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Using digital technology to design and deliver better mental health services

Perspectives from Australia and the USA

Rebecca Cotton

Contents

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About the author

Rebecca Cotton is director of policy at the Mental Health Network – the voice for NHS-funded mental health and learning disability service providers in England. Rebecca leads on policy and public affairs for the network, working with senior officials, ministers and parliamentarians on behalf of its 70 members, which include over 90 per cent of NHS mental health trusts. She has authored over 20 publications, both for the Mental Health Network and in conjunction with organisations such as the Royal College of Psychiatrists and the London School of Economics and Political Science.

In recent years, she co-founded the Mental Health Policy Group – a coalition of six national organisations working for better mental health, including the Mental Health Network, Mind, Rethink Mental Illness, Royal College of Psychiatrists, Centre for Mental Health and the Mental Health Foundation. She co-wrote the group's manifesto for better mental health and chaired the group through the 2015 general election year. In 2017, Rebecca graduated from University of Cambridge with an MBA and was awarded a Churchill Fellowship to explore how digital technology is being used to improve mental health in Australia and the USA.

Foreword

Imagine if someone had told you, when you were a child, that in the year 2018 you could summon a taxi, takeaway, or even a hairdresser, direct to your door via an app?

Imagine if they had told you that you would be able to videocall your family, for free, from the palm of your hand?

Imagine if someone had told you, instead of watching whatever happened to be on the TV, you would be able to choose from thousands of films to stream instantly to any device you wanted?

You may or may not have believed that was possible. Digital technology has truly transformed every aspect of our lives.

Now consider this.

How has your personal experience of the NHS has changed over the same length of time?

In the 70 years since it was established, advances in technology have revolutionised the treatment options available through the NHS and improved millions of lives. Hip replacements, CT scanners and ultrasounds, IVF fertility treatment, to name just a small number, were all pioneered in NHS hospitals. These, and other, breakthroughs in diagnostics and treatment have vastly improved the lives of countless patients.

However, much of our day-to-day experiences of using the NHS will likely be the same as they were 20 years ago or more. In primary care, you probably still visit your GP in your local surgery for a face-to-face appointment. You probably have your prescription handed to you on a piece of paper. Some aspects of that experience, however, may have changed. You may be able to book your appointment online or have your prescription sent electronically to your local pharmacy.

For more specialist treatment, some aspects of your experience of treatment and care will have also changed. For example, you and your clinicians might make use of technology to monitor indicators relevant to your condition and adapt your treatment plan accordingly. You may have access to new treatment options made possible by technological breakthroughs. For most of us, our experiences of accessing care will likely be very familiar. You will likely still visit your local hospital or mental health service for face-to-face appointments, usually during regular working hours on a weekday. For most people, you will probably still receive your appointment information through the post. If the time you're offered is inconvenient, you will probably have to reschedule by calling a clinic administrator during regular office hours (and perhaps, if you're like me, remark how strangely arcane that is).

Of huge significance is the explosion in availability of information. Moving to a new area? Then you might research local providers online and make choices based on reviews. Experiencing symptoms? You may well have researched likely conditions online before visiting your GP. Have a long-term condition? You'll probably research alternative treatment options online and be much more likely to suggest different courses of action to those in charge of delivering your care. The digital revolution has also been a revolution in power.

Today, there are incredible examples of clinicians utilising cutting edge technology, such as 3D printing and robotic assisted surgery, to improve outcomes for their patients and service users.

Colleagues working across the mental health sector are doing some wonderful work in finding new applications for technology to improve mental health. This year, the National Institute of Health Research awarded a grant of £4 million to trial using virtual reality in the delivery of psychological therapies.[1] At the NHS Confederation's conference in June 2018, we heard from colleagues at Mersey Care NHS Foundation Trust who are partnering with Stanford University to apply machine learning techniques to the challenge of improving the safety of services and reducing the numbers of lives lost to suicide every year.

In the years to come, we all hope that advances in medical science will lead to new treatment breakthroughs in mental health. At the same time, we all hope that researchers find new applications for existing technology in delivering better care for people using mental health services.

