless care experience for the user, with opportunities being created for financial savings through improved efficiency and productivity.

Innovative solutions

Health innovations across the world are seeking to tackle these challenges and make the most of the opportunities, delivering sustainable solutions for current and future healthcare systems. Critically, the innovations we have chosen to include in this report have the potential to be applied and replicated in other country contexts.

Personalised healthcare is a hotbed of activity, with innovations in this area focussing on empowering health consumers through increasing their health literacy and their ability to self-manage conditions. The 'Stay on Your Feet' programme (p76) in Australia is preventing falls among older people by targeting their knowledge, attitudes and behaviours, resulting in a 22% lower incidence of self-reported falls and a 20% decrease in fall-related hospitalisations.

Innovations are also capitalising on the benefits offered by integrating health and care services, while simultaneously making strides in meeting the challenges their application presents. Canterbury District in New Zealand (p53) has developed a vision of 'one system, one budget', bringing in experts to support

Australia is preventing falls among older people by targeting their knowledge, attitudes and behaviours, resulting in a

22% reduction in falls



clinicians to redesign care pathways and workflow. The result has been reduced admissions across acute care, as well as a 20% drop in nursing homes admissions.

Even with our best efforts we are not going to eradicate diseases altogether, and we have discovered a range of innovations which are aimed at achieving improved outcomes for people with health conditions at a lower cost. For example, healthcare providers in South Central Pennsylvania (p69) used 'big data' to identify 'super utilisers', then developed a coordinated care service for these people, resulting in inpatient admissions dropping by 34% after enrolment in the programme, equating to savings of \$1,242,000 for 138 patients in 12 months.

What works?

An evidence-based 'recipe for success' is needed to determine what makes an innovation successful or not in the current global health climate, and more importantly, in the future health climate. We have found seven factors that can determine whether an innovation is successful:

1. The demographics and age preparedness of a country

While almost all countries are experiencing population ageing, each country is in a different stage of transition, with some having experienced its effects for a longer time, while others are set to see a sharp increase in life expectancy. This means that health systems will need to adapt in different ways, affecting whether health innovations are replicable in a particular country context.

2. The robustness of the delivery model

Facilitators of successful innovations appreciate that implementation of a new innovation will always, to some extent, have a cost in terms of financial resources, human resources, and organisational disruption.

3. The local, regional, and national policy environment

The policy environment can aid the success of innovations, as Government actions can help raise the profile of, or change

attitudes towards, health issues.

4. **Ability to influence behavioral change**

Successful health innovations, in order to meet the present and future challenges posed by demographic change, need to enable and influence people to take ownership of their health and wellbeing.

5. **Engagement with a specific health challenge**

Successful innovations often target a specific health care challenge amongst the population, before finding a targeted solution.

6. **A sensible and sustainable funding structure**

Successful health innovations ensure that, when possible, multiple agencies are involved to share expertise and provide resources. In a tough economic climate pooling resources and making use of existing infrastructures are becoming increasingly important.

7. **The ability to evaluate and disseminate initial results**

Health innovations will often begin with a small-scale, localised pilot scheme. The chances of these innovations continuing to receive funding, expanding in geographical scope and being adopted by other healthcare providers are greatly improved if they are able to quantify the improvement in service delivery and the reduction in cost to health providers.

Where next?

We have highlighted in this report how national and international governments, institutions and organisations across the world are responding to the challenges of an ageing population and health care more broadly through innovation.

It is clear from this report that many regions and countries have proven capacity to innovate, but they are doing so at a different pace. As a result it is vital that where such networks are being developed governments participate and learn from others.

Our report highlights that governments, institutions and organisations desperately need

Canterbury, New Zealand achieved a

20% reduction

in nursing home admissions, by bringing in experts to support clinicians to redesign care pathways and workflow under 'one system, one budget'



to introduce new policies to tackle or offset the funding crises in terms of health and care services. While these can be politically fraught processes, it is vital that governments reconcile the future cost of care and develop systems to ensure that future generations do not see access to health and social care reducing.

Recommendations

While the recommendations in this report are intended for high, middle and low income countries, we appreciate recommendations for action need to be placed in culturally sensitive models and countries are on different stages and paths of their 'sustainability' journey.

We are calling on national governments to pursue three pillars of action: ensure future sustainability, prioritise a prevention agenda and promote a climate for innovation. In particular we are asking for:

1. Ensure future sustainability:

Governments must urgently ensure that systems are put in place to deliver sustainable and adequate funding to deliver the health and care needs of an ageing society.

Governments must consider a raft of cost cutting moves to drive volume to value based care, and promote expertise in population health management.

Governments should address the current and predicted future health care professional shortages, all governments should establish a review of supply and demand and make recommendations regarding national priorities and policy.

2. Prioritise a prevention agenda:

Governments should commit to investing an increasing proportion of health spending on preventative health. They should set and monitor targets for a minimum proportion of health and care spending to be devoted to preventative health.

Governments must explore innovative budgeting which would help politicians make the economic case for prevention (e.g. allowing local political authorities to budget for the cost of prevention over 5 years.)

Governments must find ways of ensuring that new technological “solutions” can integrate within existing healthcare systems.

3. Promote a climate for innovation:

Governments should ensure health plans embrace innovation and explore different financial arrangements and more consumer engaged models.

Governments need to foster and stimulate networks to transfer new approaches between sectors or localities. There needs to be a greater emphasis on pooling information and experts to provide new opportunities for generating solutions and revenue.

Governments needs to embrace the ‘digital agenda’, particularly with regard to big data and analytics to improve population health based planning, improve the service they provide and to garner new insights into disease management and prevention.

At the core of this research is a story of innovators and innovations, which we believe provide a snapshot of what could be achieved at the global level, with improved communication and sharing of ideas and information.

INTRODUCTION

We are living in an increasingly interconnected and interdependent world. When our national borders matter less, we argue the opportunity to learn from each other matters more. Aimed at national policy-makers, politicians, industry and wider civil society, we hope to provide the impetus, innovations and insight to engender a more informed collective global and national response to the current health sustainability crisis.

There is no panacea to the global challenge countries face - developing healthcare systems and outcomes that are accessible, equitable and efficient - has never been more prescient. With traditional sources of funding for health care branded obsolete and unaffordable for some countries, while others grapple to provide even the most basic health services, there is collective denial to the transformation required to respond to the changing demographics. Without radical innovation it seems unlikely that we can sustain the kind of healthcare we need.

Some would argue the healthcare sector has always been characterised by innovation and yet despite a surge in innovations in recent years, dissemination and replication can be slow – if at all. This report seeks to highlight the potential of some of the most promising innovations in healthcare and explore if our current innovation landscape sufficiently addresses the challenges and opportunities posed by unprecedented cultural, demographic, economic, political and social movement. The innovations which feature are sometimes very specific, for example technological solutions, or they may relate to wider policy and system innovations. The report also identifies areas where new solutions are required as we set out some next steps to promote and enhance learning and knowledge exchange at the global level.

The idea of sustainable health and care systems in this report

Despite the fact that different systems manage health and social care in different ways and

through a range of funding mechanisms, the fundamental challenge remains the same regardless of those differences. Sustainability is therefore a priority across all countries.

In January 2012 a study by the risk rating agency Standard and Poor's reported that "If governments do not change their social protection systems, they will likely become unsustainable." A major focus of the study was healthcare costs arising from ageing populations. They went on to say "If no reforms are adopted, healthcare-related credit downgrades would likely start within three years, eventually leading to an increase in the number of junk-rated countries as of 2020". Debt to GDP ratios are already high in many countries and if health and social care spending is not brought under control, there is a real risk of debt crises.

When we use the term 'sustainable' in this report, we are not talking principally about cutting or rationing services more severely. Our aim is to identify innovations that help to deliver more and better outcomes for the same resources within a context of growing demand pressures. This is of course a difficult circle to square but the findings here suggest that there is cause for optimism and other potential areas which could be developed to create new possibilities and options.

A growing policy quagmire

Reconciling rising demand with growing calls to cut public expenditure in many countries, and greater public accountability, will determine not only the future health of citizens, but critically their wealth. There is a growing call from the international community to invest in 'health for wealth'. The ageing population can no longer be viewed reductively as a mere 'burden', but instead governments are being urged to celebrate increased longevity with policies that enhance, promote and indeed protect the life of older people and their carers. Global ageing poses not only the intractable question of how our respective economic, health and social care systems should respond, but also we

consider the more intangible concerns of the potential of human lifespan and the need to redefine entrenched concepts of old age in light of this.

Innovations need to have citizens, patients and carers at their heart but delivering real change for real people requires innovations within systems and policies too. If we think about the example of the transformation in waiting times for operations in England, it was not simply about more resources, capacity and setting a target, it was about the active and relentless management of the system that reduced operation times from over 18 months to below 18 weeks.

Different countries will find their own routes to sustainability but these will inevitably involve a partnership between government, citizens, the private sector and civil society organisations, including charities. Whatever the mix, governments will need a vision of sustainability and a way of ensuring that it is delivered. This does not mean we are advocating big or small models of government but that government has a role in ensuring and facilitating sustainable health and care systems, not least because of the risks to sovereign ratings.

This targeted approach which clusters a range of innovations offers one of the most powerful ways to drive change alongside some of the longer-term preventative interventions we discuss in this report.

Structure of the report

The **first chapter** aims to explore the challenges and opportunities that influence healthcare at the global level, including considering the rise of NCDs to healthcare costs and sustainability, a changing health universe to 'big data'. We consider how these trends provide a platform for existing and new innovation.

The **second chapter** highlights innovations that respond to the current and future challenges and opportunities for our healthcare systems. Critically, these innovations if potentially diffused and/or adapted have the ability to transform systems, structures and societies beyond their initial country context.

The **third chapter** provides key insights into what are the critical success factors for

the diffusion of innovations and considers how varying cultural, economic, political and social cultures and climate may impact such a journey.

The **fourth chapter** provides a platform to discuss key findings from the innovations identified and next steps in terms of future actions and activities.

Approach

The information in this report was derived from:

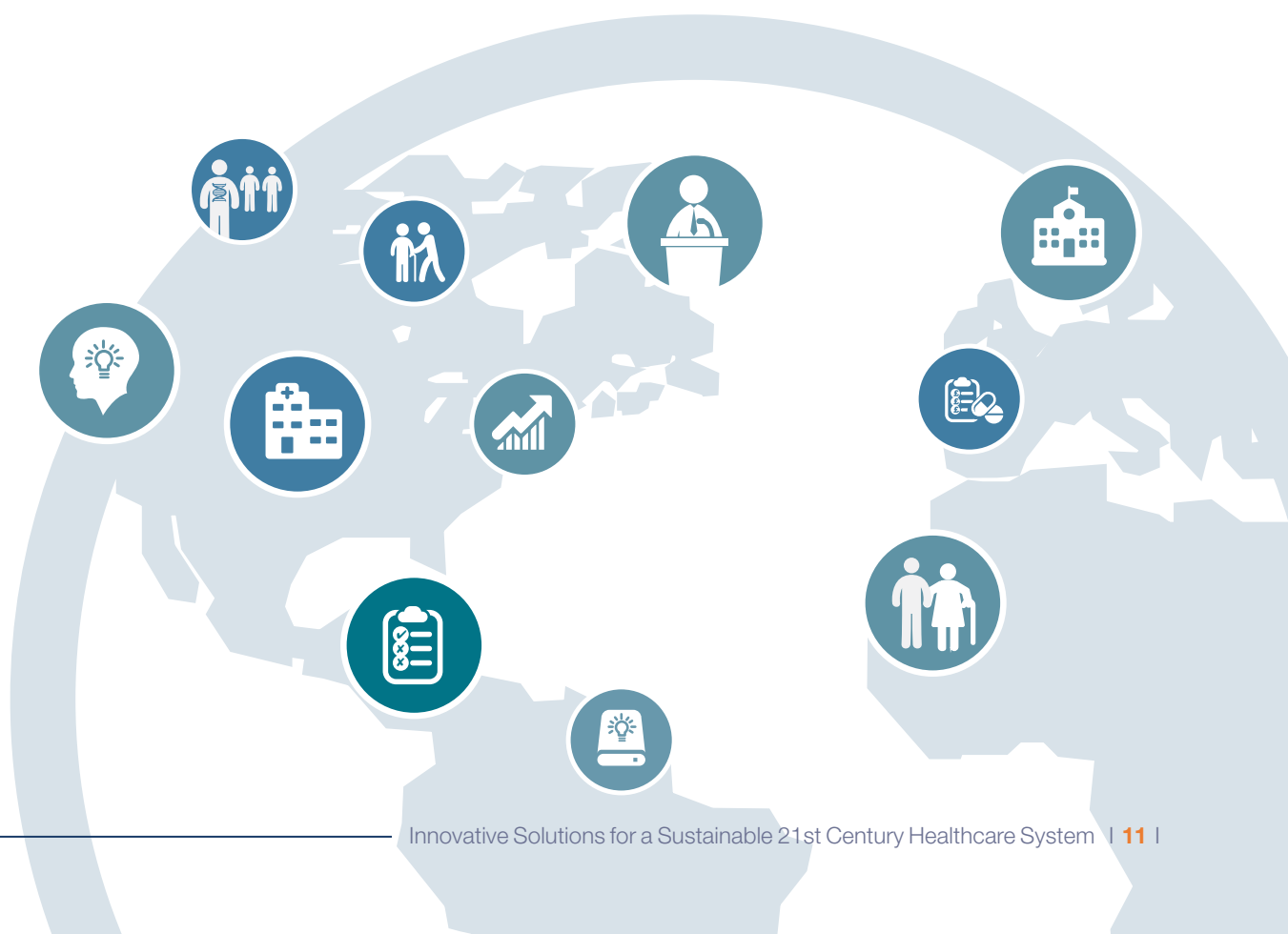
- A review of the literature pertinent to the main themes of demographic change, ageing, health and social care from a range of quantitative and qualitative data including: academic, clinical and research papers and grey literature.
- Strategic guidance and advice from the High Level Advisory Board, composed of a range of stakeholders, convened as part of the overall SOS 2020 Health project.

TRENDS THAT MAY INFLUENCE THE CLIMATE FOR HEALTHCARE AT A GLOBAL LEVEL – OPPORTUNITIES AND CHALLENGES

With the world facing an unprecedented situation – where there will be more older people than children and more people at extreme old age than ever before – critical questions arise. Will older populations see longer periods of good health, wellbeing and social engagement or will there be more illness, disability and dependency? How will population ageing play out differently for low-income countries that will age faster than their counterparts⁵? In order to answer these questions, we first need to identify the major trends which will influence the present and future climate for healthcare.

The purpose of this chapter is to provide an overview of these global trends, highlighting both opportunities and challenges, with a focus on how they may shape health innovations. Each trend has been highlighted for its global significance, but their impact on individual countries will vary depending on the pace and dynamics of ageing in each country or region.

Will older populations see longer periods of good health, wellbeing and social engagement or will there be more illness, disability and dependency?



THE TRENDS HIGHLIGHTED ARE:

CHALLENGES



1. The rise of non-communicable diseases



2. Multiple chronic diseases and the coordination of care



3. Healthcare costs and the changing nature of health spending



4. A global shortage of healthcare workers



5. Long term care and changing family structures



6. Reactive healthcare and short-termism

OPPORTUNITIES



7. Shared decisions and end-of-life care



8. Advances in healthcare technology



9. A changing health universe



10. Personalised healthcare



11. Big data



12. Integrated care

CHANGING DEMOGRAPHICS

By 2050
the over 65s



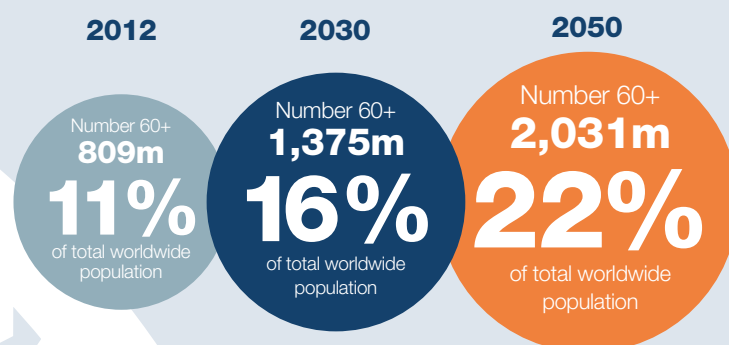
will be 16%
of the world
population

By 2050, the number of people aged 65 or older is expected to nearly triple to about 1.5 billion, representing 16% of the world's population, as a result of declines in fertility and improvements in longevity⁶. The majority of these people and growth will occur in less developed countries, which will see the number of older people increase by more than 250% from 2010 to 2050⁷.

The increases in life expectancy which have contributed to our global ageing population have also resulted in a growth of the “oldest old” (people aged 85+). This group now constitute around 8% of the world's 65-and-over population: 12% in more developed countries and 6% in less developed countries⁸. In fact, in many countries they are the fastest growing segment of society.

Health and social care systems will need to innovate to deal with the ramifications of these changes, which include increased rates of the diseases of old age such as dementia, a potential lack of resources as “working age” populations decline, and increasing numbers of people needing long term care. Effective innovations will be vital if these challenges are to be met. However, economic and political realities may affect how successfully innovations are developed and implemented. Low cost innovations that do not depend on a wide range of health structures and professionals may therefore be crucial.

Fig 1: Number and proportion of people aged 60-plus worldwide in 2012, 2030, and 2050



Source: UNDESA Population Division, Population Ageing and Development 2012, Wall Chart, 2012; UNDESA Population Division, World Population Prospects: the 2012 Revision, 21013



1. The rise and rise of non-communicable diseases

Medical developments over the last century, combined with ageing populations, more sedentary lifestyles, diet changes, and rising obesity levels, have led to a shift in the leading causes of disease and death globally; non-communicable diseases, such as cancer and diabetes, have now replaced infectious diseases as the primary cause. Even in low-income countries, where rates of infectious diseases tend to be higher, there has been and continues to be a significant rise in non-communicable diseases. They are now, by far, the leading cause of mortality in the world, representing 63% of all deaths⁹, and among over 65s they already account for more than 87% of the burden in low-, middle-, and high-income countries¹⁰. For example, Africa, the Middle East, Asia, and Latin America are experiencing epidemics in diabetes and cardiovascular illnesses. China, with 92 million diabetics, has overtaken India (80 million) as the world leader in diabetes cases, with rates set to grow significantly in the foreseeable future¹¹.

It is predicted that in 10 years people in every world region will suffer more death and

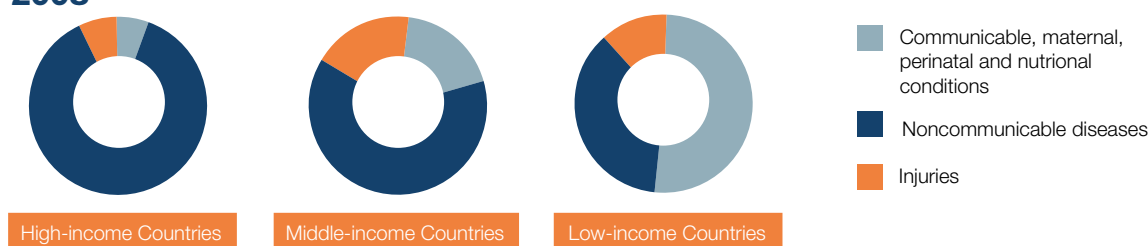
disability from non-communicable diseases than infectious diseases¹². By 2030, non-communicable diseases are projected to account for more than 50% of the disease burden in low-income countries and more than 75% in middle-income countries¹³.

Non-communicable diseases will therefore put an increasing pressure on health and social care systems globally. The significant relationship between non-communicable diseases and old age, combined with a rapidly ageing global population, means that healthcare systems will need to adapt- both to deal with the increasing numbers of people with these diseases and the percentage of those people who are over 65. For example, geriatrics training for doctors will become essential if they are to provide appropriate chronic disease management for older patients. Treatment costs of chronic diseases, which may prove too expensive for both patients and health systems could result in a greater focus on disease education and prevention.

Several conditions in particular - dementia, stroke, heart disease and diabetes - are contributing significantly to the burden of non-communicable disease amongst older people, and global health innovations may be initially concentrated on these conditions. For

Fig 2: The Increasing Burden of Chronic Non-communicable Diseases: 2008 and 2030

2008



2030



Source: World Health Organization, Projections of Mortality and Burden of Disease, 2004-2030. Available at: http://www.who.int/healthinfo/global_burden_disease/projections/en/index.html

example, countries may choose to develop innovations that help to diagnose and control hypertension, the main risk factor for stroke.

Whilst policy on preventing and treating NCD's currently largely focusses on these conditions (dementia, strokes, diabetes and heart disease), greater attention also needs to be paid to other diseases, such as common mental disorder (depression and anxiety). Mental health is often under-represented in global health policy and suffers from chronic under-diagnosis in much of the world; more than 90% of mental health resources are located in high-income countries, despite approximately 80% of the world's population living in low or middle-income countries¹⁴.

That is not to say that high-income countries are effective in treating mental health disorders, and treatment is particularly overlooked in older people. This is in part due to a high proportion of the financial costs of depression coming from lost productivity amongst the working-age population. However, the condition also affects the ability to care for someone, and can also be caused by the burden of caring for another person. With the sustainability of future health systems possibly relying on the unpaid caring duties undertaken by many older people, greater appreciation of mental health disorders as an important type of NCD is vital.

While preventative medicine will play an important role in tackling the rates of non-communicable diseases, health systems will need to address growing numbers of patients managing complex conditions over sustained periods. However, many health systems have not kept pace with the increasing shift toward long-term illness, and are instead designed to focus on acute illness and injury. While self-management (see 'A changing health universe' trend) will play an important role, this will need to be backed up by co-ordinated national approaches that support people with chronic disease and their carers. Innovations that lead to the better integration of primary and secondary care could also play an important role by reducing the use of expensive and disruptive hospital stays for people with chronic conditions¹⁵.

Dementia

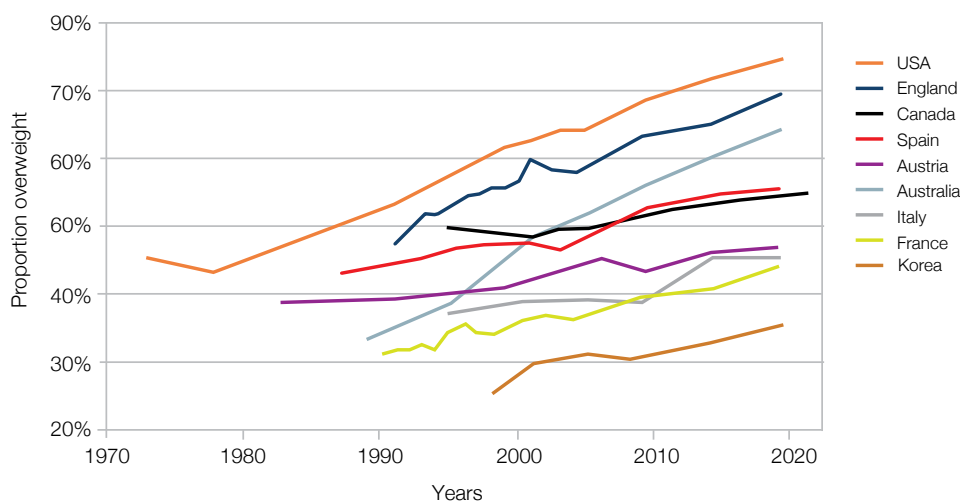
The ageing global population is set to result in a tidal wave of dementia cases. There are currently around 47.5 million people with dementia globally, with this number estimated to more than triple by 2050¹⁶. Currently, a new case of dementia occurs somewhere in the world every four seconds¹⁷.

A cure for dementia has not yet been discovered, meaning most people with the disease will see their symptoms gradually worsen, resulting in them needing help to cope at home and eventually entering residential care. Dementia not only affects the lives of the people who have it, but also their caregivers and families who often face stigmatisation, as well as negative impacts on their mental, physical and economic health as a result of the demands of the caring role.

While the human cost of dementia is high, there is also a significant economic cost associated with the disease which will challenge health systems as the number of cases increases. The global cost is currently estimated to be \$604 billion per year, a figure which is set to increase even more quickly than the prevalence rate¹⁸.

Innovations in this area may focus on improving the awareness and understanding of dementia to decrease the discrimination currently seen in some areas, and to ensure that people with the disease receive the basic rights and freedoms available to others. For example, physical and chemical restraints are used extensively in aged-care facilities and acute-care settings¹⁹. Innovations that concentrate on increasing early diagnosis may also be a focus, as this has been shown to improve the quality of life of people with dementia and their families.

Fig 3: Past and projected future overweight rates in selected O.E.C.D. countries



Source: Organization for Economic Cooperation and Development

Obesity

The world has seen a dramatic increase in the numbers of overweight and obese people in the past 30 years. While often seen as an issue of high-income countries, the biggest rises have been in middle and low-income countries and the developing world.

Over one third of all adults globally – 1.46 billion people – are obese or overweight. Between 1980 and 2008, the numbers of people affected in the developing world more than tripled, from 250 million to 904 million²⁰. In economically developed countries the numbers increased by 1.7 times over the same period²¹. This rise has resulted in part from more sedentary lifestyles combined with diets high in meat, fats and sugar, and a marked shift from away from cereals and tubers²².

Being overweight or obese has serious health ramifications, and is significantly linked to a range of health conditions including some cancers, cardiovascular disease, diabetes and osteoarthritis. Being overweight or obese is now the fifth leading risk for global deaths²³, with at least 2.8 million adults dying each year. In addition, 44% of the diabetes burden, 23% of the ischaemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to obesity²⁴.

However, rising levels of overweight and obesity are not just effecting adults. In 2011, more than 40 million children under the age of five were overweight, 30 million of which were living in developing countries²⁵. Childhood obesity is associated with a higher chance of obesity and disability in adulthood, and premature death. Obese children also experience breathing difficulties, increased risk of fractures, hypertension, early markers of cardiovascular disease, insulin resistance and psychological effects ranging from overt depression to disturbed eating behaviour²⁶.

A wide range of factors influence a person's diet, including physiological needs; the costs of food and level of income; preferences formed by culture, religion, information and advertising; social changes in work patterns and gender roles; and globalisation and its influences through trade, investment and information; and public policy²⁷. Innovations in this area are therefore most likely to be effective when they are multifaceted, potentially as part of a larger government initiative addressing education, prices and regulation.

However, while a growing number of countries have adopted policies to help prevent obesity from spreading further²⁸, in most cases these changes haven't yet had a significant effect on reducing or even slowing down the rate of overweight or obese people. There seems to be little will

among the public and governments to take the determined action needed to influence future diets, which is in marked contrast to the public measures taken by OECD countries to limit smoking. This is in part due to regulation and taxation potentially being the most effective policies for influencing people's diet, but also being the policies most unpalatable to both the public and politicians²⁹.



2. Multiple chronic diseases and the coordination of care

Longer lives, and the rise in the prevalence of non-communicable diseases, is resulting in more older people globally suffering from comorbidity - the presence of 2 or more chronic health conditions simultaneously. Prevalence rates of comorbidity among adults vary between countries, with figures ranging from 17% to just over 50%^{30,31,32,33}. However, people with comorbidities consistently represent 50% or more of the population living with chronic disease, at least in more developed countries³⁴. The prevalence of comorbidities also increases with age, with some studies estimating that as many as two-thirds of older adults are affected.

Multiple chronic health conditions are associated with decreased quality of life,

functional decline and mobility^{35,36}. Multiple chronic health conditions are also significantly associated with increased psychological distress, hospitalisations, and death³⁷.

The global ageing population, combined with the rise in non-communicable disease, mean that the prevalence of comorbidities is set to rise dramatically. For example, by 2018 it is estimated that the number of people with three or more multiple conditions in the UK will have grown from 1.9 million (2008) to 2.9 million³⁸. This will put increasing pressure on health and social care systems as this group have complex care needs, and are more likely to see a variety of health and social care providers. In Australia, research has found that the majority of patients with multiple chronic health problems interact with seven or eight health professionals and receive more than 80 health services annually in the course of their care³⁹. As there are virtually limitless potential combinations of comorbidities, each needing a different approach to treatment and putting different demands on health systems, there is uncertainty over the exact changes and challenges the rise in comorbidities will bring.

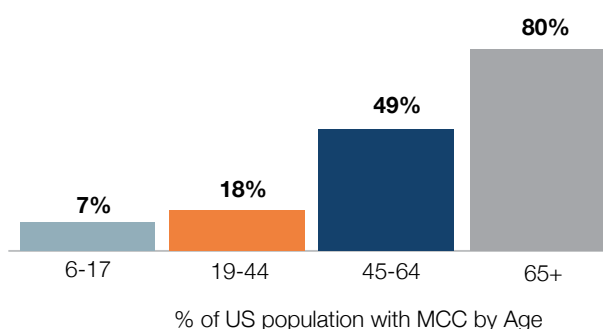
What is certain is the effective coordination of care across health and social services, as well as across different levels of health care, will be vital. However, the current norm for healthcare systems, both in higher and lower-income

Fig 4: Multiple chronic conditions are a large and growing problem in America

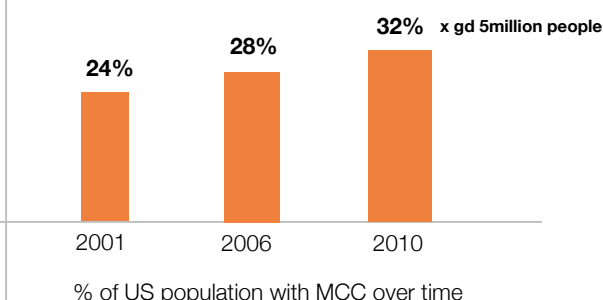
Almost **one in three** Americans lives with MCC



The prevalence of MCC increases with age, however the problem affects a large number of working aged Americans, not just the elderly

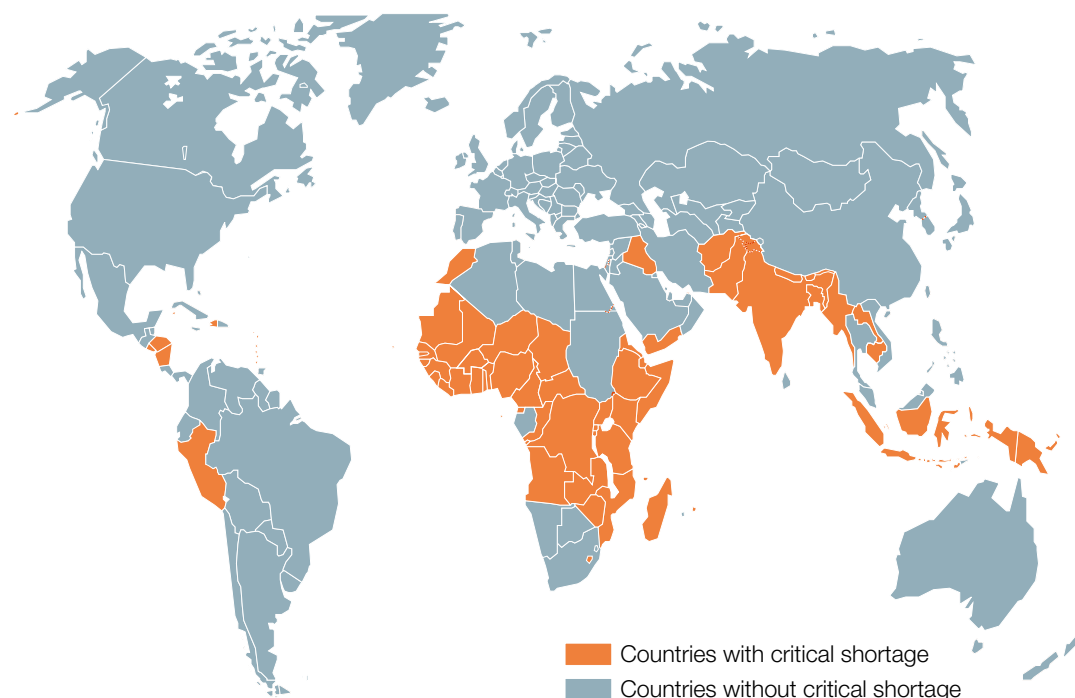


The problem is growing and will continue to grow as the population ages



Source: <http://www.ahrq.gov/professionals/prevention-chronic-care/decision/mcc/>

Fig 5: Countries with a critical shortage of health service providers (doctors, nurses and midwives)



Source: Working together for health 2006 The World Health Report

countries, is to focus on individual conditions rather than the person as a whole. This lack of person centred care risks fragmented, poorly coordinated care, which is inefficient, ineffective and delivers poor patient experience⁴⁰.

If countries are to effectively tackle the rising health and economic costs of comorbidities they may need to address how patient information can be effectively coordinated, for example across health and social care, and whether levers and incentives can be put in place that promote and support continuity of care⁴¹. However, in some countries this may be impeded by a lack of basic health and social care infrastructure.



3. Healthcare costs and the changing nature of health spending

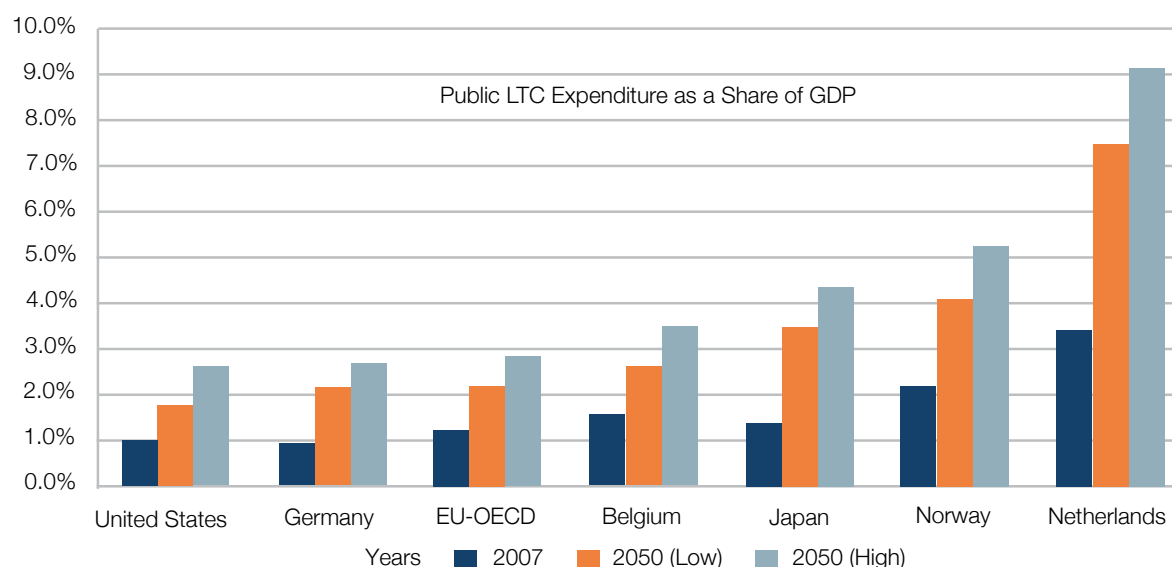
With the use of medical care services by adults increasing with age, ageing societies may create continued upward pressure on overall health care spending, with governments having to spend more in order to maintain the current level and quality of provision. For example, total global spending is predicted to rise by an annual average of 5.3% until 2017⁴². Given population growth, this means that

spending per head is anticipated to rise by an average of 4.4% a year from 2014-2017⁴³. Even Japan, one of the countries which has been most successful in containing health care costs, expects to see a doubling in health expenditure by 2030⁴⁴. This increased pressure is coming at a time when countries are seeing their economically active population getting proportionally smaller. For example, the working age population (15-64 years) in the EU will decrease by 48 million by 2050, while the number of people of working age for every older person is projected to decrease from four to two⁴⁵.

Other factors leading to increased spending in many countries include the overuse of medical services, over-prescription of drugs, and advances in treatments and health technologies. For example, while the growing numbers of people with chronic and long term diseases (see 'Multiple chronic diseases and the coordination of care' trend) has resulted in the development of more effective treatments, these are often expensive and tiered pricing does not necessarily ensure affordability⁴⁶.

The result is health spending in many countries is becoming unsustainable. A recent report by the Association of Chartered Certified Accountants (ACCA) found that across the 11

Fig 6: Long term care (LTC) expenditure is projected to at least double by 2050



Source: OECD calculations and 2009 Ageing Report, European Union

diverse countries analysed, austerity, linked with an increasing demand for healthcare services, had resulted in their systems needing either additional sources of funding and/or new innovative approaches if they were to continue at the current levels of provision⁴⁷. This lack of sustainability was found to be a common factor despite the countries analysed representing a variety of different healthcare models.

As demand for healthcare rises, the pressure to reduce costs and demonstrate value is intensifying, with broad reforms to try and make health care systems more sustainable occurring on a global scale. For example, governments in the countries most effected by the economic crisis in Europe, such as Greece and Spain, are enacting changes that will replace the current two-tier public/private system with one universal health care fund⁴⁸. While in Japan, where the majority of health care spending is publically funded, the government has begun a series of initiatives to control spending, including encouraging the use of cheaper generic drugs, self-management of chronic diseases, and preventive care⁴⁹.

These pressures are also leading to an increasing focus on value-based health care over volume-based healthcare, with governments and other payers developing strategies to align providers under new

payment arrangements. For example, 'Results-Based Financing' for Health, or RBF, involves paying providers or recipients of health services after pre-agreed results have been achieved and independently verified. RBF is a change from paying for inputs to paying for services delivered. This approach is being used more frequently by countries and major donors who finance maternal and child, malaria, tuberculosis and HIV/AIDS health programs in low-income countries to increase their impact, and to ensure that the money is used in the most effective way⁵⁰. Early research suggests that countries using RBF may be able to attain 20 percent more health care for the same amount of money with a higher quality of care⁵¹. In America, a similar system has been implemented in some areas with the introduction of Accountable Care Organisations (ACOs), which are accountable for achieving a set of pre-agreed quality outcomes within a given budget or expenditure target. Of the 32 ACOs set-up, over half have already generated savings, with 13 generating enough savings for the practices to keep \$76.1 million (£45.5 million)⁵².

Concurrently to these developments, some developing markets are predicted to experience rapid spending growth as their public and private health care systems mature, such as with the Middle East and Africa which

are expected to see an annual average increase of 8.6 percent over 2014-2018⁵³. Drivers for this investment include population growth, rising wealth and rising patient expectations. For example, there is predicted to be a 30% global rise in high income households from 2014-2018, and over half of these are expected to come from Asia alone⁵⁴. This may bring opportunities for international hospital chains and pharmaceutical and medical technology companies seeking geographic and revenue growth⁵⁵.

However, the implications of ageing for health care expenditure are not fixed, and there are a multitude of factors which may influence the severity of the economic impact, and may in turn shape the innovations that countries develop, such as the differing levels of healthcare workers, empowered health consumers who are using their increased purchasing power and access to information to drive health care decisions and purchases; and governments and healthcare providers seeking new ways to consolidate healthcare by integrating small, fragmented medical corporations and services to achieve optimal allocation of resources to streamline services and cut costs⁵⁶. Additionally, the ratio of “economically active” to “dependent” groups is driven by policies on retirement, rather than by immutable ageing processes⁵⁷. Increases in state retirement age may therefore help to mitigate against the costs of an ageing population. Older people are also not just recipients of health and long-term care- they provide a large proportion of care to other older people. Therefore, innovations that seek to create improvements in their health status may result in fiscal savings as more older people are able to provide care to a spouse or parent⁵⁸. In countries where there is a significant lack of health data, this may involve creating innovations that allow resources for health to be more effectively tracked which would allow the measurement and more effective management of resources. Redesigning acute services and departments; offering more services outside of the hospital, a high cost centre of care; the redesign of job roles; and the application of ‘lean’ thinking to regular processes could also

be productive areas of innovation to improve efficiency and productivity leading to financial savings.



4. A global shortage of healthcare workers

A significant global trend which will influence the climate for healthcare in the context of our ageing societies is the global shortage of healthcare workers. In 2013, there was a shortage of 7.2 million healthcare workers, and 118 of 186 countries analysed by WHO fell below the threshold of 59.4 skilled health professionals per 10 000 population⁵⁹. This figure is set to almost double in the next 20 years, with WHO predicting that there will be shortage of 12.9 million health-care workers by 2035⁶⁰.

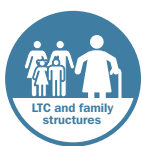
Key causes for the shortage include an ageing health workforce with staff retiring or leaving for better paid jobs without being replaced, combined with too few young people entering the profession or being adequately trained⁶¹. For example, in developed countries, 40% of nurses will leave health employment in the next decade⁶², and there will be a shortage of close to 2,000,000 healthcare workers across all EU countries by 2020⁶³.

Internal and international migration of health workers is exacerbating these regional imbalances. Recent studies on the migration of health professionals^{64,65} have shown that several high-income countries are dependent on foreign workers. For example, in England up to 35% of physicians are foreign-trained, while in Oman, the United Arab Emirates and Saudi Arabia this figure rises to over 80%. Even countries with a lower income level are becoming dependent on foreign healthcare workers, with Brazil launching a programme to recruit 6000 physicians and other professionals from 2013-2016. Simultaneously, countries with critical health workforce shortages; such as India, Nigeria, and Pakistan, are in the top 25 countries for the migration of their doctors to other countries⁶⁶.

Future projections highlight that the current rate of training of new health professionals is falling

well below current and projected demand. This will result in both primary and secondary healthcare services suffering. These shortages will be especially acute in sub-Saharan Africa, where the WHO⁶⁷ found just 168 medical schools in the 47 countries that make up this region. Of those countries, 11 have no medical schools, and 24 have only one. In consequence, the number of caregivers is often inadequate to deliver even the most basic immunisation and maternal health services⁶⁸, a situation which is only set to worsen as their populations grow.

The growing shortage of healthcare workers is occurring at a time when increasing demands are being put on the sector by a growing, ageing world population, with increasing numbers of people with non-communicable and comorbid diseases. Greater numbers of people in the system will also mean more demand for services that numerous health care systems will be unable to accommodate due to workforce shortages.



5. Long term care and changing family structures

Many older people will require long-term care at some point in their lives due to a decline in physical and/or cognitive functioning. This care may come in the form of home nursing, community care and assisted living, residential care, or long-stay hospitals.

The future need for long-term care services (both formal and informal) in individual countries will largely be determined by changes in the absolute number of people in the oldest age groups coupled with trends in disability rates. Therefore, the growth of older populations globally suggests that demand for care will rise significantly. Scenarios developed by the European Commission in 2009 projected that the public long term care spending of OECD-EU member states, as a share of GDP, is expected to at least double by 2050⁶⁹.

In many countries without established and affordable long-term care infrastructures, there will be a reliance on family members ending

employment or education to care for older relatives. With more people in these countries seeking jobs away from their home towns, this may not always be an option. However, this is not just a problem in the low-income countries. In the UK, projections estimate that the number of people providing care to older parents will increase by 27.5% by 2041⁷⁰.

However, the availability of family carers is expected to decline, given the existing rate of caregiving and population ageing⁷¹. This could potentially result in an unbearable burden on social care systems, combined with a higher proportion of the population being involved in unpaid care over time; or those involved in unpaid care being pressured to increase their care effort⁷².

Changing societal models; including declining family size, changes in residential patterns of people with disabilities and rising number of women within the workforce; are likely to contribute further to the decline in the availability of family carers, and the increasing need for paid care⁷³. Pressure on services is also likely to increase, as empowered consumers (see 'Personalised healthcare' trend) demand better quality and more responsive social-care systems, which are patient-oriented⁷⁴.



6. Reactive healthcare and short-termism

Health care systems globally have traditionally been reactive - people become sick, then visit medical services to be made better. However, the increased health and economic pressures brought about ageing populations have made this reactive approach to care unsustainable. While preventative healthcare that addresses the wider determinants of health (such as education, living conditions and employment) can help to reduce costs and overall health burden by promoting healthy environments and behaviours, governments have been slow to install preventative policies, often viewing them as an aside to traditional, reactive healthcare. As a result, global investment in preventative health care is low. In Europe, only 3% of healthcare expenditure is allocated to

prevention and public health programmes, and in some countries it is as low as 1%⁷⁵.

The long term nature of preventative practices (it takes time before the economic and health benefits can be felt), while being precisely why this approach is so important, is often their downfall. Governments working to short electoral cycles may not be inclined to commit resources to initiatives that will benefit their successors. The result is, even in countries where preventative health has risen high up the agenda, preventative policies have often been the first to go when cuts are made. For example, in Australia some of the first acts of the current government were to close the Australian National Preventive Health Agency⁷⁶, cut the core funding of the Alcohol and Other Drugs Council of Australia (ADCA)⁷⁷, and withdraw nearly \$400 million in funding for prevention allocated to the states⁷⁸. Further cuts made in 2015 heavily affect preventive health research and chronic disease prevention. All of these changes have been made despite Australia committing to reduce chronic disease (non-communicable disease) by 25 per cent by 2025, in line with the World Health Organisation's targets⁷⁹.

For governments to invest in preventative health, innovations will need to address how to create a paradigm shift in how healthcare systems are assessed, away from a focus on 'diseases treated' and instead to 'diseases avoided'⁸⁰. Innovations that can clearly demonstrate a cost saving in the short term will also be critical if governments are persuaded of the benefit of continuing to invest in preventative practices.

Preventative healthcare – an innovation challenge to all sectors of society

Globally there abides a popular misconception that anything to do with health and ill-health is purely the responsibility of the health sector⁸¹. However, as the effect of social and environmental determinants (income, class, education, living conditions,

employment etc) on people's health is slowly understood, countries have seen calls for different sections of society to become more actively involved in addressing them. For example, with the majority of the population spending over half of their lives at the work place, employers are seeing calls to influence the health of their employees through interventions such as group coaching sessions, health displays and modified canteen menus. Another area of focus has been local government, as in many countries they have an influence on every one of the identified social determinates of health and wellbeing⁸². For example, the approach they take to town planning can impact on the 'liveability' of the environment and opportunities for physical activity and recreation⁸³.

However, despite these calls for action there still remains a significant evidence gap in how to effectively tackle the social and environmental determinants of health. This is particularly true in terms of sector-wide policies in education, the health system, food and agriculture, and more generally on the influence of macro-level policies on health inequalities⁸⁴.

In countries which are trying to move away from a reactive health system to prevention, governments will need to investigate how they can encourage and facilitate innovations in all areas of society, while simultaneously creating a robust evidence base of what works. This may include focussing on those areas often underutilised in addressing health inequalities, such as engaging the 'wider workforce' and initiating public health training across a range of professions⁸⁵.



7. Shared decisions and end-of-life care

Life expectancies have increased globally as a result of improved health care, sanitation,

immunisations, access to clean running water and better nutrition. For example, in the UK life expectancy has nearly doubled since the start of the 20th Century. However, these increases have not been matched by increases in healthy life expectancy – the number of years a person can expect to live in fairly good health - meaning that greater numbers of people will be spending more of their lives unwell.