Here and now, we can all learn much about how to design and deliver better mental health services using technology by those already doing it. There is also much we can learn from other sectors in terms of improving overall user experience.

There are brilliant examples of this already happening right here at home in the NHS. There are also interesting examples which we have far less opportunity to hear about for no other reason than time and geography.

This report focuses on what we can learn from two very different healthcare systems – Australia and the United States of America. Thank you to the Winston Churchill Memorial Trust for enabling that to happen.
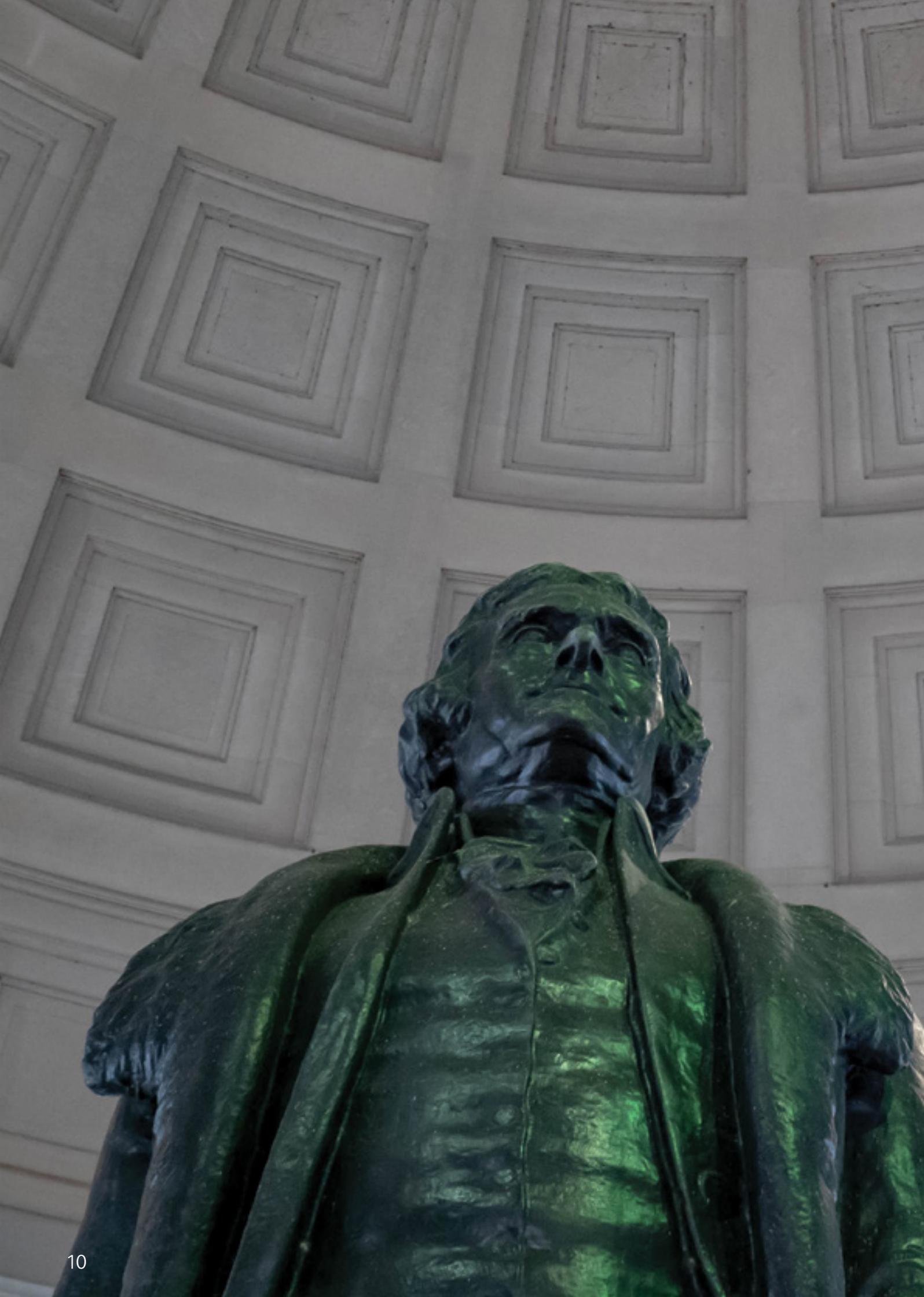
Executive summary