Traditionally, health care systems have proliferated the idea, readily taken up by society, that every cause of death can be resisted, postponed, or avoided. This has resulted in medical professionals offering treatments that have a low probability of improving a patient's health, and may effect it adversely by causing pain and discomfort. However, there is now growing debate on whether non-curative treatments to prolong life should be given regardless of the condition of the patient. This balance between quality and quantity of life, between over-treatment (over-hospitalisation of care and over-medicalising of the dying) and under-treatment, links in closely with the trend towards a more patient-centric health system (see 'Personalised Healthcare' trend).

Central to this is a growing movement towards shared decision making between patients and medical professionals. Shared decision making has the aim of ensuring that patients are involved as active partners with the clinician in clarifying acceptable medical options and choosing a preferred course of clinical care⁸⁶. In this model, the patient is made aware of the risks and benefits of a particular treatment, and the alternatives which are available. This means that the patient has the final say on whether a particular course of action is appropriate to them, helping to ensure that they are not given unnecessary or burdensome treatments. This is particularly relevant when a patient has received a terminal prognosis, for example for cancer, and a decision needs to be made on whether to continue with therapy to extend the individual's life at the cost of their physical state, or to stop therapy, shortening but potentially improving their quality of life. However, while shared decision making is often discussed in policy and planning documents the extent to which it is occurring in practice is less certain.

Innovations in this area may need to address how to ensure shared decision making gets built into standard practice.

While shared decision making offers many potential opportunities to improve healthcare, many critically ill patients do not have the capacity to make end-of-life decisions for themselves. The rising numbers of people with chronic, non-communicable diseases that affect their capacity to make end-of-life decisions (e.g. dementia) has resulted in increasing debate on how to ensure that people's wishes for treatment and care are always followed. In the UK, this has concentrated around Advanced Decisions and Lasting Power of Attorneys. Advance Decisions allow people to make a legally binding refusal of treatment in advance of a time when they cannot communicate their wishes or do not have the capacity to make a decision for themselves⁸⁷. Lasting Power of Attorneys give one or more trusted persons the legal power to make decisions about a person's health and welfare if they lose the capacity to do so themselves⁸⁸.

However, while the issue of end-of-life decisions has started to make headway in certain medical and charitable circles, there is often very little debate about death in wider society. The result is that, while many people have personal preferences about how they would like to be treated at the end of their life, very few have set out their wishes in a legally binding document. For example, a UK study found that while 82% of people surveyed said that they had strong wishes about their end-of-life treatment, only 4% had set out their wishes in an Advance Decision⁸⁹. It remains to be seen whether increasing levels of health literacy will lead to the de-stigmatisation of conversations about death, and an increase in people making early decisions about their end-of-life care.



8. Advances in healthcare technology

Over the next 10 to 15 years, several trends in healthcare technology may significantly influence patients' access to health care and

the way that health care is delivered.

First and foremost is the convergence of medical devices and information technology. This area is already resulting in the development of a range of technological healthcare innovations, and is likely to see significant innovation in the future. For example, electronic medical records will allow healthcare systems to store and transmit data gathered electronically from clinical notes, diagnostic equipment, patient monitoring systems, alarms and other sources via the integration of medical devices and information technology⁹⁰. Other medical technologies in this area include anesthesia machines, wireless infusion pumps, and radiofrequency identification (RFID) systems.

The potential benefits of this type of technology include workflow streamlining, seamless recording and exchange of information, as well as an overall improvement of patient care⁹¹. However, while significant investment in this area is occurring, only limited data currently exists showing the validity of these proposed benefits. Therefore, the extent of their influence on future healthcare is as yet unclear. In addition, there is a high cost involved in the development and application of many of these technologies, and of electronic medical record systems in particular⁹². This presents a significant challenge to their adoption in lower-income countries.

The second major trend is medical technology that can deliver complex, sophisticated care outside of the traditional medical settings, for example in the home. This type of technology has the potential to address the increasing shortage of healthcare workers and growing numbers of patients with non-communicable diseases by allowing patients to receive timely, appropriate diagnosis and treatment outside of the hospital setting⁹³.

This type of technology can be split into three areas: remote monitoring devices, portable technology and telemedicine. Remote-monitoring devices allow patients with chronic diseases to receive improved follow-up and disease management from home or secondary care facilities without needing to visit a hospital

or physician's office⁹⁴. They present particular benefits to people living in rural areas, or in countries with limited healthcare options.

Portable technology allows patient care to be delivered outside of hospitals. An example of this growing trend is the portable ultrasound unit which allows clinicians to examine patients away from the hospital, before the date is brought back to a medical centre for analysis⁹⁵.

Telemedicine is defined as “the use of medical information exchanged from one site to another via electronic communications for the health and education of the patient or health-care provider and for the purpose of improving patient care, treatment, and services⁹⁶”. While the other areas of medical technology have been primarily focussed in high-income countries, there has been a significant growth of the use of telemedicine in emerging economies⁹⁷. This is in part due to the potential telemedicine creates for facilitating consultation with trained physicians and specialists in rural and other medically underserved areas.

It is likely that the use and need of telemedicine will increase due to the growth in patients suffering from long term, non-communicable diseases⁹⁸. However, this type of technology requires adequate numbers of trained personnel, so its implementation may be effected by the current shortage in healthcare workers.

Despite the potential benefits that medical technology presents to all countries, there are often significant barriers which impede the diffusion of medical devices and IT, and the potential benefits that they offer to public health⁹⁹. These barriers include a lack of reliable water and power; lack of replacement parts; cost and other financial issues; lack of experienced, trained technical and clinical staff; lack of consumables such as syringes and catheters; lack of appropriate public infrastructure; a need for these devices to be regularly serviced and upgraded; political instability; regulatory constraints and corruption¹⁰⁰. In consequence, some countries may need to tackle the underlying problems, such as failing or absent infrastructure, before considering the adoption of some of the new

medical technologies¹⁰¹.

The cost of acquiring and leveraging technology innovations may also be a restrictive factor for some countries, due to increasingly restricted health care budgets. In consequence, there have been global efforts by public and private health care providers and insurers to contain expenditure on medical technology by restructuring care delivery models and promoting more efficient use of resources¹⁰².



9. A changing health universe

Three themes have crept into health policy agendas which have the potential to significantly affect the health innovations of the future:

Self-management

Increasingly, there is a trend towards personal responsibility for health in public health agendas, particularly in higher income countries where health information is more accessible.

This trend is intimately linked with the rise in chronic, non-communicable diseases where management is primarily the responsibility of the person with the chronic disease. This is in contrast to acute illness, where health care providers assume the majority of responsibility for illness management.

In response, health care services are increasingly being encouraged to adopt a more person-centred, collaborative, and long-term approach. This includes embedding support for self-management in standard practice alongside and integrated with high quality clinical care¹⁰³.

Reviews of the available evidence do suggest that supporting self-management can have benefits for people's attitudes and behaviours, quality of life, clinical symptoms and use of healthcare resources, in particular through focusing on behaviour change and supporting self-efficacy. However, many people with chronic disease still struggle to follow treatment recommendations, with research suggesting that adherence to long term treatment for chronic diseases averages 50%¹⁰⁴.

While supporting self-management has the potential to ease the pressure on health systems caused by workforce shortages, rising demand for services, population increases and budgetary constraints, implementing one-off interventions is unlikely to make a significant impact on the overall health of the population or on the sustainability of health and social care systems¹⁰⁵. Instead, it is likely to be most effective when implemented as part of wider initiatives to improve care through educating practitioners, applying best evidence, and using technology, decision aids and community partnerships effectively¹⁰⁶.

Health literacy

Health literacy has been described as entailing "people's knowledge, motivation and competences to access, understand, appraise and apply health information in order to make judgements and take decisions in everyday life concerning health care, disease prevention and health promotion to maintain or improve quality of life during the life course"¹⁰⁷.

Health literacy has gained considerable attention worldwide, and global research is quickly deepening understanding of the vast potential that optimising health literacy can have in improving health and well-being and reducing health inequities¹⁰⁸. Good health literacy, or the ability to make sound health decisions in the context of everyday life has been shown to be linked to higher life expectancy and healthy life expectancy. In contrast, limited health literacy cost more than US \$8 billion, an estimated 3–5% of the total health care budget in Canada in 2009¹⁰⁹. In 1998, the United States National Academy on an Aging Society estimated that the additional health care costs caused by limited health literacy were about US\$73 billion¹¹⁰.

However, there is a discrepancy that exists in many modern societies where people are increasingly encouraged to make healthy lifestyle choices and manage their own health and movement through complex health care systems, while simultaneously receiving little support in addressing these tasks¹¹¹. This is shown clearly in the European Health Literacy Survey which found that, despite the increasing

focus on health literacy by governments in this area, nearly half of all adults in the eight European countries tested had inadequate or problematic health literacy skills¹¹².

Factors which have been found to be significantly associated with limited health literacy are lower levels of education and migrant status¹¹³. Old age in particular has been shown to be a likely barrier to health literacy. This group are typically lower-level users of the internet, a key source of health information and as such are at a disadvantage compared to the rest of the population. Moreover, they are less likely to be proactive about voicing their preferences in their health care. These groups represent a failure of health systems to effectively reach out to all segments of society, rather than a failure on the part of the individuals themselves. Lessons could be learned and methods incorporated from other sectors, such as retail, which have been successful in reaching out to a broad spectrum of consumers.

The ‘new empowered health consumer’

Intimately linked with the growing focus on health literacy is the idea of the ‘new empowered health consumer’. This new consumer is posited as having better access to information about conditions and cures, higher expectations of health services, access to and a willingness to use more and better self-diagnosis tests, and more willing to look outside the health service if it cannot meet their needs.

However, it is wrong to assume that all people will be interacting with the changing health universe in the same way. For example, recent research focussed on Europe has found that age is a significant factor in how people interact with and access health information. Trust and use of web-based health sources was found to be stronger among younger people than older, and younger people were also found to be more likely than older to search out and trust health advice from friends, family or colleagues¹¹⁴.

While the development of new technologies provides significant opportunities for increasing the health literacy and self-autonomy of patients, health information providers must also

recognise the need for significantly different tools to communicate health messages to older and younger people. Service providers must continue to invest in tackling digital exclusion and encourage governments and health and social care professionals to do more to develop health literacy as part of a strategy to raise awareness among people of how to keep themselves healthy¹¹⁵.

Patient empowerment also needs to also be seen as desirable by the patients themselves. Just providing new services that allow people to take more responsibility for their health is not enough without first having consumer buy in, and this may need creative investment. Professional attitudes and behaviours may also need to change, with patients and the community seen as assets, rather than just sources of need. Without these changes there is a danger that patients will become empowered only to be discouraged when they encounter services and professionals that don’t embrace this new relationship.



10. Personalised healthcare

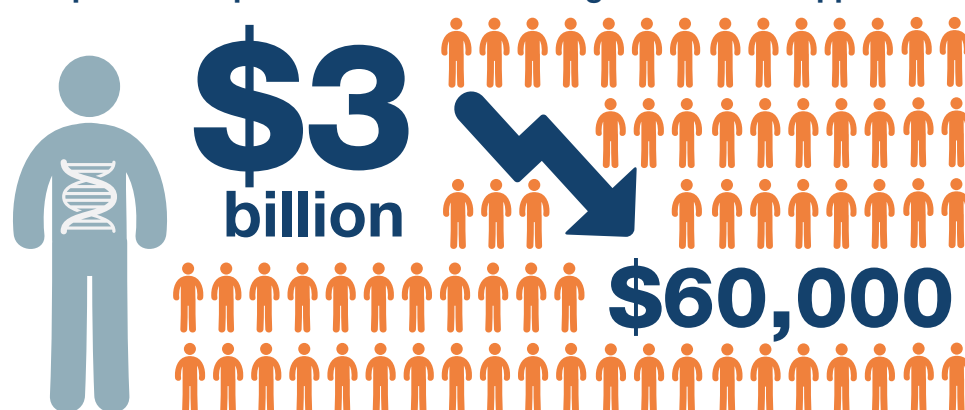
There is currently a global move towards personalised healthcare, which aims to shift the health system from one which is reactive to one which is proactive and preventative, and recognises that health services are more effectively integrated around the individual ‘customer’ than the provider¹¹⁶. Personalised healthcare aims to move away from the ‘one size fits all’ approach to one in which services are tailored to the individual needs and preferences of patients, and in which patients can directly input into decisions about their healthcare. It is therefore intimately linked to the ideas of self-management, health literacy and the new health consumer.

Two primary drivers for this shift are;

1. Advances in science which have created groundbreaking ways to treat disease, manage risk of illness, and more effectively achieve outcomes for patients – for example genetic therapies¹¹⁷.

Fig 7: Decline in price of sequencing the human genome

The price to sequence the entire human genome has dropped from



Davies, K. 2008. Applied Biosystems and the \$60,000 genome. http://www.bio-itworld.com/BioIT_Article.

- Unprecedented access to health information resulting from advances in communication technologies (see 'Advances in healthcare technology' trend), leading to a shift of power away from health provider teams to the individual¹¹⁸.

Genetics

Rapid advances in biomedical research and technologies have significantly contributed to the rise of personalised medicine, and offer the potential for revolutionary change. Researchers have developed genetic tests to diagnose, predict and identify carriers of genetic disease and also determine the risk of adverse medication reaction¹¹⁹. For example, genome-wide association studies have uncovered new genes linked with common diseases, including coronary heart disease, type 1 diabetes, type 2 diabetes, rheumatoid arthritis, Crohn's disease, bipolar disorder and hypertension¹²⁰. For example, a test can now show whether a woman has mutations which signify an increased risk of breast cancer. If found, she can then be monitored throughout her life for the disease¹²¹. This technology offers significant promise for accelerating the move towards individualised predictive, preventive and personalised care.

In addition to genetic research, there has been a rise in '-omics' technologies, which allow researchers to link phenotype with dynamic protein production, gene-protein and protein-

protein interactions to identify markers and molecular targets in health and disease¹²².

The cost of this type of technology so far has been prohibitive, but it is decreasing. For example, the price to sequence the entire human genome has dropped from \$3 billion to \$60,000¹²³, with several countries and commercial entities investing in technology to try and reduce the cost further. This would create the opportunity for many more people to obtain a blueprint of their genetic code, allowing them to evaluate their genetic risk of disease, and take control of their own health by modifying their lifestyle according to their genetic predisposition to particular diseases¹²⁴. However, even with these potential reductions in cost, genetic therapies still remain expensive, which presents a challenge to their integration into health systems. This is particularly so in countries with a more socialised system of medicine where therapies and technologies would need to be accessible to all¹²⁵.

There are signs that genetically personalised healthcare is becoming a global initiative. For example, the HapMap project is aiming to develop a haplotype map of the human genome, with researchers around world having free access to the data to find genes affecting health, disease, and responses to drugs and environmental factors¹²⁶.

There is also great potential to link many of the technological trends discussed earlier

in this chapter (see ‘Advances in healthcare technology’ trend), with the new individualised genetic information to offer more personalised healthcare. For example, electronic and personal health records containing information on patient’s clinical conditions and characteristics can be interfaced with genetic information to deliver the best individualised care for each patient.

Despite these advances, there is still a lack of knowledge and utilisation of clinical genetics, genetic testing and genetic counselling amongst medical professionals and the public¹²⁷. Innovations that create personalised healthcare-related educational programmes may be one way of addressing this. Other challenges to integrating genetically personalised healthcare into countries healthcare systems include a lack of regulation, reimbursement, standardisation of healthcare information technology such as electronic medical records, clinical validation, adequate funding for research, and privacy concerns¹²⁸.

Access to health information, health technology and the empowered consumer

Unprecedented access to health information resulting from advances in communication technologies (see ‘Advances in healthcare technology’ trend) is significantly contributing to the rise of personalised medicine. This wave of information is resulting in increased health literacy, with many people having more input into their own healthcare and wellbeing, and actively self-managing conditions (See ‘A changing health universe’ trend). The result has been the development of a consumer-based health system in many countries, “within which people select and engage online tools and resources to personalise their own system of health and wellness that is custom made to the needs, values, and goals of the individual¹²⁹”.

These empowered individuals not only have greater control over the decisions and actions affecting their health, but also aid in the creation of a preventative health system, leading to economic savings. In a perfect scenario, empowered patients who are able and willing to address their own behaviours are less likely to suffer from health problems, reducing their use

of medical services and the associated costs. Empowered consumers can also create a ‘pull’ for health service change as they are more invested in the system.

However, this has developed almost separately, and is virtually distinct from traditional healthcare systems. This is largely down to most systems being primarily focussed on managing illness and disease, rather than the health and wellness that the empowered consumers are seeking to achieve¹³⁰. There is also a lack of opportunities for consumers to link their personalised health tools to the formalised patient health data embedded in health systems¹³¹.

The result is that while consumers are able to seek and engage with health services in new ways, and technological developments have transformed how health challenges are managed personalised healthcare has not yet achieved its potential globally¹³². However, this is likely to change as the challenges presented by ageing populations increase pressure on health services, and empowered consumers demand better quality and more responsive healthcare systems.



11. Big data

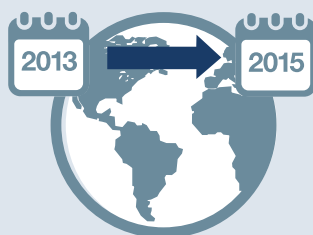
Our ability to generate data has moved light-years ahead of where it was only a few years ago, and the amount of digital information now available to us is essentially unimaginable – it has been suggested that the last five years have seen more scientific data being generated than in the entire history of mankind¹³³. Simultaneously, the potential for an era of open information in healthcare is being ushered in by the digitisation of healthcare systems. The result of these changes is an opportunity to revolutionise healthcare through the use of ‘big data’.

There are two sets of data which health care organisations are already using; retrospective data, basic event-based information collected from medical records; and real-time clinical data, the information captured and presented at the point of care (imaging, blood pressure,

Fig 8: For Healthcare big data is a big deal

90%

of the world's data created
in the last **2 years**.



That's predicted to grow by a factor of
50 to 25,000 petabytes
by **2020**



**A comprehensive study by McKinsey Global Institute
found that if Big Data was used effectively:**

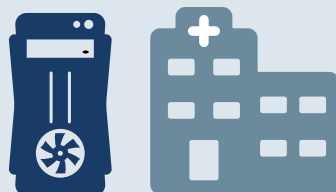
The US healthcare sector could make **\$300 Billion**
in savings every year, thereby reducing expenditure by **8%**

Poorly co-ordinated care = \$25-50 Billion

Fraud and abuse = \$125-175 Billion

**Administration and
clinical inefficiency = \$175-250 Billion**

**50
Petabytes**



There is an estimated **50 Petabytes**
of data in the healthcare realm

Source: <http://ihealthtran.com/wordpress/2013/02/5-ways-to-improve-hies/>



**Data
Sizes**

1024 Kilobytes = 1 Megabyte
1024 Megabytes = 1 Gigabyte
1024 Gigabytes = 1 Terabyte
1024 Terabytes = 1 Petabyte
1024 Petabytes = 1 Exabyte

oxygen saturation, heart rate, etc)¹³⁴. New technologies have succeeded in linking these two sets of data together so that medical professionals can now identify trends that will impact the future of healthcare (predictive analytics). For example, if greater numbers of deep vein thrombosis (DVT) patients report pain in their abdomen, combining the real-time and retrospective data can help doctors analyse how treatments will work on a particular population. Linking this data creates the opportunity for healthcare systems to develop customised preventative and longer-term services¹³⁵.

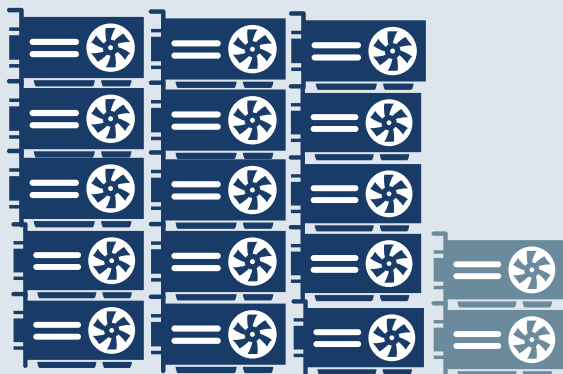
The second and potentially most revolutionary opportunity created by 'big data' lies in linking traditional health data to non-traditional data

to improve health outcomes. For example, environmental scientists are capturing huge quantities of air quality data from polluted areas and attempting to match it with health care datasets for insights into respiratory disease, and epidemiologists are gathering information on social and sexual networks to better pinpoint the spread of disease and create early warning systems¹³⁶. The global proliferation of wireless devices (e.g. mobile phones) has created another enormous source of data about human life and behaviour which offers particularly exciting opportunities to improving global health¹³⁷. This data has the potential to be linked with both electronic medical records and the new individualised genetic information (See 'Personalised Healthcare' trend) to deliver

Fig 9: For Healthcare big data is a big deal

15 out of 17 sectors

in the United States have more data stored per company than the US Library of Congress, including healthcare.



Source: <http://ihealthtran.com/wordpress/2013/02/5-ways-to-improve-hies/>

At current growth we will soon have more data than our IT systems can handle

40%

Data growth per year

5%

Current global spend on IT



individualised care for every patient, and a far more complete picture of human health. It can also provide us with new opportunities and methods for encouraging healthy behaviour, new capabilities for medical intervention at non-traditional points, and the possibility of reducing healthcare costs¹³⁸.

Observing human behaviour in this way, sometimes referred to as ‘reality-mining’¹³⁹, offers new opportunities to tackle the rise of chronic, non-communicable diseases. In many countries, the main information that we have on preventing these diseases has come from traditional longitudinal studies. ‘Big data’ and ‘reality-mining’ techniques give scientists the opportunity to bypass the logistical challenges inherent in collecting this data, as well as allowing the collection of far more information than ever before¹⁴⁰. They also offer ground-breaking possibilities around the analysis of ‘contagious’ non-communicable diseases. Recent research suggests that some conditions and behaviours are “contagious,” in the sense that personal health outcomes are linked to who a person shares social connections with. For example, obesity has been shown to spread within social networks. Therefore, by ‘reality-mining’ scientists might be able to produce specific points of leverage for effective health interventions¹⁴¹. Other

significant application areas for this data include: chronic and infectious diseases, mental health, environmental health, nutrition, healthcare cost and quality, accidents and injury, and social health¹⁴².

However, the use of ‘big data’, particularly data collected from personal electronic devices, does create potential issues around data privacy, ownership and misuse of personal data. Governments will have to develop ways of balancing privacy regulations - regulating the security, disclosure and ownership of personal health information – with the potential health and cost benefits that sharing ‘big data’ can bring.

An even greater problem is how to make the best use of the data. Currently, countries’ ability to generate data far outstrips their ability to analyse it. If they are to make the most of the opportunities offered by ‘big data’, they will need to train more staff and allocate more resources, as well as investing in the development of sophisticated algorithms to aid analysis¹⁴³. The sharing of datasets between individuals, between organisations, and between countries would also allow for a greater amount of data to be analysed, and its potential benefits garnered. However, this will require more transparency and data sharing in both industry and academia.



12. Integrated care

Integrated care is currently at the heart of worldwide health care reform, and is gaining significant and increasing traction as countries try to address the complex needs of ageing populations within limited health budgets. While there is not one accepted definition, integrated care is generally seen as involving extensive collaboration between different departments within and across health and social care, with the over-arching aim of delivering a personalised system that is both high quality and good value.

Models of integrated healthcare vary in emphasis and focus. For example, in some Swedish counties the government has contracts with private providers to provide primary, secondary and social care at a fixed price; while in Australia, national and state programs are seeking ways of integrating primary care, bringing together general practice, nurses, allied health professionals and visiting medical specialists¹⁴⁴.

However, by ensuring that the most appropriate and effective care is provided where and when it is needed, all forms of integrated care can potentially create a more seamless care experience for the user and opportunities for financial savings through improved efficiency and productivity. For example, integrated care can result in the patient and his carers no longer having to coordinate different treatments and steer themselves across different providers¹⁴⁵. This offers particular opportunities to addressing the growing numbers of older people suffering from multiple chronic conditions, as many of them are in regular contact with several health and social care professionals as well as receiving care from families, friends and volunteers. Integrated care, in an ideal situation, allows these professionals to work together in responding to the patient's needs, treating the person as a whole rather than the presenting medical condition.

However, effective integrated care is difficult to achieve as the complex care needs it is

aiming to tackle often need equally complex solutions. Funding structures and competing priorities can also create difficulty, such as in England, where health provision comes through a centrally allocated budget, while social care budgets are controlled by local authorities.

Additionally, while countries have seen an increasing focus on integrated care, these efforts have not typically extended into a concern for the broader health of local populations and the impact of the wider determinants of health. In countries with a long history of public health policy initiatives, such as England, the paths of integrated care and public health have rarely crossed¹⁴⁶. If countries globally are to make the most of integrating their health and social care services, those involved in these areas will need to innovate to 'join up the dots', recognising that population health is affected by a wide range of influences across society and within communities¹⁴⁷.

FUTURE SCENARIOS – WHAT WILL GLOBAL HEALTHCARE LOOK LIKE IN 2065?

Below are three potential future scenarios based upon the trends previously discussed, imagining what global healthcare may look like in 2065. They are; **‘Prevention is key’**, **‘Technological takeover’**, and **‘The status quo remains, health systems collapse’**.

1. Prevention is key

The crippling health costs seen in the early 21st century have resulted in the traditional reactive health systems becoming unworkable, and they have been replaced by a focus on prevention through the promotion of wellness. Health budgets are now primarily used for preventative activities, including educating the public on good nutrition, the creation of green outdoor spaces open to all, and grants for businesses to incorporate gyms into their workplaces.

The use of ‘big data’ has led to a much deeper understanding of the broader determinates of health. There is now irrefutable evidence of the health advantages and cost savings that addressing environmental issues and individual behaviours bring. All new homes are built to a lifetime homes standard and electricity rates are reduced to ensure that everyone is able to keep warm during the winter months. Air quality has been improved significantly through international agreements aimed at reducing CO2 emissions, and in many countries private motorised vehicles have been banned from urban centres.

Many countries have also introduced much tighter regulations around food and drinks to encourage healthy diets. Maximum retail prices have been set for fruit, vegetables and grains, while higher rates of tax have been applied to foods that contain over a certain percentage of fat, sugar or salt. Particularly harmful foods, such as trans fats, have been banned altogether, while subsidised healthy food options are available to the poor.

Tighter regulation has also been developed around food and drink advertising in line with that introduced for tobacco. Unhealthy products are no longer allowed to sponsor sports events, and adverts can no longer imply a link between the product and a healthy lifestyle. Advertisements for these products are also banned from targeting children, and cannot be shown on television before the nightly watershed.

The use of ‘big data’ has increased understanding of the links between physical and mental health, and the cost savings to both the health system and businesses of preventing mental ill health. In consequence, both the focus and funding for mental health has achieved parity with physical health. This has resulted in new regulations to ensure that employers take measures to safeguard and improve the wellbeing and mental health of their employees. For example, computerised cognitive behavioural therapy has now become the norm in offices, which has resulted in employees taking less time off, and lower costs for businesses. More money has been allocated to projects tackling social isolation and loneliness generally, with a particular focus on the older generations. These primarily address helping people to both build and maintain social connections.

Governments’ greater focus on prevention has led to the consumer-based health system in many countries, where people select and engage online tools and resources to personalise their own system of health and wellness, becoming fully merged with the traditional health system. People can now access their personal medical data and use it to further personalise their own online health and wellbeing plans. These are directly linked to the medical system, which feeds back health advice relevant to each individual’s personal plan, for example around diet, exercise and relaxation.

The result of this preventative approach is the incidence of non-communicable diseases has reduced dramatically. In particular, the rates of diabetes, strokes and heart disease have nose-dived as the global levels of obesity have fallen. Dramatic costs savings have been made, both to healthcare systems as the need for costly acute care has fallen, and to businesses as productivity levels have increased and fewer sick days are taken. As people are now healthier for longer, governments have also been able to raise state retirement ages providing further economic benefits. These changes did not happen instantly, but were gradually achieved over a 50 year period. However, as governments started to see the benefits of preventing rather than reacting to health problems, they were emboldened to implement more progressive policies. Equally, as the public saw the benefit to their individual health and wellbeing of a preventative approach, they were more willing to take an active part in their own health care.

2. Technological takeover

High levels of health literacy are the norm, with patients actively measuring their own health through a range of wearable technology, including internal devices continually testing their blood, body temperature and neural activity. This data feeds directly into people's health records, along with behavioural and social information, such as their movements throughout the day and who they come into contact with. Sophisticated programmes constantly monitor the health data coming in from the wearable devices, analysing it in the context of each individual's medical history and linking it in with environmental data.

Individuals and their doctors are alerted when any potential health issues arise. For example, asthmatics are informed if they are about to enter an area of high pollution and alternative routes are suggested. When health problems are detected, the highly health literate consumers are often able to self-manage these conditions through knowledge of their own health data, and through guidance received from doctors directly into their wearable devices. If conditions require tests or a more

detailed consultation, individuals are sent directly to the relevant specialist without needing a one-to-one consultation with their GP.

Genome sequencing is a standard part of every child's medical beginning, as technological advances and competition between commercial enterprises have reduced the cost to around £80 per person. This data feeds directly into a global medical database which can be accessed and analysed by researchers from every country. When this was first set up, there were some initial concerns about data privacy and misuse of personal data. However, these were largely overridden by calls for greater collaboration, as health systems all around the world buckled under the logistical and economic pressures of the rise of chronic, non-communicable diseases.

The result has been a dramatic increase in the understanding of genotype/phenotype relationships and of epigenetic factors, resulting in the discovery of cures for many age-related chronic ailments such as Alzheimer's disease and diabetes. This new understanding of genetics has also led to the creation of a host of personalised therapies. Not only can people choose the medicines which are least likely to cause theme side-effects, but the interventions are so effective that non-communicable diseases are diagnosed earlier enough to stop them from progressing.

The huge amount of behavioural and health data being collected from personal technological devices now mean that governments are able to monitor how healthy each individual's lifestyle is. When this data is combined with personal genetic information, government's also have an idea of how healthy each individuals lifestyle is in relation to the diseases and conditions that they are genetically predisposed to, or currently suffer from. For example, they now know if a diabetic patient is regularly drinking alcohol which is leading to spikes in their blood sugar levels.

This new data has helped contribute to the rise of empowered health consumers, who have increasing levels of health literacy, actively inputting into their own healthcare

and wellbeing, and self-managing conditions. However, the move towards personal responsibility for health has coincided with many health systems reaching critical mass, both economically and logistically, trying to deal with the health challenges of ageing populations. Some governments have responded to this by creating a 'Wellness tax', the rate of which is dependent on how healthy a person's lifestyle is. This takes into account their predisposition to particular conditions based upon their genetic data. For example, someone who smokes who is genetically predisposed to lung cancer pays a higher rate of tax than someone who smokes but who isn't genetically predisposed to lung cancer.

The result of the rise in health technology is huge reductions in the incidence of non-communicable diseases, and dramatic cost savings to governments. However, the biggest change has been the rise of the empowered consumer - a patient who is no longer a passive recipient, but is instead plays an active role in their own healthcare and is equal partners in medical interactions, driving forward the full personalisation of health systems.

3. The status quo remains, health systems collapse

A focus on short-term wins for political gain resulted in many governments never fully implementing preventative health systems, and instead upholding the traditional model of reactive care. However, the increasing financial and logistical burden brought about by rising levels of comorbid, non-communicable diseases, and a lower percentage of people of working age, resulted in health system reaching breaking point. Waiting times dramatically increased, with hospitals bouncing back GP referrals to try and keep within impossible targets. With people having to wait longer for treatment much of society, both young and old, ended up living with long term conditions that reduced their quality of life and their capacity to work. Severely underfunded social care systems meant that many people had to make a hard choice between staying at home and caring for a loved one, or going to work to financially support them.

To try and prevent total breakdown many governments made brutal cuts in other areas, such as the civil service, as well as increasing taxes on both businesses and personal income. The economic uncertainty created by these measures resulted in a global recession worse than that seen in 2008. Not only did this result in even less money being available to health services, but it also retarded the development of the health technologies which could have helped address many of the health challenges brought about by ageing populations.

Countries became more preoccupied with their own interests, as they attempted to address their own internal problems. As a result, the potential health breakthroughs which could have come from sharing 'big data', particularly around genetic information, did not happen, and cures are not found for what became known as 'the big three' – diabetes, Alzheimer's disease and cancer.

The social health of individual societies deteriorated as people split up into factions, with each group looking out for its own interests. This resulted in the physical and mental health of many people reducing further as all but the most economically well-off faced hardship, with many people turning to alcohol and other drugs, or at the very least making poor dietary choices, as rates of depression escalated. Countries with national health services turned to the private sector for help. However, the virtual economic collapse meant that this only furthered the divide between the rich and the poor, as a significant proportion of the populations were unable to afford even the most basic level of insurance. As a result, many people turned to illegal health services offered by untrained individuals, as well as unbranded medications.

The free or subsidised services which remained open faced an increasing shortage of medical professionals. Overburdened services, a lack of resources and poor rates of pay pushed many doctors and nurses into the top-end private hospitals, and to countries whose health systems had better weathered the ageing storm.

As a result of these changes, overall life expectancy and healthy life expectancy in much

of the world has reduced, with dramatic drops for people living in the most deprived areas. However, the affluent factions of society, who can still afford the most comprehensive private healthcare, have seen both life expectancies continue to increase, living longer and healthier than ever before.

INNOVATIONS

The aim of this chapter is to showcase innovations which have the potential to deliver sustainable solutions to current and future healthcare systems. Based on the challenges and opportunities identified in the previous chapter, we have identified a range of innovations, which have the potential to be applied and replicated in other country contexts. The innovations are intended to serve as a springboard to action, providing a blueprint for adoption and implementation for global healthcare leaders.

For the purposes of this report, we define innovation as “the intentional introduction and application within a role, group, or organization, of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, or wider society”¹⁴⁸. The search criteria included nondisruptive and disruptive innovation and all possible product, process or structural innovations¹⁴⁹. We selected the innovations according to the three predefined characteristics: a) novelty b) an application component and c) an intended benefit¹⁵⁰.

Innovation Criteria

The innovations we showcase here cut across many of the trends identified in the previous chapter. Invariably one innovation will often respond to a number of challenges or offer a range of positive solutions or outcomes. Nevertheless certain priority trends emerged and innovations have therefore been grouped accordingly.

The innovations are classified and evaluated according to the following criteria:

Country of origin



Innovation Trends



1. The rise of non-communicable diseases



2. Multiple chronic diseases and the coordination of care



3. Healthcare costs and the changing nature of health spending



4. A global shortage of healthcare workers



5. Long term care and changing family structures



6. Reactive healthcare and short-termism



7. Shared decisions and end-of-life care



8. Advances in healthcare technology



9. A changing health universe



10. Personalised healthcare



11. Big data



12. Integrated care

Type of innovation



Innovation in organisations

e.g. care hospitals in India by applying 'Fordist' principles



Innovation in academia

e.g. action based research, randomised control trials



Innovation in markets

e.g. demand of personal trainers



Innovation in service delivery and design

e.g. establishment of memory clinics to improve diagnosis rates



Innovation in politics/ government

e.g. creation of dementia national action plans



Innovation in products

e.g. apps to monitor long term conditions

Potential for roll out

Ranging from 1 -3

Potential cost savings

Ranging from 1 – 3

Country health impact

Ranging from 1 – 3

Potential global health impact

Ranging from 1 -3

Current diffusion journey

And in more detail we consider:



Innovation description



The instigator and implementation journey



Evidence of success



Limitations of innovation



Where it may be applicable

Evidently it was beyond the confines of this report to source innovations which are representative of all themes explored in the first chapter. Thus it should not be assumed simply because an innovation on smoking is not included, that smoking does not pose a significant health challenge for the population. As mentioned above, innovations were chosen according to their pertinence to the challenges and opportunities identified in Chapter 1 and their fit to the pre-defined innovation criteria above. As the report assumes a life course approach to health, some of our innovations refer to the wider social determinants of health, as discussed previously.

RESPONDING TO THE SURGE OF NON-COMMUNICABLE DISEASES (NCDs)

Non-Communicable Diseases pose a considerable challenge for healthcare systems. The World Health Assembly in May 2012 set a global target to reduce deaths from NCDs by 25% for those aged under 70 by 2025 and undeniably innovation will be essential to achieve this target. Our innovations in this section have been chosen in light of this and include targeted and wider population based approaches to both prevent and manage NCDs, with the potential of diffusion beyond their country context.

Without intervention and innovation, NCDs threaten the sustainability of the health economies in high-income countries and the extension of universal healthcare and overall development in low and middle income countries. It is also evident that right now our systems and structures are woefully underprepared to prevent and manage NCDs and respond to this growing pandemic.

While around nine-in-ten countries may have a unit, branch or department within the Ministry of Health with specific responsibility for NCDs very few have specific policies, strategies or action plans for all of the following areas; cardiovascular diseases, cancer, chronic respiratory diseases, diabetes, alcohol, unhealthy diet and/or obesity, insufficient physical activity and tobacco. Furthermore research funding for chronic disease areas that














are not seen as life-threatening diseases such as dementia, are also often under prioritised (We have deliberately classified dementia as a NCD for the purposes of this report and following the campaign by several dementia charities to have dementia recognised as an NCD at the UN High Level Summit in 2011)

Changes in lifestyles and behaviour also reinforce a need for implementing prevention programmes to improve the health of the future population of older people. However, preventive measures account for less than 3% of health care budgets in industrialised countries¹⁵¹ and despite the small investments made in prevention programmes, many of the major risk factors for NCDs are preventable, and risk reduction programmes can be implemented relatively inexpensively and throughout the life course.

Common population level prevention measures include lowering tobacco use, lowering alcohol misuse, promoting physical activity and promoting a healthy diet, and can reduce the risk of developing common NCDs. Implementing 'best buy' prevention campaigns to reduce common NCD risk factors was estimated to cost as little as 4% of current health spending in low income countries, 2% in lower middle and 1% in upper middle income countries¹⁵².

COUNTRY - INDIA

Reducing Cardiovascular Risk in the Workplace

| | | | |
|---|---|--|----------------------------------|
|  |  | Country Health Impact | ✓ |
| |  | Potential Roll Out | ✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Working age population |
| |  | Potential Cost Savings | High |
| |  | Innovation Theme | Innovation in organisations |
| |  | Partnerships Created | Private companies, universities. |
| |  |     | |

The innovation:

This programme was set up in 10 Indian industries in 2001. Due to the lack of official data, the programme surveyed the cardiovascular disease (CVD) risk factors in the Indian industrial workforce, and 10 companies (from tea production to aeronautics) across India were chosen to participate. After surveying, they found that 30% of employees used tobacco, 1/3 were overweight and there were also high levels of diabetes. A four year programme of interventions, supervised by trained health personnel, were set up in these workplaces including: individual and group coaching sessions; health displays; dance classes; smoking bans at work; simple health

messages spreads through banners, booklets etc and a change in canteen menus. High risk individuals were referred to health providers, and also offered one on one counselling.

Instigator and implementation journey:

The rationale behind the project was to target people in employment at risk from CVD. People in India are having strokes and heart disease about 10 years before Western populations. This means that people are succumbing to CVD in their most productive years, often when they are the main breadwinner.

Medical institutions screened and surveyed for CVD risk factors in the population. Then 10

employers were selected, along with a control group, to participate in this 4 year programme. It was set up in 2001 and the programme ran from 2003-2007.

Evidence of success:

Nearly 20,000 people completed the survey, and blood glucose samples were taken from 10,500 people. Control sites were set up, which banned smoking and referred high-risk employees to health providers but didn't change anything else.

Whilst the control group showed significant risk factor increase, the other workplaces showed at the end of the 4 years a decline in body weight, blood pressure, and cholesterol and blood sugar levels. 4 years later, a follow up test showed the results had been continued.

With such a large population at risk from CVD, even a small decrease in risk factors in India would result in significant reductions in premature death and disability. The cost of implementing this programme was \$7.30 per person per year. If this was carried out as part of a larger or national programme, costs would be even lower. WHO predict that loss of productivity due to disability and premature deaths in India will cost the country \$237 billion by 2015, so potential for reducing risk and thereby reducing costs is high.

Limitations of innovation:

This innovation targeted employees in formal, industrial work. In India the vast majority of workers are still in the informal economy - agriculture, street vendors etc. These people also need to be reached.

Where may it be applicable?

Across India and in other countries which are facing increase prevalence rates of CVD.

References:

Prabhakaran, D. et al. (2009). *Impact of a Worksite Intervention Program on Cardiovascular Risk Factors*. Journal of the American College of Cardiology 53 (18).













Collaborating for Health. (2011). Workplace health initiatives: evidence of effectiveness.

World Heart Federation: <http://www.world-heart-federation.org/?id=2391>

United Nations Population Fund.(2011). Report on *Status of Elderly in Select States of India*, 2011.

COUNTRY- UK

The Memory First Project – Early Diagnosis

| | | | |
|--|---|--|---|
|  <p>MIDLANDS</p> |  | Country Health Impact | ✓✓✓ |
| |  | Potential Roll Out | ✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Mainly older people |
| |  | Potential Cost Savings | High |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | Local government (CCG), civil society, charity/third sector |
| |  |    | |

The innovation:

Memory First is an integrated dementia service run by a consortium of 162 GPs across 41 practices in Staffordshire and has been instrumental in reducing dementia diagnosis times in Staffordshire, from three years to just four weeks. It provides fully integrated care by bringing consultant led clinics into the community and drawing together social care services, charity and end of life support. The patient remains in the community under the responsibility of their GP with support from secondary care expertise as and when required. Patient centric care plans are held, monitored and performance managed by the patient and their family using innovative new

smartphone apps. At the heart of the service is the new role of the Eldercare Facilitator. Recruited from the local communities, these include many retired healthcare professionals who act as intelligent companions and advocates for patients and coordinate access to services.

Instigator and implementation journey:

The clinical commissioning group set out service specifications defining the service they wished to commission. The locality had very low rates of diagnosis of dementia (40% diagnosis rate) and post-diagnostic support and aftercare. The commissioners set this as one of their fundamental challenges. The mental health trust procured the contract as

“prime provider” and subcontracted to the GP Federation doctor first, thereby avoiding any conflict of interests. The recruitment and training of care facilitators was done through the third sector end of life charities St Giles and Douglas Macmillan hospices.

Evidence of success:

Patient outcomes

- Diagnosis time reduced from three years to four weeks.
- Detection rates increased from 30% to 100% of predicted cases.
- Patient Satisfaction rates of 100% were achieved.

Value for money

- Reduced cost of clinical time over £120,000 per year.
- Cost savings of nearly £500,000 per year for a catchment area of 280,000 patients.

Encouraging spread

- The team is working with Brunel University and LSE to map and establish a national model for the UK.
- The King's Fund is evaluating the process and mechanics for publication.
- The patient care app featured in the top 10 apps at NHS expo 2013.
- Won NHS Innovation Challenge Prize for Dementia 2013.

Limitations of innovation:

The innovation involves a wide range of primary and secondary delivery partners to work, and it is dependent on strong leadership and coordination. According to one project lead, Dr Ian Greeves, the outreach clinics were not as easy to replicate as they first envisaged. It was initially hard to engage with clinicians and the trust to reduce some of the duplication of the traditional secondary care models of clinic protocols. Shared prescribing was again something that GPs and the consultants had to work through.

Where may it be applicable?




High to middle income countries with developed primary and secondary care services.

References:

NHS England. (2013). Memory First - £80000 [online]. Available at: <http://www.england.nhs.uk/challengeprizes/winners/mem-first/>

COUNTRY - FINLAND

Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER) – Risk Reduction

| | | | |
|---|---|--|---|
|  |  | Country Health Impact | ✓ |
| |  | Potential Roll Out | ✓✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Mainly older people |
| |  | Potential Cost Savings | Medium (long-term) |
| |  | Innovation Theme | Innovation in academia |
| |  | Partnerships Created | Universities, national government (National Institute for Health and Welfare) |
| |  |    | |

The innovation:

FINGER is a multi-center intervention study which aims to prevent cognitive impairment, dementia and disability in 60-77 year-olds at an increased dementia risk for both Alzheimer's disease and vascular disease. The 2-year multi-domain lifestyle intervention includes nutritional guidance, exercise, cognitive training, increased social activity, and intensive monitoring and management of metabolic and vascular risk factors. A total of 591 such individuals were assigned to the intervention group and received at least one post-baseline assessment. During the intervention period,

these people participated in individual and group sessions to facilitate dietary modification, partake in strength and aerobic training, undergo cognitive training and manage metabolic and vascular risk factors. The sessions were overseen by nutritionists, physiotherapists, psychologists and study nurses/doctors, respectively.

A total of 591 such individuals were assigned to the intervention group and received at least one post-baseline assessment. During the intervention period, these people participated in individual and group sessions to facilitate dietary modification, partake

in strength and aerobic training, undergo cognitive training and manage metabolic and vascular risk factors. The sessions were overseen by nutritionists, physiotherapists, psychologists and study nurses/doctors, respectively.

Instigator and implementation journey:

Funding provided by National Institute for Health and Welfare, Finland, which was provided to a consortium of 8 Universities/Academies. Screening began in September 2009 and was completed in 2011. The intervention was in 2013. However participants will be followed after seven years to assess if the incidence of dementia has been reduced.

Evidence of success:

Plans are already in development for a large multi-national dementia survey. The intervention group's z-score improved by a significant 0.022 more points per year than that of the control group, and by the end of the study the intervention group's cognition had improved by 25% more than that of the control group. The intervention group had significantly greater improvements than the control group in executive function (by 83%) and processing speed (by 150%), but not in memory, although post-hoc analysis suggested greater improvements in "more complex memory tasks".

While the results of this trial are extremely modest, the need and potential for lifestyle interventions to reduce or delay the onset of dementia is high. Postponing the onset of Alzheimer's disease by 5 years has been estimated to decrease its prevalence by up to 50% in 50 years.

Despite conflicts in the literature, studies such as FINGER suggest risk reduction is possible. Some estimates show that 10% of dementia cases may be avoided by improvements in public health. Campaigns that target smoking, underactivity, obesity, hypertension and diabetes should be prioritised as well as education and other cognitive enhancements.

A report by the ILC-UK shows that when

such best practice lifestyle interventions are translated into numerical outcomes they show significant promise for reducing dementia prevalence. The report estimates that over a 27 year period (2013-2040) this could prevent nearly 3 million people developing dementia in the UK – and would reduce the costs to the state in the UK by £42.9 billion between now and 2040 (minus any associated costs of intervention).

Limitations of innovation:

Limited but growing evidence base; while there is a growing interest and support for risk reduction, prevention of dementia is still relatively new in term of priorities, particularly for the public purse.

Where may it be applicable?

Low, middle to high income countries.

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HEALTHCARE COSTS AND THE CHANGING NATURE OF HEALTH SPENDING

Many of our earlier innovations show prevention can make a big difference but we are not going to eradicate diseases altogether, so when people do develop a condition, evidence shows there are better ways of delivering improved outcomes at lower cost. Innovations that deliver efficiencies without compromising on the quality of care therefore form the foci of this section.

As we know, the cost of delivering healthcare has been rising for some time across many countries and such increases will become unsustainable. While there is considerable debate as to how much of this increase is attributable to populating ageing, we do know that the use of health and social care resources is generally concentrated on a sub-set of the population.














The global trend of increasing life expectancy brings with it an increase in the prevalence of long term chronic diseases and people living with co-morbidities. In the UK, the number of people living with three or more long-term health conditions is set to increase from 1.9 million in 2008 to 2.9 million in 2018¹⁵³. In the US, in 2010 26% of adults had 2 or more long-term health conditions, with this number expected to increase as the numbers of older people increase¹⁵⁴. To meet the challenges facing global healthcare systems, health systems need to be smarter, more efficient and more targeted. In this section we have grouped together innovations which are adopting this approach.

Health providers are beginning to realise that significant cost savings can be achieved through providing more care, rather than less care, to these groups who are frequent and expensive users of health provision. Targeted and coordinated service delivery can ensure that the individuals do not repeatedly enter, leave and then re-enter the health system – an expensive scenario which also importantly does not offer them the best healthcare.

Indeed it is also this sub set that not only generally drive health costs but in the case of older people may in particular be at risk of low standards of treatment in acute care settings. Driving improvement for people in acute settings therefore is another key feature of the innovations we cover in this section.

COUNTRY - UK

Proactive Care of Older People undergoing Surgery (POPS)

| | | | |
|---|---|--|---------------------------------|
|  |  | Country Health Impact | ✓✓ |
| |  | Potential Roll Out | ✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Mainly older people |
| |  | Potential Cost Savings | High |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | Hospitals, charity/third sector |
| |  |     | |

The innovation:

The Proactive Care of Older People undergoing Surgery (POPS) team at Guy's and St Thomas' NHS Foundation Trust aims to improve outcomes by optimising physical, psychosocial and functional well-being, prior to and following surgery, in older surgical patients. In particular over 65's, high-cost, high-use patients with a record of high emergency admission rates and a predicted risk of high emergency admissions. The POPS team comprises of a consultant geriatrician, nurse specialist in older people, occupational therapist, physiotherapist and social worker.

Silos of care are broken down through

collaborative working at all stages of the pathway: consultant surgeons refer, joint anaesthetic and POPS meetings allow pre-assessment nurses to discuss non-POPS patients, complete assessments are communicated to patients, GPs, ward staff, surgeons and anaesthetists. Suggestions for ongoing management of chronic conditions are made to GPs such as dementia investigation.

Inpatient support is managed through MDT board rounds and meetings to identify and manage issues, while providing education for the surgical team. Discharge is planned prior to elective admission and proactively managed for emergencies.

Instigator and implementation journey:

The rationale behind the project was a pilot study, examining the feasibility of preoperative CGA intervention for older surgical patients, found that older patients undergoing elective surgery had high levels of modifiable preoperative co-morbidity, but rarely received geriatric or multidisciplinary team input before surgery. In 2004, local exploratory work found 20% of those aged 65 and over had their surgery delayed for preventable medical reasons. There was a high incidence of morbidity, functional deterioration and delayed discharge. The project was funded by a grant from the Guy's and St Thomas' Charity (formerly the Charitable Foundation). Following the results of the pilot study, the POPS service was substantively funded.

Evidence of success:

Two cohorts of older elective orthopaedic patients were studied for the pilot. One was referred to the POPS service, the other received routine preoperative care. Despite higher comorbidities in the POPS cohort they had reduced medical complications (pneumonia 20% vs 4% [$p=0.008$], delirium 19% vs 6% [$p=0.036$]), multidisciplinary issues (pressure sores 19% vs 4% [$p=0.028$], delayed mobilisation 28% vs 9% [$p=0.012$]) and LOS (4.5 days).

A formal cost assessment has not been undertaken. However, the reduction in cancellations, complication rates for patients, and length of hospital stay could bring significant monetary savings.

The service is now embedded into the preassessment pathway, assessing 800 new patients preoperatively annually. POPS lead ward MDMs and attends joint medical- surgical ward rounds in most surgical specialities in the Trust. The team annually case manages 1200 postoperative elective and emergency inpatients.

In addition, POPS has been instrumental in setting up daily preassessment clinic MDMs, where POPS provides, together with an anaesthetist, a forum for preassessment clinic

nurses to present and discuss patients with unstable medical conditions, functional needs and issues regarding optimisation.

Limitations of innovation:

Requires considerable buy in from a range of clinical and non- clinical actors and strong leadership.

Where may it be applicable?

Applicable in more developed health economies - the service is easily replicable across the UK. However, it does require a significant level of resources, including a range of highly trained health professionals which may restrict its rollout in lower-income countries.

References:














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COUNTRY - INDIA

Narayana Health System

| | | | |
|---|--|--------------------------------|---------------------------------|
|  <p>INDIA</p> <p>THE CAYMAN ISLANDS</p> |  | Country Health Impact | ✓ |
| |  | Potential Roll Out | ✓✓✓ |
| |  | Potential Global Health Impact | ✓✓✓ |
| |  | Target Audience | All ages |
| |  | Potential Cost Savings | High |
| |  | Innovation Theme | Innovation in organisations |
| |  | Partnerships Created | Hospitals, healthcare providers |
|  |     | | |

The innovation:

From a 225 bed hospital in 2001, Narayana Health has grown to a 7500 beds healthcare conglomerate in 2014 with 29 hospitals present in 17 Cities within the country. The group has also embarked on a project to set up a center of excellence in The Cayman Islands to serve patients from the Caribbean and other countries in the region.

With 150 major surgeries performed everyday and 4200 OPD patients attended per month, Narayana Health offers super-specialty tertiary care facilities across areas of specialization including cardiac surgery, cardiology, neurosurgery, paediatrics, as well as general

medicine. They also have oncology services for most types of cancer including head, neck, breast, cervical, lungs and gastro intestinal. They also involve families in patient care and have developed training programmes to support relatives with the skills they need to support their loved ones at home. Allowing family members to provide these services reduces costs and allows for personalized care and continuity of care, reducing post surgical complications.

It is one of India's largest and cited as one of the world's most economical healthcare providers with a reputation for its ability to reconcile quality, affordability and scale. It manages to attract the affluent as a provider

of the world's best healthcare and meet the needs of the poor through innovative insurance schemes and philanthropy.

Instigator and implementation journey:

Set up by Dr Devi Prasad Shetty, the vision was to provide high quality healthcare with care and compassion at an affordable cost on a large scale. The expansion beyond its success at providing world class health care in terms of clinical outcomes, is also accountable to strong leadership from clinicians including Dr Shetty, Dr Raghuvanshi and other managers. NH also encourages general physicians to become specialists and trains nurses to advance to the higher skilled position of nurse intensivist similar to the nurse practitioner in the United States.

They have also focussed on powerful organisational advantages including an innovative way of determining who should do what and a focus on cost effectiveness rather than just cost cutting.

Evidence of success:

Internationally recognised as providing world class healthcare affordably and to scale. Targets well off patients and provides care that meets global quality standards, but their aim is to serve everyone, hence a pressure on the organisation to lower costs dramatically.

- NH now carries out more open heart surgeries than any other hospital in the world, at NH each surgeon performs between 400 – 600 procedures a year compared with 100 – 200 by US surgeons.
- NH health's total cost of surgery at U.S. levels and salaries at U.S levels is £13,700
- Total cost of open heart surgery in the U.S is \$75,662 - \$342,087

One of the most striking aspects of the model is the economies of scale that it brings:

“We work for six days a week. We keep our infrastructure utilised for 16 hours a day. And when other traditional heart hospitals in the west and Europe perform about 2-3 major heart surgeries a day, we do about 30 to 35 major heart surgeries. Last year, we implanted

the largest number of heart valves in the world, so we get all these heart valves and expensive implants at a lesser price compared to the other hospitals.” Dr. Devi Shetty, Developer of Narayana Hrudayalaya hospital

Limitations of innovation:

Regulations, fees for service incentives and investments in extensive hospital infrastructure.

Where may it be applicable?

A strong example of a reverse innovation in a low income country that has high potential in high income countries.












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<http://www.narayanahealth.org/about-us>

COUNTRY- UK

North Tyneside Falls Prevention Service

| | | | |
|---|---|---|---|
|  |  | Country Health Impact | ✓✓ |
| |  | Potential Roll Out | ✓✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Frequent users of emergency department and inpatient hospital services |
| |  | Potential Cost Savings | Medium |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | Universities, charity/third sector, hospitals, local government, primary care trust |
| |  |   | |

The Innovation:

The North Tyneside Falls Prevention Service actively screens for fall risk factors in primary care settings. Patients over 59 who are already known to services are omitted. The GP notes of the remaining patients are screened for fall risk factors as well as cases of fainting; a questionnaire is sent and people determined to be at risk are invited in for an assessment.

Advice is given on preventing falls and useful exercises. If risk of fall is deemed to be unusually high, patients were invited to Age UK classes to improve strength and balance, run

in conjunction with the voluntary sector.

Instigator and implementation journey:

The partners are: Newcastle Hospitals Foundation Trust, Newcastle University, Age UK, Norprime (a private primary care provider), North Tyneside social services, North East Ambulance Services and North of Tyneside Primary Care Trust. It was originally just available to GP practices who volunteered to be involved in the pilot, but was then made available to the entire over 59 population of North Tyneside

Evidence of success:

Patient outcomes

- Part of the Department of Health's National Evaluation of Integrated Care Pilots
- In 2010-11 rates of fracture of the femur rose in the adjacent NHS Trust of Newcastle by 11.42%; in North Tyneside it rose by only 2.46%.
- Set against the control group of Newcastle (with a similar sized population), in 2010-11 there were 51 fewer hip fractures in North Tyneside
- Service users had very high levels of satisfaction with the falls clinic; however the evaluation does not compare to previous levels of patient satisfaction, which could have already been high.
- Shortlisted for the British Medical Journal's Working in Partnership award.

Value for money

- Treating a hip fracture costs the NHS £13,000 in the first year and £7,000 in the second.
- The prevention of 51 hip fractures in North Tyneside is estimated to have saved £1,020,000.

Limitations of innovation:

- Relies on voluntary sector (Age UK) to carry out the strength and balance classes.

Where may it be applicable?

Wide scope for replication. Although funding sustainability is helped by the involvement of Age UK, the balance classes are low tech and easily replicated.

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INTEGRATED CARE

Integrated care can have different meanings. The integration process could be vertical (integrating primary with secondary care) or horizontal (integrating primary healthcare, public health and social care)¹⁵⁵. However all processes of integrating health systems have the over-arching aim of delivering a system which is tailored to the needs of the individual patient, of high quality and good value.















Despite wide levels of consensus across the world of the merits of integrated care, it is notoriously difficult to achieve. The fact that integrated care is needed due to the complex, fluid and multi-dimensional needs of individuals require a solution that is just that; complex, fluid and multi-dimensional. With health professionals often lurching from one crisis to the next just dealing with the increasing usage of health services by our ageing and, in many cases, expanding populations, it is difficult to step back and plan a coordinated approach to these big, complex issues.

Difficulty in achieving integrated care can also be due to funding structures; for example in England whilst health provision through the NHS has a centrally allocated budget, social care budgets are largely through local authorities (although policy developments such as Manchester being given responsibility for its health budget could lead to a promising breakthrough). There are also competing priorities between the different actors that need to merge and coordinate, whether it is between national and local governments or between health care and social care providers.

Below we have sourced three innovations which have made strides in meeting these challenges, and take an integrated approach to providing care for their respective populations.

COUNTRY - NEW ZEALAND

Canterbury Integrated Care

| | | | |
|---|--|--------------------------------|--|
|  |  | Country Health Impact | ✓ ✓ |
| |  | Potential Roll Out | ✓ ✓ |
| |  | Potential Global Health Impact | ✓ ✓ |
| |  | Target Audience | Entire population of Canterbury |
| |  | Potential Cost Savings | Medium |
| |  | Innovation Theme | Innovation in policy/ government |
| |  | Partnerships Created | Local government (District Health Board), health and social care providers |
| |       | | |

The innovation:

Canterbury decided to focus on integrating health and social care because of concern that unless action was taken to stem growing demand for hospital care, increased hospital capacity would be needed, which was not affordable. The District Health Board's (DHB) leaders responded by developing a vision for the future based on the notion that there was 'one system, one budget', and that all those involved in the system needed to work together to improve care. This resulted in a commitment to build on the strengths of primary care in Canterbury and, particularly, to invest in services that would help avoid hospital

admissions and facilitate early discharge where appropriate. These and many other initiatives enabled the District Health Board to stem the increase in hospital use. They also helped the system cope with the effects of the 2011 earthquake, which destroyed some of the hospital capacity in Christchurch.

Instigator and implementation journey:

There has been sustained investment in providing staff and organisations under contract with the District Health Board with the skills needed to improve care and develop innovative models of provision. Training was

provided for more than 1,000 staff in quality improvement methods such as Lean and Six Sigma. Arrangements were also made for some staff to visit other organisations that had used these methods (such as Air New Zealand and New Zealand Post). The training and visits proved important in building momentum and staff commitment to make the changes needed. Experts in process engineering were also engaged to support clinicians and managers to redesign care pathways and work flows in order to cut waste and improve performance.

Evidence of success:

Patient outcomes

- Canterbury reduced nursing home admissions by 20%, and duration of nursing home stays by 25%.
- The proportion of elective work in Canterbury has risen from less than 23% of its activity in 2006/7 to 27% in 2011/12.
- Reduced emergency department visits, hospital admissions, length of hospitalisation and readmission rates.

Value for money

- No formal cost evaluation, however the reductions achieved by the programme suggest significant cost savings.

Limitations of innovation:

- Canterbury's successful move towards the full integration of health and social care has been aided by a gradually increasing budget, a position few countries are able to match in the current economic climate.

Where may it be applicable?

- Countries with the economic ability to gradually increase health and social care budgets.

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COUNTRY- UK

Stroke Association Integrated Service

| | | | |
|---|---|--|--|
|  |  | Country Health Impact | ✓ ✓ |
| |  | Potential Roll Out | ✓ ✓ |
| |  | Potential Global Health Impact | ✓ ✓ |
| |  | Target Audience | Stroke survivors in the Durham and Darlington Primary Care Trust, in their first 30 days following transfer from hospital. |
| |  | Potential Cost Savings | Medium |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | National Health Service, charity/third sector |
| |  |     | |

The innovation:

The Stroke Association's Early Integration Service was set up in Durham and Darlington to establish a single point of contact which offers support to survivors of stroke. Each stroke survivor was assigned a coordinator, who assessed individual needs and offered a tailored care plan. The coordinator continued to identify and meet needs after discharge from hospital. Patients could also be referred on to other services such as social services or the Carer's Trust, during or after the 30 day period.

59 patients were also referred to the Stroke Association Information and Advice Service, and may have used the service for longer than the 30 days.

Instigator and implementation journey:

Funded through the NHS, but relied on the Stroke Association, a registered charity, for signposting people to the service and providing other materials. The pilot ran from 1st November 2012 to 31st March 2013.

Evidence of Success:

Patient outcomes

- 90 referrals were made over 5 months, from four hospitals in the Durham area.
- Of the 90 referrals, 6 were readmitted to hospital within the 30 day period and 1 person died.

Value for money

- Expenditure from the NHS was £50,000 on salaries and expenses.
- 90 readmissions prevented would save £210,000.

Limitations of innovation:

- Programme relied on the Stroke Association's infrastructure.
- The pilot only lasted 5 months, too short a time to effectively measure any success. The evaluation was also limited, as no comparative study was set up, or a randomised control trial. Therefore it is hard to prove exactly how many readmissions were prevented.

Where may it be applicable?

- UK wide, other settings with a charity equivalent of the Stroke Association who can assist.














References:

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COUNTRY- BELGIUM

P3

| | | | |
|---|---|--|--|
|  |  | Country Health Impact | ✓✓✓ |
| |  | Potential Roll Out | ✓✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | People aged 60 or older who need complex or long-term care after hospitalisation or who suffer from serious health complaints, with an inevitable admission to a nursing home in the short term. |
| |  | Potential Cost Savings | Medium |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | National Health Insurance Institute, local care providers |
|  | |     | |

The innovation:

Protocol 3 (P3) offers a wide range of care services to older people in great need of care 24/7, with coordination by a case manager/ care coach. The patient must achieve relevant scores on the Katz and Edmonton scale measures, and/or suffer from early stage dementia. Family carers are also targeted, where there is a need for professional support to continue to avoid admission to a residential setting for the person for whom they provide care.

Services available include night rounds by nursing assistants, professional alert responses, emergency relief, individually scheduled day care, occupational therapist advice, cleaning services and volunteer befriending.

A central element of the initiative is the role of the Care Coach who acts as both a client advocate and a service coordinator. The Care Coach provides a single point of contact for service providers, clients, volunteers and family members and constantly adapts the service

arrangement to the clients' needs.

Instigator and implementation journey:

Protocol 3 (P3) was developed in response to the first of a two phase call for projects by the National Health Insurance Institute (INAMI/RIZIV). The mandate was to develop and pilot an innovative solution to delay nursing home admission for at-risk older patients (over 60 years) with chronic conditions including early stage dementia, who require multi-dimensional and integrated care.

Project progress is monitored by a steering committee consisting of representatives of various partners. Furthermore, a project report must be submitted to the National Health Insurance Institute (RIZIV) every six months. The project is monitored by an administrative coordinator who is also in charge of contacts with the National Health Insurance Institute (RIZIV). The project currently reaches approximately 110 people per year in Ghent, within a 12-15km distance of the organisation's service centre, an urban region with a general area population of 280,000.

Evidence of success:

Patient outcomes

- Results to date show the P3 project delays nursing home admission by an average of eight months, exceeding the original P3 objective of six months.
- Other benefits identified include improved social and wellbeing benefits for clients and carers and improvement in Katz scores for clients. Monitoring and evaluation of the project is conducted by a scientific consortium from a number of universities using pre-defined measures of assessment.
- The innovation came third in the Social Innovation in Ageing European Awards.

Value for money

- No formal analysis undertaken, but the reduced length of stay for older patients facilitated by P3 Unit may directly translate in cost savings.

Encouraging spread

- There is a possibility that the programme may become a standard solution adopted by the Belgium government.

Limitations of innovation:

- Flemish and federal rules and regulations are not entirely harmonised and make it difficult to optimise care services. The various types of care providers and their professional status are often defined by different regulations, which sometimes prevents flexible employment of these professionals.

Where may it be applicable?

- All areas














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COUNTRY - USA

General Electric's healthymagination cities program

| | | | |
|---|---|--|---|
|  |  | Country Health Impact | ✓✓✓ |
| |  | Potential Roll Out | ✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | All residents, but with the aim of reducing the healthcare costs of GE employees and their dependents |
| |  | Potential Cost Savings | Medium/High |
| |  | Innovation Theme | Innovation in policy/government |
| |  | Partnerships Created | Private company, local government, local medical practices |
| |  |     | |

The innovation:

General Electric's healthymagination cities program brings together city leaders, local employers, providers, payers and civic organizations to establish region-wide treatment standards, encourage more efficient information exchange and improve health and wellness education among those battling chronic diseases.

Instigator and implementation journey :

GE's employee benefit programs support more than 500,000 workers, their spouses and children, and retirees. With GE's U.S. healthcare costs at more than \$2 billion

annually, they realised that they needed to develop solutions in order to manage future growth.

GE's healthymagination cities program was launched in 2009 in the greater Cincinnati area, which was the centre of GE Aviation and home for thousands of GE workers. The plan included a coalition of large employers, hospitals, insurers, city government and patients who would work together to improve the cities' healthcare quality, expand access to care and lower costs.

The coalition focussed on five areas: primary care, information technology, quality

improvement, consumer engagement, and payment innovation. They began collecting metrics like healthcare improvement, outcomes and costs, and tracking goals for the area's 2.2 million residents. Simultaneously, the local community invested in primary care, digital records, and customer engagement to improve healthcare efficiency and generate better value.

G.E. also pushed for the creation of medical homes, in which an individual medical practice closely coordinates a patient's care by having access to all of the patient's medical records, and by 2013, about 118 doctors' practices have converted to this model. All five of the major health systems are also making their primary care practices move in that direction.

Evidence of success:

Studies conducted by GE on their employees and dependents found that:

- The PCMH pilot population had 3.5% fewer ER visits and 14% fewer admissions over the period 2008–2012.
- While complications, ER visits and hospital admissions have declined nationally for pediatric asthma patients, the improvement has been better for Cincinnati, including 14 points of lower annual trend for ER visits over the period 2008–2012.
- While HbA1c testing has improved nationally, at 80% there is more prevalent testing in Cincinnati. Additionally, with 23 points of lower annual trend over the period 2008–2012, diabetes patients in Cincinnati are experiencing fewer complications.
- The program has also helped to create more than 100 new primary care medical homes.

The U.S. government selected the city to participate in the Comprehensive Primary Care (CPC) initiative organised by the Center for Medicare and Medicaid Innovation.

Limitations of innovation :

While the benefits offered by the GE model are significant, many companies will not have the time or resources to work with hospitals and civic organisation on the scale required.

Even some large organisations, who have premises in different American states and in other countries, may find time and resource constraints when trying to work with hospitals and health plans in a range of locations.

Where may it be applicable?

The early results were strong enough that GE expanded its community-level efforts to two additional cities in 2012 — Erie, Pennsylvania, and Louisville, Kentucky. The company has also partnered with the Clinton Foundation's new Health Matters Initiative to help build healthy communities nationally, and announced the expansion of the initiative to the greater Houston area in 2013.

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COUNTRY- UK

Acute Geriatric Intervention Service (AGIS)

| | | | |
|---|---|---|--|
|  |  | Country Health Impact | ✓✓ |
| |  | Potential Roll Out | ✓✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Over 65, high cost, high-use patients |
| |  | Potential Cost Savings | High |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | Local government, local health commissioning group |
| |  |   | |

The innovation:

The Acute Geriatric Intervention Service (AGIS) is an extension of the successful Falls Partnership Vehicle programme. It consists of a multidisciplinary team comprised of ambulance clinicians, physiotherapists, occupational therapists and a consultant geriatrician, which delivers an immediate response to the multi-faceted issues of older people and bringing together services that have previously worked independently.

The service operates twelve hours a day from 6:30 a.m. to 6:30 p.m. from Monday to Saturday. It currently has two vehicles at its disposal. It responds to 999 calls for older

people who have fallen at home or who are generally unwell. Direct referrals are also accepted from GPs, providing an additional referral route for GPs within the Greater Cambridge area for older patients who are in or at risk of imminent crisis and who are likely to be admitted acutely.

The team aims to start the CGA process at the point of need. This can include the patient's physical health, functional ability, cognitive function, nutritional status, mobility and falls, and an environmental assessment. The service has the ability to provide many interventions from the time of contact, such as functional equipment and walking

aids, wound care and provision of some medications, as well as making appropriate onward referrals.

Services focus on patients over the age of 75, at their normal place of residence, who are acutely unwell but do not display any red flag symptoms (e.g. Chest pains, severe SoB, head injury with LoC, stroke).

Instigator and implementation journey:

CATCH and Camhealth, which are two Local Commissioning Groups in South Cambridgeshire.

The already established interdisciplinary team from the FPV was tasked by the commissioners (CATCH and Camhealth) to provide a more comprehensive approach to healthcare provision for a wider demographic of elderly patients, and the service was introduced in January 2013.

The AGIS is a collaborative venture between the East of England Ambulance Service (EEAST) and Cambridgeshire Community Services (CCS). It builds on the success of The Falls Partnership Vehicle (FPV), an immediate response service to people over 65 who have fallen in their homes and dialled 999, which was run by EEAST and CCS and received a National Innovation Award.

Evidence of success:

Patient outcomes

- The service was evaluated from the 9th January 2013 until 31st March 2013.
- The AGIS achieved an admission avoidance rate ranging between 21% and 29%, an average of 24% over duration of the pilot.
- With the frail elderly generally being subject to a 30% inappropriate admission rate, the evaluation suggests that an approach which employs appropriate assessment for the elderly can effectively tackle this high level of inappropriate admissions.
- The AGIS service over the 3 month period of winter pressures successfully treated

69% of its patients at home, this is 29% above the ambulance services 'see and treat rate'.

Value for money

- Saving money by avoiding unnecessary admission to hospital has also been a key driver for this service, as it is for many. Although this is notoriously difficult to measure, the reduction in hospital admissions potentially represents a significant monetary saving to the health service.

Limitations of innovation:

The service has been affected by the limited capacity within social care and step-up/step-down beds in the local community.

The service also currently has no provision to take blood samples and this can be an issue in different areas, the lack of intravenous therapy in the community has also been highlighted.

All these factors can and have reflected negatively on admission avoidance decisions.

Local health systems in lower-income countries may find this particularly restrictive, as well as the need for a trained therapist (either an occupational therapist or physiotherapist) with each paramedic crew.

The service also requires a time commitment after it is implemented to build trust and support from other professional groups and organisations so that they believe the service offers a safe and better alternative to usual care.

Where may it be applicable?

All local authority areas.

References:

Lumbard, P (2013). Winter Pressures 2013 Acute Geriatric Intervention Service – The right response, first time in a timely manner? [Online]. Available at: <http://www.kingsfund.org.uk/sites/files/kf/media/The%20Acute%20Geriatric%20Intervention%20service%20%28AGIS%29.pdf>

HEALTH TECHNOLOGY

Over the last decade there has been an increasing focus on the potential benefits health technologies offer to healthcare. New systems which combine medical devices and information technology; and new medical technology that can deliver complex, sophisticated care outside of the traditional medical settings, have proliferated and increasingly influenced health agendas.

Health technologies offer particular opportunities to providing quality health care to underserved populations – those people who lack access to quality primary and secondary care. With the proliferation of cheap mobile phones, and expanding mobile and internet networks, low cost innovations have increasingly made use of these technologies to reach the traditionally ‘unreachable’. For example, a survey of 112 countries in 2011 found the majority had implemented multiple mHealth (mobile health) initiatives such as mobile telemedicine¹⁵⁶, which could be accessed by a wider segment of the population, and increased access to medical professionals.

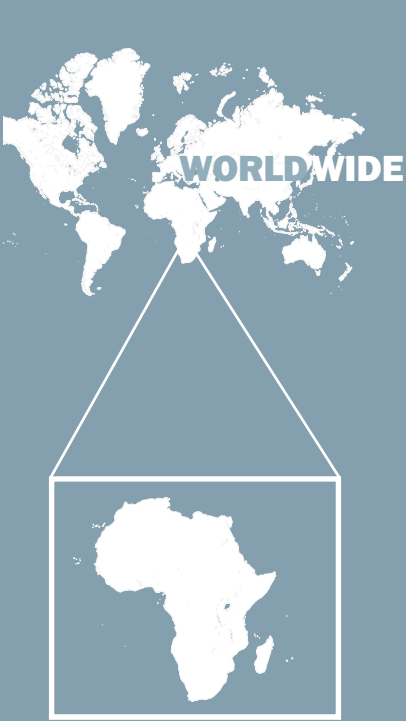










However, for health technology innovations to have a broad impact, it is important that policies, strategies, and action plans concerning them are incorporated into national health plans. Research by the World Health Organisation (WHO) has found that there is still a way to go in this area, as only

34% of the countries they reviewed had a health technology national policy as part of the national health plan, and only 9% had an independent health technology national policy¹⁵⁷. In addition, 35% didn’t have an authority responsible for implementing and enforcing medical device specific product regulations¹⁵⁸.

The innovations we have chosen to include in this section reflect the opportunities health innovations present to addressing the key areas outlined above; the needs of underserved populations, how health technologies can be incorporated at a national level, and how technology can be used to increase access to medical professionals. Both single country and multinational initiatives have been highlighted.

COUNTRY - MULTINATIONAL

RAFT- Telemedicine network

| | | | |
|--|---|---|---|
|  |  | Country Health Impact | ✓✓ |
| |  | Potential Roll Out | ✓✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Underserved populations, often in rural areas |
| |  | Potential Cost Savings | Medium |
| |  | Innovation Theme | Innovation in academia |
| |  | Partnerships Created | Universities, local medical coordinators |
| |  |   | |

The innovation:

In 2001, the University of Geneva Hospitals established RAFT, a telemedicine network now connecting hundreds of care professionals in twenty African countries. This network aims at supporting isolated medical and technical professionals who do not have accessible opportunities for continuing education and expert advice. RAFT works to provide online training for medical staff and healthcare practitioners, the majority of which is given by African instructors. It also provides a network of experts available to remotely provide advice to care professionals (tele-expertise) including tele-radiology applications. The main aim of RAFT is to make possible the dissemination of telemedicine tools as well as diagnostic technologies on a large scale.

Instigator and implementation journey:

RAFT was created by the University hospitals and the University of Geneva (HUG and UNIGE).

RAFT's core activity is webcasting interactive courses for physicians and other health care professionals. The topics are proposed by network partners. Courses are webcast every week, freely available and followed by hundreds of professionals who can interact directly with the teacher. Some 80% of the courses are now produced and webcast by African texperts. A bandwidth of just 20 kilobits per second, the speed of an analog modem, is enough to webcast to participants in remote hospitals or cybercafés. Other activities of the RAFT network include teleconsultations,

tele-echography and collaborative development of educational online material.

The network is run by more than 40 national coordinators and a small coordination team in Geneva. In each partner country, RAFT activities are supervised by a medical authority (usually a university professor) that links the project to national government bodies (ministries of health and education). A local medical coordinator (a junior physician) and a technical coordinator take care of day-to-day operations, including communication with health care professionals, identification of training needs, technical training and support to sites across the country.

Evidence of success:

Patient outcomes and value for money

A study in Mali evaluating the impact of RAFT found:

- The telehealth activities contributed to improving medical diagnoses in cardiology and obstetrics (92.6%) and the patients' management system on site (96.2%).
- The attendance records at health centres increased from 8 to 35% at all project sites during the study period.
- Patients from project sites saved an average of 25 USD and a maximum of 70 USD compared to patients from neighbouring sites, who must go to the capital city to receive the same care.

Encouraging spread

- The African Development Bank rated RAFT one of the top ten eHealth projects of 2013.
- RAFT began in Mali but has been extended to 19 other African countries, Bolivia and Nepal.

Limitations of innovation:

RAFT's development depends on expanding internet access and increasing bandwidth.

Although the RAFT is active in a considerable number of countries, the number of sites per country is low and they are mainly concentrated in reference hospitals in urban areas. A larger number of sites and a wider

distribution in the periphery are needed to improve health systems.

Where may it be applicable?

Worldwide. RAFT began in Mali in 2001. In 2008, it extended to English-speaking Africa and is currently being deployed in Portuguese-speaking Africa (Angola). The RAFT is primarily African with 13, 5, and 1, French, English, and Portuguese-speaking countries, respectively. However, it has become more global with the addition of Bolivia and Nepal since 2010 and 2014, respectively.

References:

Bediang G, Perrin C, Ruiz de Castañeda R, et al. The RAFT Telemedicine Network: Lessons Learnt and Perspectives from a Decade of Educational and Clinical Services in Low- and Middle-Incomes Countries. *Frontiers in Public Health*. 2014;2:180. doi:10.3389/fpubh.2014.00180.














African Development Bank (2014). Innovative e-Health Solutions in Africa Award. [online] Available at: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Innovative_e%E2%80%91Healthb_Solutions_in_Africa_Award.pdf

Georges et al. (2014). The RAFT Telemedicine Network in Low and Middle Income Countries: Educational and Clinical Services, Lessons Learnt and Perspectives. *Frontiers in Public Health*, Volume 2. [online]. Available at: <http://journal.frontiersin.org/article/10.3389/fpubh.2014.00180/full>

Bagayoko et al. Medical and economic benefits of telehealth in low- and middle-income countries: results of a study in four district hospitals in Mali. *BMC Health Services Research* 2014, 14 (Suppl 1):S9 <http://www.biomedcentral.com/bmchealthserves/content/14/S1/S9>

COUNTRY - USA

Seattle Medical Home Care Pilot

| | | | |
|---|--|--|-------------------------------|
|  |  | Country Health Impact | ✓ ✓ |
| |  | Potential Roll Out | ✓ ✓ |
| |  | Potential Global Health Impact | ✓ ✓ |
| |  | Target Audience | No specific group targeted |
| |  | Potential Cost Savings | High |
| |  Organisation | Innovation Theme | Innovation in an organisation |
| |  New Partnerships created | Partnerships Created | Non-profit health cooperative |
| |  |     | |

The innovation:

Seattle-based Group Health Cooperative ran a two year medical home pilot, with an aim to enhance access, increase healthcare professional's productivity and improve financial performance in primary health care settings. No specific group was targeted with the intervention, although the enrolled patients at the pilot clinic were slightly older than the average age of other clinics (average age of 53 against 51), and more likely to be female (57% vs 55%). Practice changes at the pilot clinic included:

- Conversations via telephone or email between patients and health professionals to prepare for or follow up physical visits. They could also be used as a substitute for a physical visit.
- Patients were contacted in advance of appointments to discuss concerns or expectations.
- Electronic Health Registers (EHR) were promoted to improve patient engagement. EHRs were used for online repeat prescriptions, lab test results overviews and health risk appraisals.

- A payment system of staff which values alternative communication forms, quality improvement and continuity of care.

Instigator and implementation journey:

Group Health previously had implemented a number of changes to provide 'advanced access' for patients, allowing them to make same-day appointments and using an electronic health record to email doctors and view some of their medical history. However although access was improved, the changes had the consequence of increased physician 'burnout' as well as an increase in use of services 'downstream of primary care'.

Group Health then looked for a way to increase advanced access, allowing the patients who really need it to see a doctor, whilst reducing physician burnout.

Evidence of success:

Value for money

- The evaluation estimated total savings of \$10.30 per patient per month after 21 months.
- The pilot suggests that initial investments in primary care can produce savings through reduced hospital admissions and A&E use. The use of electronic health registers also provide the opportunity for financial savings.

Patient outcomes

- The pilot Medical Home experienced 29% fewer emergency visits and 6% fewer hospitalisations compared to other Group Health clinics.

Limitations of innovation:

There is some evidence of low reporting rates by end users, and also weak health system responsiveness (e.g. supply chain inefficiencies mean that reports of drug stock outs cannot be acted upon). Such problems serve to highlight that success of m-health innovations is largely dependent on the strength of the health system into which they are introduced.

Where may it be applicable?

High-income countries with populations able to access emails easily, and a health care system that uses Electronic Health Registers.

The pilot offers a roadmap to reducing costs and improving quality, but the authors acknowledge success in other settings requires decent leadership, electronic health records and incentives.

References:

Reid, R. et al. (2010). The Group Health Medical Home at Year Two: Cost Savings, Higher Patient Satisfaction, And Less Burnout for Providers. Available at: <http://content.healthaffairs.org/content/29/5/835.abstract>

BIG DATA

As referenced in the Health Technology Section, 'big data' - large data sets that may be analysed to reveal patterns, trends, and associations- offers huge potential to address some of the key challenges outlined in our report. Linking medical records and real-time clinical data creates the possibility of identifying health trends, and developing effective interventions, that reduce costs and provide more effective healthcare for patients.

'Big data' is being used successfully in many countries now and in different settings. One area which has shown significant potential is in identifying and addressing 'super users' - a small percentage of the general population who account for a disproportionate percentage of health costs. In America, analysis of 'big data' by the Agency for Healthcare Research and Quality (AHRQ) discovered that 1 percent of health care users accounted for 21.4 percent of total health care expenditures¹⁵⁹. Interventions were then be tailored to this group to produce significant health and financial savings.















'Big data' not only allows the identification of current 'super users' but also the identification of those patients who are at risk of becoming 'super users' in the future. For example, the Ontario Ministry of Health and Long-Term Care developed a predictive model to identify patients at risk of becoming future 'super users'. Data from various administrative sources were linked to patient's unique health insurance numbers, and logistic regression was used to identify those individuals at risk.

Identifying current 'super users', and those at-risk of becoming 'super users' allows targeted interventions to be developed before substantial avoidable costs have been incurred and health status has deteriorated further. Some of the innovations in this section address how 'big data' can work in this respect.

However despite the huge opportunities offered by 'big data' to identify and target 'super users', there is a lack of research highlighting what activity is occurring globally. With the identification and targeting of 'super users' promising significant economic and health benefits, we need to urgently locate 'best practice' from around the world.

COUNTRY - USA

South Central Pennsylvania High-Utilizer Learning Collaborative

| | | | |
|---|---|---|--|
|  |  | Country Health Impact | ✓✓✓ |
| |  | Potential Roll Out | ✓✓ |
| |  | Potential Global Health Impact | ✓✓✓ |
| |  | Target Audience | Frequent users of emergency department and inpatient hospital services |
| |  | Potential Cost Savings | High |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | Multiple healthcare providers |
| |  |  Rise of NCDs  Multiple chronic diseases  Changing costs of Healthcare  Changing health universe  Personalised healthcare | |

The innovation:

This coordinated programme across five healthcare providers in South Pennsylvania analyses available data to identify ‘super-utilisers’, small percentages of patients who consume a high percentage of the healthcare budget. These people often have multiple, chronic conditions such as diabetes or heart conditions. They may also be homeless or live in poor quality housing, are isolated or live in communities of high crime rates. This programme aims to identify these people and deliver a coordinated medical and social care service, including home visits, regular health checkups and help with health self-

management. The aim is to prevent or reduce costly A&E and/or hospital admissions, which are often preventable with coordinated health and social care support.

Instigator and implementation journey:

In October 2012 five organisations (four health systems and one neighbourhood health centre) in South Pennsylvania established the collaborative, in order to share best practice and begin to coordinate service delivery. This programme was inspired by, and received help from, the Camden Coalition of Healthcare Providers in New Jersey. From April 2013 the

group received funding from The Highmark Foundation, with the aim to provide tools to allow each member to deliver care to high-utilisers, to assess the cost savings and to serve as pilots to support new delivery models.

Evidence of success:

Patient outcomes

- Inpatient admissions dropped 34% after enrollment in the programme.
- A&E admissions increased 12%. However this is believed to be due to patients being more likely to be discharged from A&E rather than then being admitted to hospital, at a much greater cost. This would therefore result in an A&E visit being recorded, rather than an inpatient visit.
- 68% of participants successfully 'graduated' from the programme, returning to normal primary care after having their complex health and social care needs met by the programme.

Value for money

- The average cost to Medicare of a hospital admission is \$7500 per person. A 34% reduction in admissions would equate to savings of \$1,242,000 for 138 patients in 12 months. The complex health needs of these targeted high-utilisers suggest that savings could in fact be higher.
- The average cost of an A&E admission which does not result in hospital admission is \$1097. A 12% increase would therefore equal \$54,498.
- Net savings are therefore likely to be at least \$1,187,501 for 138 patients over 12 months.

Encouraging spread

- This programme is still running, with next steps including exploring propensity matched controls and assessing which type of patient the programme is most effective for.
- Part of a wider group of health providers in the US which are targeting 'super utilisers'. Best practice is being shared, and the

group has recently been given \$2.1 million in grants to expand their services.

Limitations of innovation:

The identification of high utilisers relies on the analysis of electronic health records, hospital inpatient databases and outpatient records. This requires a lot of data to be analysed, which is both complex and time consuming. This could possibly limit this innovation to high-income countries with available online datasets of health service access.

Where may it be applicable?

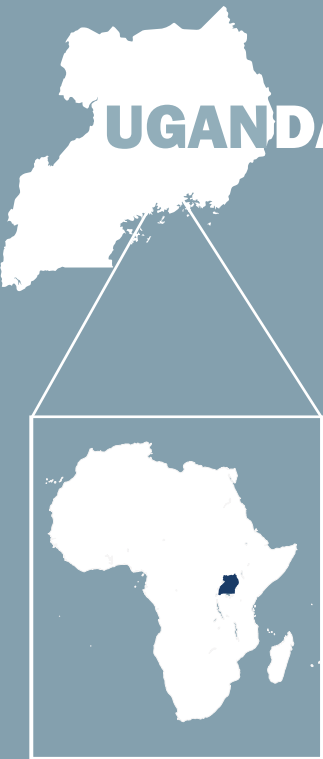











All high-income countries with sufficient datasets available. More specifically, geographical areas with high numbers of high-utilisers.

References:

South Central Pennsylvania High Utilizer Collaborative (2014). Working with the Super-Utilizer Population: The Experience and Recommendations of five Pennsylvania Programs.

COUNTRY - UGANDA

mTrac

| | | | |
|--|---|--|--|
|  <p>UGANDA</p> <p>AFRICA</p> |  | Country Health Impact | ✓✓✓ |
| |  | Potential Roll Out | ✓✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Whole population |
| |  | Potential Cost Savings | Medium |
| |  | Innovation Theme | Innovation in policy/government |
| |  | Partnerships Created | National government, district health teams |
| |  |    | |

The innovation:

mTrac is a e-Health solution which enables real-time monitoring of disease surveillance, drug stocks and health service delivery using text messaging (short message service, SMS) built on a web-based data aggregation and analysis platform.

Instigator and implementation journey:

mTrac is a government initiative that originated as a pilot project within a Millennium Villages Project and Foundation for Innovative New Diagnostics (FIND). It was then handed over

to the Government of Uganda for launch and scale up in December 2011. The Ministry of Health (MoH) fully owns and operates mTrac and began to roll it out in four phases, each covering approximately twenty-eight districts.

The mTrac solution takes advantage of the rapid growth in telecommunication infrastructure, network coverage and mobile phone penetration. Health facility and community health workers use their own mobile phones to submit weekly disease surveillance and ACT drug stock reports on a health management information system form at no cost. This weekly information is managed on a web-based dashboard by

district health teams, the Ministry of Health and other national stakeholders who can generate reports to facilitate planning and monitoring. To strengthen community monitoring, mTrac has an anonymous, toll-free SMS-based hotline for reporting health service delivery problems. Data are fully integrated into mTrac to provide a cohesive report on disease surveillance and drug stocks.

With built-in intelligence features, mTrac enables health workers to receive summaries of their submitted reports and administrators to flag potential errors and communicate directly with health facility workers.

Automatic reminders can be sent to the mobile phones of health workers who are late in submitting weekly reports. District dashboards automatically aggregate reports for district health teams and the Ministry of Health—so that they can more easily identify disease outbreaks, disease trends and drug consumption to make informed decisions and intervene at the district level. The dashboards are configured for data collection, cleaning, verification and analysis. And district health teams provide technical and field support to health facilities to improve the quality and timeliness of their reporting. At the community level, village health teams send weekly data on danger signs like fever, malnutrition and ACT availability, which can be used to keep ACTs sufficiently in stock. Combining health facility data and community-level data on disease and ACT consumption provides a more accurate picture of ACT requirements. At the national level, mTrac provides the Ministry of Health with an improved monitoring system for disease, drugs and health service delivery that enables better accountability.

Evidence of success:

Value for money

- A formal cost analysis has not been undertaken. mTrac has the potential to raise cost efficiency by streamlining processes, reducing waiting times, and improving accuracy of data. Financial support has come primarily from the Department for International Development (DFiD).

Encouraging spread

- The African Development Bank rated mTrac one of the top ten eHealth projects of 2013.
- mTrac was scaled up in December 2011. The Ministry of Health (MoH) began to roll it out in four phases, each covering approximately twenty-eight districts.

Limitations of innovation:

There is some evidence of low reporting rates by end users, and also weak health system responsiveness (e.g. supply chain inefficiencies mean that reports of drug stock outs cannot be acted upon). Such problems serve to highlight that success of m-health innovations is largely dependent on the strength of the health system into which they are introduced.

Where may it be applicable?

With mobile phone usage high and coverage available in most areas worldwide, mTrac has a high potential for replication worldwide.














References:

African Development Bank. (2014). Innovative e-Health Solutions in Africa Award. Available at: <http://www.afdb.org/en/documents/document/innovative-e-health-solutions-in-africa-award-48731/>

Frank-Vasdeki, J. et al. (2015). Taking mHealth Solutions to Scale: Enabling Environments and Successful Implementation. JMTM 4 (1). Available at: <http://articles.journalmtm.com/jmtm.4.1.8.pdf>

COUNTRY - USA

City of Louisville and Propeller Health

| | | | |
|---|---|--|---|
|  |  | Country Health Impact | ✓✓✓ |
| |  | Potential Roll Out | ✓✓ |
| |  | Potential Global Health Impact | ✓ |
| |  | Target Audience | Residents of the Louisville Metro area with physician-diagnosed asthma and a prescription for a short-acting beta agonist |
| |  | Potential Cost Savings | Medium/High |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | Private company, local government |
| |  |     | |

The innovation:

Beginning in 2012, the City of Louisville partnered with Propeller Health to develop a community-based, data driven, asthma management program to improve asthma outcomes among city residents. Mobile technology was supplied to 600 asthma sufferers to pinpoint where and when they used their rescue inhalers to cope with asthma symptoms. Each time they used their inhalers, a GPS-enabled sensor sent out a signal to the company's database and analysed the data to create a snapshot of inhaler use. The analysis, together with information on how to improve

asthma control, was then e-mailed to the patient on a weekly basis.

Instigator and implementation journey:

Louisville is one of the America's ten worst cities for air quality. Rising medical costs resulting from poorly controlled asthma led Louisville officials to begin talking to Propeller Health (formally 'Asthmapolis'), developer of a sensor that attaches to asthma inhalers, tracking data on precisely when and where individual asthma sufferers are administering their medication. Private philanthropists and health-oriented foundations, including the Foundation for a

Healthy Kentucky and the Norton Healthcare Foundation, then funded a \$150,000 pilot, which implemented 600 sensors in Louisville. Residents of the Louisville Metro area with physician-diagnosed asthma and a prescription for a short-acting beta agonist were enrolled at participating retail pharmacies, private clinics and community asthma-education events. Participants received a small electronic inhaler sensor to track the frequency of rescue medication inhaler use. After an initial month-long control period, participants received 12 months of access to smartphone and web-based applications that provided education and support based on national guidelines and standards of care.

Evidence of success:

The proportion of participants with an asthma-free day increased significantly over the course of the program. Results showed that the proportion considered to have well controlled asthma increased by 33% between intake and program completion. Improved adherence to clinical guidelines also showed improvement; 57% of participants reported having an asthma action plan at study end, compared to only 41% at intake.

Limitations of innovation:

The initial cost of the inhaler sensors, and gaining acceptance of the technology by health professionals.

Where may it be applicable?

With mobile phone usage high and coverage available in most areas worldwide, the scheme has the potential for replication worldwide. However, Propeller Health's position as a private company with limited resources, may restrict rollout on a national or worldwide scale.

References:

Van Sickle D et al. (2014) Impact of a technology-driven asthma program on symptoms, control and self-management: The clinical perspective. [online]. Available at: <https://apha.confex.com/apha/142am/webprogram/Paper303269.html>

Knell N (2012). Big Data Takes on Chronic Disease. [online] Available at: [http://www.](http://www.govtech.com/e-government/Big-Data-Takes-on-Chronic-Disease.html)

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Commonwealth Fund (2011). Q&A—Asthmapolis: Improving Asthma Control with Mobile Technology. [online]. Available at: <http://www.commonwealthfund.org/publications/newsletters/quality-matters/2011/october-november-2011/q-a>












PERSONALISED HEALTHCARE

Personalised healthcare creates significant opportunities to address the health challenges of the future. By shifting health systems from reaction to prevention, it aims to give patients the opportunity to directly input into decisions about their own healthcare. Innovations in this area often focus on addressing the rise in chronic, non-communicable diseases where management is primarily the responsibility of the person with the chronic disease. Health literacy and self-management are key elements of this movement, as they help to create an empowered health consumer who has better access to information about conditions and cures, and is willing to use self-diagnosis tests. Health care services are also increasingly being encouraged to adopt a more person-centred approach which embeds support for self-management in standard practice, integrated with high quality clinical care.

Empowering health consumers through increasing their health literacy and ability to self-manage conditions are therefore at the heart of the innovations in this section. We consider how a mix of community education, policy development and the engagement of local clinicians and other health professionals can help achieve this; how care transitions can be improved by providing patients with tools and support that promote knowledge and self-management of their condition; and how increasing competency and health management in the target population can allow people to make knowledgeable decisions about their health and to better navigate the health system.

COUNTRY - AUSTRALIA

Stay on Your Feet Programme

| | | | |
|---|---|--------------------------------|---|
|  |  | Country Health Impact | ✓✓✓ |
| |  | Potential Roll Out | ✓✓✓ |
| |  | Potential Global Health Impact | ✓✓✓ |
| |  | Target Audience | Non-institutionalised people aged 60 years and over in a large rural coastal region of New South Wales. |
| |  | Potential Cost Savings | Medium |
| |  | Innovation Theme | Innovation in policy/government |
| |  | Partnerships Created | Local government, National Health and Medical Research Council |
| |    | | |

The innovation:

The 'Stay on Your Feet' programme was a multi-strategy, population-based intervention to prevent falls among older people living in a large rural coastal region of New South Wales in Australia. The four-year intervention targeted knowledge, attitudes, behaviours, medication use, footwear, home hazard reduction and other risk factors related to falls for non-institutionalised people aged 60 years and over.

Subjects aged 60 years and over were

randomly selected, and, enrolled via telephone interview into intervention and control area cohorts.

Instigator and implementation journey:

NSW Health Department and the National Health and Medical Research Council were the instigators of the intervention, with the NSW Health Department providing the overall funding of approximately AUD\$600,000. The programme was delivered via a mix of community education utilising brochures, posters, television and radio; policy

development and through the engagement of local clinicians and other health professionals.

Evidence of success:

Value for money

- No formal cost benefit analysis was undertaken. However, the 22% lower incidence of self-reported falls and 20% lower fall-related hospitalisation rate in the intervention area compared to the control area suggests significant cost savings could be made.

Patient outcomes

- 22% lower incidence of self-reported falls in the intervention area compared to the control community after adjusting for baseline fall-related injury rates.
- 20% decrease in fall-related hospitalisations in the intervention area compared to the control community after adjusting for baseline fall-related injury rates.
- 77% of the targeted population had been in contact with at least one aspect of the intervention over the duration of the programme.

Encouraging spread

- Following on from the successful New South Wales program, a Western Australia program began in 1996 in the South West region. In 1998, the Department of Health Injury Prevention Branch officially adopted the Stay On Your Feet WA® model. The 'Stay on your feet' programme has now expanded out across other Australian states.
- The Stay On Your Feet program has been recognised world-wide with requests being received from government, non-government and private agencies to use the program to help develop area specific literature and programs

Limitations of innovation:

The evaluation suffered a high loss to follow-up rate (30%), which should be taken into

consideration when viewing the results. However, the nature of the study population (persons over 60 years) meant that any prospective study (including randomised trials) will suffer from the problem of attrition due to morbidity, mortality and relocation.

Where may it be applicable?

The programme is applicable to public, private and charitable organisations due to its multifaceted nature.












References:

Kempton, A et al (2000). Older people can stay on their feet: final results of a community-based falls prevention programme. [online]. Available at: <http://heapro.oxfordjournals.org/content/15/1/27.full>

Corlett et al (2006). Evaluation of Stay on Your Feet. [online] Available at: http://onf.org/system/attachments/123/original/SOYF_Evaluation.pdf

COUNTRY - USA

Care Transitions Intervention

| | | | |
|---|---|---|---|
|  |  | Country Health Impact | ✓✓✓ |
| |  | Potential Roll Out | ✓✓ |
| |  | Potential Global Health Impact | ✓✓ |
| |  | Target Audience | Hospitalised patients age 65 years and older |
| |  | Potential Cost Savings | Medium |
| |  | Innovation Theme | Innovation in academia |
| |  | Partnerships Created | Hospitals, universities, charity/third sector |
| |  |   | |

The innovation:

The overriding goal of the Care Transitions Intervention is to improve care transitions by providing patients with tools and support that promote knowledge and self-management of their condition as they move from hospital to home.

The model is composed of the following:

- A patient-centered record that consists of the essential care elements for facilitating productive interdisciplinary communication during the care transition (referred to as the Personal Health Record, or PHR).
- A structured checklist (Discharge

Preparation Checklist) of critical activities designed to empower patients before discharge from the hospital or nursing facility.

- A patient self-activation and management session with a Transitions Coach® in the hospital-designed to help patients and their caregivers understand and apply the first two elements and assert their role in managing transitions.
- Transitions Coach® follow-up visits in the Skilled Nursing Facility (SNF) and/or in the home and accompanying phone calls designed to sustain the first three components and provide continuity across

the transition.

A randomised controlled trial focussed on 750-subjects, and was implemented at a large, nonprofit, capitated delivery system that cares for more than 60,000 patients age 65 years and older in Colorado.

Instigator and implementation journey:

The Care Transitions Intervention was funded by the John A. Hartford Foundation and The Robert Wood Johnson Foundation, and developed by the University of Colorado at Denver. Before implementation of the program, approximately 15 percent of the system's Medicare patients were readmitted to the hospital within 30 days of discharge.

The delivery system contracts with one hospital, eight skilled nursing facilities, and a home health care agency. Patients receive care from hospital-based physicians (i.e. hospitalists) during their inpatient stays and, in general, from a different team of health professionals in each postdischarge care setting.

Evidence of success:

Value for money

- Although a formal cost-effectiveness analysis has not been conducted, hospital cost data suggest an annual savings of just under \$300,000 (savings represent the difference in hospital costs at 180 days postdischarge between program participants and the control group, after subtracting out the cost of the intervention).
- These estimates may be conservative because the health delivery system that participated in this trial had already made great progress in reducing hospital readmissions (its readmission rate was 15 percent, below the 20 percent national). Thus, there may be greater potential for reductions in hospital utilisation and costs for the average delivery system.

Patient outcomes

- Program participants had 20 to 40 percent lower overall hospital readmission rates (i.e. readmissions for any reason) than did members of a control group of

similar patients at 30, 90, and 180 days postdischarge.

- These differences, adjusted for age, sex, education, race/ethnicity, chronic disease score, and other factors, were statistically significant at 30 and 90 days. Participants were approximately 50 percent less likely to be rehospitalised at 30, 90, and 180 days for the same condition that caused the initial hospitalisation.

Encouraging spread

- The Care Transitions Intervention has been adopted by more than 900 organisations in 43 States in America.

Limitations of innovation:

The cost of the Transition Coach, which, to be effective, required at least a dedicated half- to full-time employee, and long-term commitment to fund the care transition role.

Without funds or regulatory requirement, most of the pilots' health care delivery systems lacked the incentive to sustain the care transitions program.

Where may it be applicable?












High income countries. The service is fairly easy to replicate, however it requires a fairly high level of resources, including the cost of training and employing the care transitions coach, and hiring an advanced practice nurse. Local health systems in lower-income countries may find these costs restrictive.

References:

Coleman EA, Parry C, Chalmers S, et al. The care transitions intervention: results of a randomized controlled trial. Arch Intern Med. 2006;166(17):1822-8. [PubMed] Available at: <http://www.caretransitions.org/documents/RCT.pdf> (link is external)

COUNTRY- UK

Action on health literacy in Stoke-on-Trent: Engaging South Asian men with Diabetes.

| | | | |
|--|---|---|---|
|  <p>UK</p> <p>MIDLANDS</p> |  | Country Health Impact | ✓ |
| |  | Potential Roll Out | ✓ ✓ |
| |  | Potential Global Health Impact | ✓ ✓ |
| |  | Target Audience | Men of South Asian heritage |
| |  | Potential Cost Savings | High |
| |  | Innovation Theme | Service delivery |
| |  | Partnerships Created | Stoke-on-Trent City Council, NHS Stoke, |
| |  |   | |

The innovation:

The project looked to increase competency and health management in the target population, allowing them to make knowledgeable decisions about their diabetes and to better navigate the health system. Specifically, this programme was looking to address the challenge that people of South Asian heritage in the UK are up to 6 times more likely to have Type 2 diabetes, with men from Indian or Pakistani backgrounds having 3 times greater risk than the general population, and men from Bangladeshi backgrounds 4 times. The project involved a peer learning scheme,

where participants with higher health literacy skills were mentors to others in the group. The mentors were trained, and then led one-to-one sessions which discussed navigating the health system, improving health communication skills and making sense of health information.

An information kit was given to participants, which was discussed at the peer learning discussions. They included translated information sheets from Diabetes UK, flash cards which visualised a lot of information and a South Asian diet booklet.

Instigator and implementation journey:

Stoke on Trent Healthy City Partnership. The city was identified as having one of the lowest health literacy rates in England, which is reflected in poor health levels. The project was developed to support people to better understand their health, in particular management of diabetes. The project was funded by NHS Stoke and Stoke-on-Trent City Council.

Evidence of success:

Patient outcomes

- The project was evaluated by researchers from Keele University. Qualitative feedback from participants all agreed or strongly agreed that it improved their abilities to communicate with healthcare professionals, understand health information and improved their knowledge of diabetes. Participants spoke particularly highly of information on managing diabetes whilst eating a South Asian diet.

Limitations of innovation:

It was found that although language barriers can be an issue in South Asian communities, some individuals cannot read in their native language either. In these instances audio and visual explanations could work better. However this was noted to be prevalent largely in older first generation migrants – as their children and grandchildren reach older age one would expect this issue to decline.

Where may it be applicable?

Countries with a significant ethnic minority population of South Asian heritage; South Asian countries themselves.

References:

Estacio, V. et al. (2015). Health literacy: Why it matters to South Asian men with diabetes. Primary Health Care Research & Development 16 (2).

Keele University. (2012). Action on health literacy in Stoke-on-Trent: Engaging South Asian men and young men with diabetes.

WHAT MAKES A HEALTH INNOVATION SUCCESSFUL?

After sourcing health innovations from different country settings and analysing the most important healthcare trends, we need to assess what can determine whether a health innovation is successful or not. An evidence-based ‘recipe for success’ is needed to determine what will work in the current global health innovation climate and, more importantly, what will work in the future global health climate.

Healthcare models vary on a country-by-country basis, sometimes quite dramatically. Some innovations, therefore, are more replicable in some locations than others. However there are certain factors, explored below, which can determine whether an innovation is successful or not. These are:

1. The demographics and age preparedness of a country
2. The robustness of the delivery model
3. The local, regional and national policy environment
4. Ability to influence behavioral change
5. Engagement with a specific health challenge
6. A sensible and sustainable funding structure
7. The ability to evaluate and disseminate initial results

1. The demographics and age preparedness of a country

Healthcare systems across the globe need to adapt in different ways in order to meet the demands placed on them by demographic change. Almost without exception, countries across the world are experiencing population ageing¹⁶⁰. And whilst many countries will be facing similar challenges, the demographic situation will be different from one country to the next. Germany, for example, is often described as being in either stage five or six of demographic transition, meaning that despite

an increase in life expectancy their population is in fact declining due to low fertility rates¹⁶¹. Meanwhile the US, whilst also experiencing increased longevity, has a population that is set to increase, mainly due to high birth rates amongst Hispanic citizens¹⁶².

Each health system will therefore need to adapt in different ways, affecting the replicability of health innovations which have been evaluated in this report; successful innovations in one country setting may not necessarily be a success in another. A successful innovation in Germany may look to meet the challenge of having fewer doctors of working age whilst meeting the needs of an ageing population; whilst in the US, innovations which meet the specific health needs of the increasingly ethnically diverse population may be more successful in gaining buy-in from health providers.

Whether a health innovation is successful or not can also depend on the age-preparedness of a country, with certain innovations being more suited to high-income countries that have been experiencing the effects of an ageing population for a longer time, and other innovations being more suited for emerging economies that are set to see a sharp increase in life expectancy, along with the declining birth rates that are associated with economic growth. The age-preparedness of a country will therefore have an effect on the priorities of health decision makers, and they may need to take different approaches to meet the same challenges. The UK’s approach to meeting the needs of the increasing numbers of the population that have dementia, for example, will differ from the approach of some South Asian countries, where many local languages have no equivalent word for ‘dementia’¹⁶³.

A ‘perfect storm’ can encourage innovation

A ‘perfect storm’ of demographic change can

lead to a political and economic climate which can encourage health innovation. Increasing life expectancy and the resulting pressures on health and social care systems can attract capital, encourage innovative approaches to the most pressing healthcare challenges and encourage health policy makers to be receptive to health innovations.

These conditions may be more prevalent in middle income countries that have experienced population ageing more recently than high income countries, where they have had less time to prepare. The demography of China, for example, is projected to change dramatically over the next few decades. Significant increases in life expectancy, the one child policy and low fertility rates in China mean that their health system will have to care for an increasing number of older people. However, aspects of the healthcare system in China have struggled to make the same strides life expectancy has; there are only 1.4 doctors per 100 people in the country¹⁶⁴, as well as weak infrastructure.

Despite, or perhaps because of, these problems, China is attracting large investment into their health care sector, with much of the capital coming from abroad. The healthcare sector began to liberalise in 2009, and in 2014 China began to allow full foreign ownership of hospitals, undertook a deregulation of drug prices and streamlined the process of approving medical devices¹⁶⁵. Investors are attracted by predictions that there will be 223 million people aged over 65 by 2030, and healthcare spending by private sector, individual consumers and the state is expected to treble to \$1.3 trillion in the next 5 years¹⁶⁶.

Of course financial spending does not equal sustainability, and with China's economy looking like it is slowing down, future investment may be harder to come by. But certainly innovations require an initial injection of funding. And the development and implementation of health innovations may benefit from a start-up culture of encouraging innovative approaches to healthcare, particularly for the development of innovative technology.

The healthcare sector in the US for example

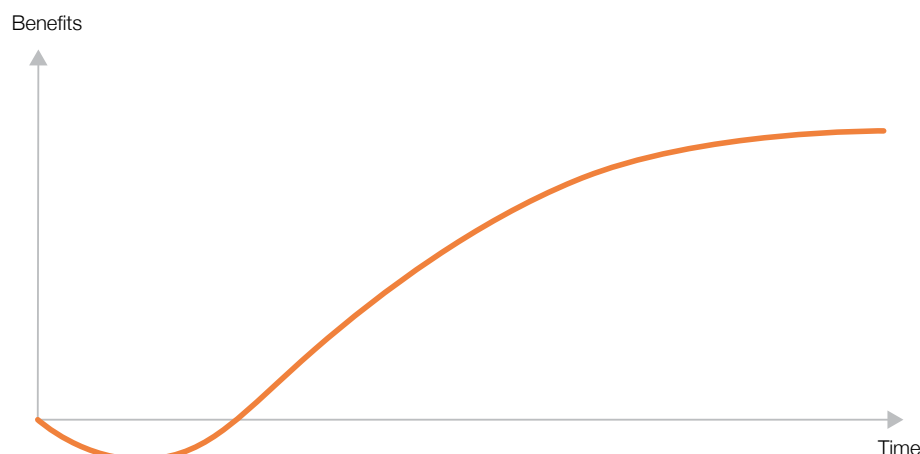
is drawing on the technology start-up culture to develop new innovations. Care Ticker is a mobile app through which caregiving activities can be tracked, and carers can connect with others in a similar situation. Carers can offer support and advice through the app, as well as being rewarded with redeemable incentives such as gift vouchers. Several healthcare insurers in the US have signed up to the app; the idea being that participating individuals can share in the savings health insurers make through their unpaid caring duties.

Each countries' health care system is different in funding structure. Foreign healthcare investment in universal, publicly funded healthcare systems such as the NHS is different from a publicly funded health insurance system, which is in turn different from a privately funded health insurance system. It is difficult to see foreign capital investing in the NHS in the same way as in China. However, innovative methods of healthcare may emerge from this large scale investment in China, with some degree of replicability in different global settings.

2. The robustness of the delivery model

Of course innovative health solutions can only be successful if the fundamental mechanisms of the innovation, in terms of organisational and funding structures, are robust. There needs to be a clear vision from healthcare leaders of what they want to achieve. This must first be delivered from the highest level, with national or high-level regional health decision makers placing an emphasis on creating an environment that encourages, supports and disseminates innovation. In recent years countries have been placing increasing emphasis on innovation, due in some part to the challenges posed by demographic change. Australia, for example, have focussed on supporting innovations which move the focus from acute care to a community-based care framework, as well as integrating health and social care¹⁶⁷. The NHS in England has also placed significant emphasis on fostering innovative pathways for healthcare, with their report *Innovation Health and Wealth: Accelerating Adoption and Diffusion in the NHS* setting out a delivery agenda for spreading

Fig 10: Health Provider cost curve



Source: Global Diffusion of Healthcare Innovations (GDHI) Working Group

innovation across the NHS¹⁶⁸.

Initial costs can be high, but health providers must not run scared

Few, if any, healthcare innovations which make a tangible impact cost no money to implement. In a troubled economic climate of poor economic growth and rising healthcare costs, brought about in part by a global ageing population and the continued increase in the costs of medical technology, health policy makers and health providers may be reluctant to meet the costs needed to set up a new pilot health innovation. A health provider, faced with tighter budgets and increasing cost may be tempted to be cautious. However, facilitators of successful health innovations appreciate that implementation of a new innovation will always, to some extent, have a cost in terms of financial resources, human resources and organisational disruption. Clear improvement and a progression towards the aims of innovation may not be apparent in the initial stages of the pilot; in fact there could even be a reduction in efficiency and cost-effectiveness (shown in figure 10). For example the Protocol 3 project in Ghent, Belgium, involved an initial first year budget of €455,000 to target on average 110 older people per year. Whilst this appears to be a relatively high spend on a small number of the population, to date the project has succeeded in allowing older people to age in place in their own homes, delaying admissions to nursing homes by on average 8 months

(compared with a target of 6 months), resulting in substantial savings in the long term.

Implementers of health innovations must therefore do everything possible to make the innovation implementation process as smooth and as painless as possible; from initial financial expenditure and organisational adaptation to an innovation that is fully integrated within the healthcare environment and improving financial sustainability of the healthcare system. This process can be helped by:

- Planning the implementation of new ideas and systems carefully, and envisaging what challenges might occur.
- Before embarking on the new project, resources and time needs to be invested in ensuring organisational change is in place.
- Being prepared to adapt innovations to meet these challenges.

3. The local, regional and national policy environment

The policy environment is influential in healthcare, and can help or hinder the success of health innovations. The direction that central or local governments take can influence health behaviours, an example being the successful efforts of governments in The Netherlands, Denmark and Germany to increase cycling rates amongst their populations¹⁶⁹.

Government actions can also help raise the profile of, and change attitudes towards, health

The devolution of health and social care in Manchester, England

In early 2015 it was announced that Greater Manchester will become the first region in England to gain full control of health spending, with 10 local authorities taking over a combined health and social care budget of approximately £6 billion¹⁷³. If implemented well, this innovation in health care is a good opportunity to achieve joined up health and social care, a move which it is routinely argued will improve financial sustainability of health systems as well as improving the health and wellbeing of populations^{174,175}.

This policy has the potential to improve the success of health innovations which have a focus on prevention. The priorities and responsibilities of local government are markedly different from central government, as it is local councils that fund other areas which may benefit from a preventative approach to health care, for example social care, housing and leisure facilities. There is therefore a direct economic interest for local authorities to, for example, delay admission into care homes, or reduce childhood obesity. The reforms in Manchester therefore provide a positive opportunity to take a preventative approach to health care, and are a significant opportunity to meet the challenge of the big, cross-sectional challenges which demographic changes poses to countries across the globe.

issues which might have been previously maligned. Globally we are seeing the challenge posed by dementia being, albeit rather lately, taken seriously. As the global population ages, dementia prevalence rates will increase dramatically, with middle and low income countries seeing the biggest increase; by 2050 71% of those with dementia will be living in lower and middle-income countries¹⁷⁰.

This policy environment of moving dementia further up the political agenda is linked with some interesting and important innovative approaches to improving the lives of people with the condition. One example is in Japan; in 2004, the name for 'dementia' was changed to replace the previous, stigmatising word, which translated as a 'disease of cognition associated with idiocy'¹⁷¹. This change, alongside a public awareness campaign about dementia, has helped reduce the stigma surrounding the condition.

In the UK, in recent years significant political attention has been awarded to dementia. After years of being neglected politically, following the G8 dementia summit which was organised by the UK Government, dementia is moving up the political agenda, encouraging new innovations in dementia treatment and research. Enthused by the Prime Minister's 'dementia challenge', new projects have been undertaken, including

building dementia-friendly communities which aim to allow people with dementia to better access services and the wider community¹⁷². New health policy initiatives have also been introduced, including financial incentives for GPs to diagnose dementia.

4. Ability to influence behavioural change

Three case studies

For health systems to be financially sustainable whilst still providing high quality care, populations across the world need to take increased ownership of their health. Prevention, rather than intervention, needs to be the priority of health care decision makers. And citizens need to take an active interest in their own health and wellbeing across the lifecourse – not just when they are in ill health. Health providers and policy makers need to therefore know what can be effective in changing health and lifestyle behaviours. This is notoriously difficult to achieve – however globally there are instances of success. Below we have included three significant behavioural trends in different country settings, and analysed the most significant enablers of behavioural change.

These three case studies demonstrate that the right combination of factors can have success in influencing health and lifestyle behaviours of

Case Study 1: Smoking prevalence rates

In much of the developed world, cigarette smoking prevalence has decreased over the last few decades, along with a decrease in the uptake of smoking by young people which suggests prevalence rates will decrease even further¹⁷⁶. The US, for example, since 1980 has seen a year-on-year decline in smoking prevalence of more than 2% for both men and women¹⁷⁷. This has been achieved through a combination of influences. Legislation has made it more difficult for people to smoke as much, with a ban on smoking in the workplace cited as significant¹⁷⁸. The financial costs of tobacco smoking has also increased, with an increase in tax on cigarettes a factor¹⁷⁹. Finally, social pressures have played a role, through public health adverts and the reduced 'normalisation' of smoking in public.

Case Study 2: Cycling levels

After seeing cycling rates fall sharply between 1950 and 1975, there was a concerted effort in Denmark, Germany and The Netherlands to make cycling safer, more accessible and more attractive to the general population¹⁸⁰. Again, the combination of legislation, societal influencers and costs had an impact in the transformation of cycling rates in these European countries. Governments invested in infrastructure to create decent and safe cycle lanes, and created legislation to improve right-of-way for cyclists; planning regulation also favoured mixed-use urban development which meant that the average trip is generally shorter than in the US or UK, making it easier to cycle¹⁸¹. Financially, driving was made more expensive and inconvenient in cities and towns, again encouraging the use of two wheels rather than four¹⁸².

Case Study 3: Drink driving

The UK experienced a sharp reduction in alcohol-related road fatalities from the 1980s, with the percentage of driver fatalities who were over the drink-drive limit reduced from 30% to 20% between 1982 and 1998¹⁸³. This directly correlates with a change in policy, with the number of roadside tests in the UK increasing from 200,000 to 800,000 in the same period¹⁸⁴. Behavioural influencers also came from public awareness campaigns and advertising, as well as a decline, particularly amongst younger drivers, in the acceptability of driving whilst drunk.

populations. These factors are often a mixture of new legislation or new policy direction, financial advantages (or disadvantages) and social influences. Successful health innovations, in order to meet the present and future challenges posed by demographic change, need to enable and influence people to take ownership of their health and wellbeing.

A move needs to be made away from the mind-set of only thinking about health when someone doesn't have it, and towards one which prioritises health in everyday life. Innovations may be able to influence the behaviour of certain parts of the population, but an even greater challenge is to change behaviours in harder to reach parts of the population. For example, despite the UK experiencing an increase in the numbers of people cycling in recent years (arguably again due to the formula of legislation, costs and social influencers), the increase has come in the shape of young, male cyclists, especially in areas with low rates of cycling where men are 14 times more likely to cycle to work¹⁸⁵.

There are some groups who are harder to reach than others by health providers; however there is no group which is impossible to reach. Large corporations, whether it be Coca-Cola, Apple or McDonald's, regularly influence people across all social, ethnic or gender groups. Interestingly, Apple itself is increasingly taking

an interest in health; the launch of its new wearable technology was focussed very much on healthcare apps, such as ones which can monitor blood levels or the heart rate of a user with diabetes¹⁸⁶.

The danger of health innovations in new technology is that it could further increase the already present income-related inequalities that exist in healthcare across the globe. Across OECD countries, people with higher incomes are more likely to see a doctor, and are also more likely to be in better health¹⁸⁷. A significant problem with new technology is cost, with new technologies often prohibitively expensive for significant parts of the population. On the other hand, the open-sourced nature of many new health-related apps mean that developing them has never been cheaper¹⁸⁸. If these reduced costs result in greater accessibility for individuals, then the possibility of future health innovations utilising this technology to successfully inform traditionally hard-to-reach groups and direct them to relevant healthcare is high.

5. Engagement with a specific health challenge

It is difficult for an innovation to attempt to solve a large, over-arching health challenge such as cancer survival rates or the care of people with dementia. It is also rare for the implementation pathway of a successful health innovation to start as a country-wide initiative; instead innovations can be honed and refined on a smaller scale before, if successful, being rolled-out gradually across a wider geographical scope.

From our research, successful innovations often target a specific health care challenge amongst the population, before finding a targeted solution. For example, the Action on Health Literacy project in Stoke-on-Trent, England, looked to find solutions to two specific challenges; relatively poor levels of health literacy amongst the population of Stoke-on-Trent, and the fact that people of South Asian heritage in the UK are up to 6 times more likely to have Type 2 diabetes than the general population. Several studies have

found a correlation between diabetes and low levels of health literacy, due to the importance of health self-management when living with the condition^{189,190}. A pilot scheme was therefore set up to meet this challenge; health skills were shared between men of South Asian heritage, with health mentors trained to lead one-to-one sessions which gave participants, of whom English was often a second language, confidence to navigate the health system and improve health communication skills. Action on Health Literacy is a good example of an innovation targeting a specific health challenge and improving outcomes.

6. A sensible and sustainable funding structure

Multiple agencies can increase financial sustainability

Successful health innovations ensure that, when possible, multiple agencies are involved to share expertise and provide resources. In a tough economic climate pooling resources and making use of existing infrastructures are becoming increasingly important.

A multi-agency approach is a feature of many successful health innovations around the world. For example, the Falls Prevention Service in North Tyneside, England, involved a number of different organisations, including; Newcastle Hospitals Foundation Trust, Norprime (a private primary care provider), Age UK, Newcastle University, North Tyneside Social Services and North Tyneside Ambulance Services. Frontline services such as Norprime and the ambulance service worked together to identify older people who were at risk from falls, and financial sustainability of the project was improved by Age UK, a large charity, which provided some of the financial and human resources needed to screen the over 59s population in North Tyneside for falls. Importantly academic partners, in this case Newcastle University, can be utilised in health innovation pilots to share knowledge and undertake evaluation of cost-effectiveness. Demonstrating both financial sustainability and achievement of objectives is highly important in the decision to roll out health innovations.

Third sector involvement can be important in whether an innovation is successful or not. With health budgets facing increasing pressures from ageing populations globally, charities or NGOs can provide much needed capital and infrastructure. Involvement of the third sector can be particularly useful for low and middle income countries which may have limited health funding from government; however these countries may have a third sector which is less established or well-funded as higher income countries.

The ‘team’ which one builds a successful and sustainable health innovation around must also include the patient. The current climate of health policy across many middle and high income countries is one of patients taking increasing responsibility for their own healthcare, with prevention and health literacy the theme of many health innovations that are featured in this report. The future sustainability of health care systems, in an environment of declining replacement rates and increasing life expectancy, relies to some extent on individual’s self-management of their health and delaying or preventing admission to care. Sam VanNorman, from Park Nicollett in the US said of his experience as an ACO (accountable care organisation):

“We have come to realize we have to incorporate the most important member of the care team — the patient. With our finite resources, we must figure out ways to offload what we have thought as tasks that needed to be done by our staff. In most cases, it’s the patient who can do it more effectively. In the process, the patient is more engaged and it’s more efficient for everyone.”¹⁹¹

Financial incentives can play a role

The use of financial incentives in healthcare remains contentious, and prevalence and opinion can differ on a country by country basis. In the US, perhaps due to healthcare being largely in the private sector, financial incentives are seen as an important factor in the success or failure of a health innovation¹⁹². But the use of incentives and performance related pay is beginning to appear in publicly funded universal healthcare systems such as the NHS, with

GPs now receiving £55 for each new dementia diagnosis. Performance related pay for nurses is set to be introduced to the NHS after the failings of Mid-Staffordshire NHS Foundation Trust resulted in unnecessary patient deaths.

Financial incentives for healthcare professionals have been used successfully in Seattle, USA, for the Group Health Cooperative Medical Home Pilot. The innovation looked to increase productivity of healthcare professionals, improve financial performance and enhance access for patients. Conversations via telephone or email between health professionals and patients were introduced before and after physical visits; this allowed patients to discuss concerns and ask questions before the appointment, reducing appointment times. Electronic Health Registers were also promoted to engage patients and were used for online repeat prescriptions and test results overviews. Importantly, a payment system was introduced which incentivised healthcare professionals in Seattle to use the alternative communication forms of telephone and email. This financial incentive was a factor in the successful uptake of this new system, which ultimately resulted in a 29% reduction in emergency visits and 6% reduction in hospitalisations compared to other Group Health clinics.

Despite this success in Seattle, evidence varies on the effectiveness of financial incentives, and it is clear that they should be used carefully. Studies have found that incentives may result in an acceleration of improved performances and an increase in quality of care; these improvements however often are reversed after incentives have been in place for some time¹⁹³. Another study found that whilst financial incentives may improve performance in the short term, once the incentives are removed any improvements may be lost¹⁹⁴, whilst incentives may also lead to a reduction in quality of care for areas which are not financially incentivised¹⁹⁵.

The use of financial incentives in health innovation models must be used carefully and sparingly. Evidence suggests that these incentives for healthcare professionals can be useful in a targeted approach at encouraging

new and different working patterns and methods; for example in Seattle, using new communication methods with patients in an aim to reduce hospital admissions. But these incentives should not be in place for a sustained period of time, as any positive impact may be eventually negated and other non-incentivised aspects of healthcare may suffer. Financial incentives can be an important part of a successful and sustainable health innovation, but a 'short and sharp' approach when applying any may be the best approach.

7. The ability to evaluate and disseminate initial results

Health innovations will often begin with a small-scale, localised pilot scheme. The chances of these innovations continuing to receive funding, expanding in geographical scope and being adopted by other healthcare providers are greatly improved if they are able to quantify the improvement in service delivery and the reduction in costs to health providers. As discussed previously, the involvement of universities, or another partner organisation that can effectively assess the results of a health innovation is beneficial, with a quantified measure of success increasing the likelihood of pick up from health providers.

Healthy Outlook was an alert system in the UK for patients with chronic obstructive pulmonary disease (COPD), the term for a collection of lung diseases including bronchitis. The severity of the symptoms can be effected by weather conditions; because of this, Healthy Outlook was developed by the Met Office. A forecasting model was devised to predict when weather conditions may affect people with the condition, and patients would then receive a telephone call to advise them of the weather conditions, give them advice and remind them to seek medical attention if their symptoms got worse¹⁹⁶. This innovation was met with enthusiasm, and showed initial promise. However, this programme did not achieve roll-out. When contacted, the Met Office explained:

"In mid-2013 we made the difficult decision to close down the Healthy Outlook service due to the lack of take-up from the PCTs (Primary Care Trusts)/CCGs (Clinical Commissioning

Groups). The health market demands strong evidenced-based products and services to justify budgetary spend. The Healthy Outlook service was designed to form part of an overall COPD (Chronic Obstructive Pulmonary Disease) 'pathway', and it proved difficult for the health providers to effectively monitor its impact on patients' health – and hence cost savings for the PCTs/CCGs. We would welcome the opportunity to reintroduce this service should the opportunity arise".

The journey of Healthy Outlook hints at a difficult issue in healthcare innovation. Current consensus amongst health decision makers and health funders is that greater attention needs to be directed towards prevention in order to ensure future sustainability of health systems. However, prevention is notoriously difficult to quantify and evaluate^{197,198}. The current climate of health provision places high importance, understandably, on clear tangible results if they are to provide funding and roll out pilot projects.

There are ways to improve the evidence base of new innovations. As with most issues, increased funding to enhance the gathering of appropriate evidence for new innovations and techniques in healthcare could enable new health innovations to show results¹⁹⁹. Health providers, industry and other sectors can also improve the sharing of information and make evidence more accessible, to help build better evidence bases²⁰⁰.

Barriers to health innovation

Above we have detailed certain factors and climatic conditions which can lead to health innovations that offer a sustainable future of healthcare in ageing societies. However, it is important also to know what can result in an unsustainable health innovation. P.F Drucker in *Innovation and Entrepreneurship*²⁰¹ lists a number of sources for innovation opportunity, some of which are applicable for health innovations. To be successful, a health innovation must acknowledge these factors:

- **Process need.** Will the innovation save

money whilst improving quality of care?

- **Appreciate changes in industry or market structure.** Successful health innovations must acknowledge what is happening in their respective countries health policy; failed health innovations do not. For example, an innovation which aims to improve quality in public health in England must appreciate the large scale structural changes brought about by the Health and Social Care Act 2012, and look to work with, not against, the decentralisation of public health.
- **Demographics.** Whilst this may appear obvious in the context of ageing societies, health innovations need to appreciate demography in greater depth. Action on Health Literacy in Stoke-on-Trent, for

Case study

PharmaTrust was a Canadian company which developed a remote prescription dispensary. Working much like a vending machine, patients could pick up prescriptions 24 hours a day from the electronic dispensary, and could also have remote appointments in the booth with a pharmacist via video link. Pharmacists could see patients faster and more efficiently, and patients were able to access pharmacy services at more convenient times. The company initially received significant investment, and after installing machines in hospitals in Ontario they expanded to the US and ran trials in the UK. However in 2012 PharmaTrust filed for bankruptcy. It was noted that the users of this service were older people, who were resistant to using new technology. But more importantly this innovation was met with opposition by pharmacists. The president of PharmaTrust cited stated; “Pharmacists don’t like them because they see *these machines as threatening to their livelihood.*”²⁰²

example, was put in place to improve the previously relatively poor health literacy and health management skills of older people of South Asian heritage with diabetes, a demographic group which is set to increase in the future.

- **New knowledge.** A failed innovation does not take into account new knowledge on working practices, organisational structures or health technology.

Conservatism within the sector

From the case study above, innovations, especially disruptive innovations that diverge from traditional access points to health care, can be met with opposition and caution from both the health care industry and patients themselves. Although it may be understandable that the healthcare industry can be resistant to disruptive innovations (new technologies or models of care which challenge the status quo), the end point of health provision is to provide the best possible care. It is concerning that new disruptive innovations are currently being blocked by the health care industry; from recent years examples include:

- The further development of portable X-ray machines that are 10% of the cost of traditional machines has been blocked by traditional x-ray machine suppliers²⁰³.
- Glasses which can allow individuals to adjust the prescription themselves without the need for an optician, at a cost of around \$5, have been repeatedly discredited by opticians and other eyesight specialists, who claim that other eye conditions may go unnoticed²⁰⁴.

Concerns of traditional health providers may have some validity. However, a mind-set of protectionism and conservatism in health provision harms patients and stifles many innovative technologies and models of health care which are needed to create sustainable health systems in future years. Health technology and practice constantly evolves, meaning that some methods and technologies will become redundant. For example, in the 1980s there was strong resistance from

endocrinologists and manufacturers of large scale blood-glucose testers when personal blood glucose meters were developed, allowing patients to check their blood sugar levels at home; the subsequent improvement in quality of life for patients with diabetes greatly outweighed the reduced demand on the manufacturer's machines and the endocrinologist's services²⁰⁵.

Failed health innovations do not find the right balance between financial sustainability and innovative, new approaches. Established, publicly funded health systems such as the NHS are relatively good at financial sustainability when innovating; private health start-ups in more liberalised health environments may not be. However, the positive side of start-ups is that an environment is created to develop more radical innovations. The 'fail fast, fail often' mantra of Silicon Valley may not be as true for health innovations as it is for tech innovations, however there is certainly a greater acceptance of failed attempts in this sector; understandably, when investment in projects comes from taxpayers money there is greater caution demonstrated.

Data privacy concerns

The increase in personal data generated by the population, as well as advances in the ability of health care providers to process and use this data, brings with it opportunities. However concerns remain over the use, or misuse, of this data. Electronic GP records, health apps and even social media use can all generate personal data which can be beneficial in improving the health of the population. Despite these benefits, innovation is often hindered as there remains a mistrust in many populations across the globe, with many fearing an increase in breaches of privacy. To overcome these barriers, governments must be prepared to ensure that privacy laws keep up to date with the rapid advances in the use of data, and the public must be made aware of exactly how their data is used, with the choice to opt out.

Google's venture into healthcare in the form of Google Health was widely seen as a failure. Despite being successful innovators in information technology, Google's success was

not transferred over to their healthcare venture; reasons included the lack of appreciation that patients may be reluctant to divulge personal health information to a company such as Google²⁰⁶. Difficult as it may be, health solutions to our ageing population must find the best balance between these two models; an innovative approach to healthcare challenges whilst reducing the financial risks.

Failing to assess the 'lay of the land'

Whilst innovation should be at the heart of finding solutions towards a sustainable older society, from the healthcare innovations that have been sourced and evaluated for this report, a common factor emerges which is important for replicability and avoiding failure. The most successful health innovations are not ones which drive change themselves, but those which assess the health environment and innovate within certain themes. Healthcare trends mostly do not appear through chance, but instead are shaped by the factors listed above; new knowledge, demographics, needs of patients and changes in the sector. Across the health innovations sourced from the UK for example, preventing admission to acute care settings is a common theme. This is driven by the demographics of the country, the need to reduce hospitalisations which are costly to the NHS, and changes brought about by the Care Act 2014, which places a preventative agenda at the heart of social care in the UK. Therefore a successful health innovation will appreciate the move towards prevention in healthcare, and will work within those parameters to improve delivery of health care in a financially stable manner.

CONCLUSIONS, RECOMMENDATIONS AND NEXT STEPS

Conclusions

We have highlighted how national and international governments, institutions and organisations across the world are responding to the challenges of an ageing population and health care more broadly through innovation.

It is clear from this report that many regions and countries have proven capacity to innovate. But they are doing so at a different pace. As a result it is vital that where such networks are being developed governments participate and learn from others.

Our report highlights that governments, institutions and organisations desperately need to introduce new policies to tackle or offset the funding crises in terms of health and care services. While these can be politically fraught processes, it is vital that governments reconcile the future cost of care and develop systems to ensure that future generations do not see access to health and social care reducing.

It is also vital that national governments have and publically demonstrate strong leadership and a clear sense of direction in relation to ageing policy as it is evident many governments struggle to deliver integrated policy solutions.

We have also demonstrated through our innovations in response to the surge of NCD's the necessity of investing in preventative health programmes across the life course. We have evaluated the potential of reducing cardiovascular risk factors in the workplace in India, and how risk reduction for dementia has the potential to prevent 3 million people in the UK developing this condition. Thus while we know there is evidence that prevention works and can be cost effective, many governments have struggled to mainstream preventative health. It is therefore imperative we foster innovation in prevention as well as treatment programmes.

However, governments find it difficult to invest and perhaps justify preventative measures when acute pressure is high and perhaps there are limited resources. It is vital that the evidence base for prevention continues to develop. Governments across the world must understand better what works in terms of encouraging greater self-management and health literacy to promote preventative action.

One of the policy challenges hindering prevention is often the fiscal return may take years to reap its reward. Governments could however, find innovative ways of funding the front loading of the cost of prevention (e.g. through the use of private insurance). We have also highlighted that significant cost savings can be achieved through providing more care rather than less care to groups who are frequent and expensive users of health provision, for example through innovations such as the North Tyneside Falls Prevention Service and the South Central Pennsylvania High-Utilizer Learning Collaboration.

Furthermore at the individual level, there needs to be greater investment to educate and support the health consumer in an increasingly changing health universe. Many older people, particularly those with co-morbidities, can find it difficult to both navigate health systems and be a demanding "consumer".

Some of our case studies have highlighted the potential of new technology such as RAFT Telemedicine across Africa and mTrac in Uganda to deliver better and cheaper health and care. These health technologies also offer significant opportunities to develop innovations that harness the power of 'big data'. Without a doubt, governments must learn from innovations across the world, but they should not assume that technology will solve the crises. There is no shortage of technological "ideas" or solutions, but governments must work harder to develop systems to integrate these ideas into health structures and systems.

One of the best ways of addressing supply is in relation to ensuring that the funding for health and care does not place inverse incentives on, for example, prevention. The experience of countries who have introduced care systems which empower the consumer, highlights the importance of developing long term personalised health and care systems. If there is funding available and if the consumer is empowered and engaged to actually “purchase” the care they want, it is likely that a care market (whether state run or private) can deliver the services which older people want and need. Yet without a doubt, there is a need for further innovations in health and care in order to meet the challenges of an ageing society.

Across the world, governments need to find a way to stimulate a “market” for innovation. A ready supply of innovative ideas needs to be developed for others to build on.

Recommendations

The recommendations we make in this chapter seek to be relevant to high, middle and low income countries. Whilst our recommendations for action will need to be placed in culturally sensitive models, it is not clear that there is always a case for significantly different innovations for high income countries compared to middle or low income countries. In fact, it is apparent that the wealth of a country is not always the most important factor in terms of the efficacy of their health or social care policy responses. For example, some of the wealthiest countries are failing to deliver systems to pay for care or to incentivise innovation, whereas some of the poorest already have systems in place to monitor and deliver policy solutions to some of the biggest health challenges.

Of course, there are some countries where communication of prevention may be more difficult, where health inequalities are greater, or where systems are less well developed. But these differences often happen within countries as well as between them. Delivering solutions to the challenges as outlined in this report is likely to rely upon collaboration and communication. What our research highlights

above all else, is that we can all learn from each other.

1. Ensure future sustainability:

Recommendations for Governments

- 1. The development of further demand for care is likely to mean that governments across the world need to either ensure current systems are sustainable, or develop new ways of funding long term care.*
- 2. Governments must urgently ensure that systems are put in place to deliver sustainable and adequate funding to deliver the health and care needs of an ageing society.*
- 3. Governments must consider a raft of cost cutting moves to drive volume to value based care, and promote expertise in population health management.*
- 4. Governments should address the current and predicted future health care professional shortages, all governments should establish a review of supply and demand and make recommendations regarding national priorities and policy.*
- 5. Governments must invest significantly in ageing research and ensure there is parity in research funding for age related diseases such as dementia compared to other NCDs such as cancer.*

2. Prioritise a prevention agenda:

Recommendations for Governments

- 6. Governments should commit to investing an increasing proportion of health spending on preventative health. They should set and monitor targets for a minimum proportion of health and care spending to be devoted to preventative health.*
- 7. Governments must explore innovative budgeting which would help politicians make the economic case for prevention (e.g. allowing local political authorities to budget for the cost of prevention over 5 years).*
- 8. Governments should invest in strengthening health systems to deliver*

packages of cost effective interventions for NCDs and consider how fiscal policies could be used to greater effect as a lever for reducing the NCD burden.

9. *Governments must ensure that they understand health seeking behaviour and health seeking pathways to greater understand behavioural responses to prevention.*
10. *Governments must support the development of health literacy programmes targeted across the lifecourse.*
11. *There may be specific challenges for communicating health literacy in areas with low internet access or where communication systems are not well developed. Access to impartial information is vital to empower the individual.*
12. *Governments must find ways of ensuring that new technological “solutions” can integrate within existing healthcare systems.*

3. Promote a climate for innovation:

13. *Governments must create and support a market for innovation. Including creating incentives for innovation and funding.*
14. *Governments should ensure health plans embrace innovation and explore different financial arrangements and more consumer engaged models.*
15. *Governments should explore how to remove inflexible planning, regulation and policy which constrain innovations.*
16. *Governments need to foster and stimulate networks to transfer new approaches between sectors or localities. There needs to be a greater emphasis on pooling information and experts to provide new opportunities for generating solutions and revenue.*
17. *Governments needs to embrace the ‘digital agenda’, particularly with regard to big data and analytics to improve population health based planning, improve the service they provide and to garner new insights into disease management and prevention.*

18. *Governments must ensure that the supply of healthcare innovations do not further embed health inequalities and inequities.*

19. *Governments must ensure health and care systems are “personalised” and user focused.*

20. *Innovation works well when there is a focus on the end user. User led innovation should be supported at a national level.*

Next Steps

At the core of this research is a story of innovators and innovations, which we believe provide a snapshot of what could be achieved at the global level, with improved communication and sharing of ideas and information.

However we are not content simply to state the potential of the innovations identified in this report, we want to continue our story, and demonstrate the potential if we could apply the innovations in different country contexts.

Phase 2 of SOS 2020 - Health will use some of the innovations identified in report 1, apply these to different countries and model the impact of the innovations on the respective country if applied, developing different scenarios based on demographic and wider environmental factors such as employment, health, social care etc to assess the potential impact with both current and future scenarios.

We will explore this through a ‘policy off/on’ assessment, exploring what would happen if we maintained the current status of health (care) related interventions or, put simply, if we do not do anything new. This will provide a baseline against which we can explore what may be possible, through modelling the application of our chosen case study/ innovation (the ‘policy on’ assessment).

The next report building on the foundations of report 1, will provide models of innovation in health which will stimulate successful change leadership in different countries health (and social care) systems.

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