Introduction

Digital technology is central to how we live in the modern world. Nine out of ten people have access to the internet at home.[2] Seventy-eight per cent of UK adults use a smartphone, and 20 per cent of households have wearable technology such as fitness trackers.[3]

In mental health, our system is facing unprecedented challenges. While rates of severe and enduring mental illness among the population is broadly stable, we know that far too many people currently do not access the treatment and care they need. According to the most recent figures from the Adult Psychiatric Morbidity Survey, six out of ten people who screened positive for bipolar disorder were not in receipt of any current medication or treatment (59.2 per cent).[4] Nearly one in five people with a psychotic disorder (such as schizophrenia) are similarly not in receipt of treatment.[5]

Digital technology presents us with new opportunities to deliver NHS services differently, hopefully enabling more people to access the treatment and support they need.

This is also a global opportunity. Across the world, people experiencing mental health problems face challenges accessing care and support. The purpose of this project is to explore what we in the UK might learn from colleagues in the USA and Australia engaged in work relating to making better use of digital technology in the mental health sector.

Findings

Over the spring and summer of 2018, I met with more than 50 people working in more than 25 organisations to interview them about their work. Across both countries I met with a wide cross section of inspiring people, all demonstrably committed to improving the lives of people with mental health conditions. They included peer workers, psychiatrists, psychologists, academics, policy makers and campaigners.

This report summarises my findings from those interviews, drawing out some of the main learning points for the UK system. Five overarching themes emerged:

1. The opportunity provided by digital technology to rethink current service design and delivery.

2. How we can capitalise on the potential of technology to provide scalable options for prevention, self-help and peer support.

3. The potential of digital phenotyping to improve the quality of care.

4. How to best support innovation.

5. Digital technology in relation to research and insight.

Illustrating each of these themes, a number of case studies are shared drawing on interviews carried out for the report. These case studies draw on examples from mental health services, academic research, non-profit programmes and other examples.

Conclusion and recommendations

The Churchill Fellowship represents a fantastic opportunity to learn from other countries who are tackling some of the same systemic challenges we are confronted with in the UK. In the case of mental health, colleagues are absolutely right when they observe that mental health is a sector that is ripe for digital disruption.

We have much to learn from one another.

I saw fantastic examples in Australia of how digital technology can be used to redesign the delivery of mental health services. I was particularly taken with our colleagues at eOrygen and eheadspace who together had thought so deeply about this challenge. At eheadspace they could see clearly how help-seeking behaviour was changing among young people and ensuring their service model responds to ensure people can access help when they needed it. At eOrygen and eheadspace I could see clearly the opportunities to not only help empower individuals to take charge of their own recovery, but also to make support and advice better available for families and carers.

Spending time in the USA was an education in innovation. I saw how providers can create the right structures and culture necessary to support in-house innovation, and how government agencies can support that. Spending time with Dr John Torous and Dr Ipsit Vahia in particular was a fascinating opportunity to learn more about digital phenotyping and how this is starting to be applied in their clinical practice.

In both countries, I met with wonderful researchers who were building the evidence base for new interventions and developing new ways of supporting people with mental health problems. Among the many colleagues I met from the non-profit sector I found real examples of innovation aimed at helping to educate, inform and support people experiencing a mental health problem. I hope that the case studies set out in this report spark the imagination of colleagues working in mental health about what we might do differently in the future.

The final chapter of the report highlights the following five recommendations for the NHS.

Five recommendations for the NHS

1 NHS England should significantly expand its current Global Digital Exemplars programme to make learning accessible to all. As part of the programme, more mental health services should be given access to significant levels of dedicated funding to support digital innovation.

2 NHS England should consider developing and articulating a national vision for digital mental health.

3 NHS England, the NHS Digital Academy and Health Education England should ensure that NHS workforce and development strategy appropriately considers the impact digital technology is having, and will continue to have, on the future NHS.

4 NHS England should give consideration to whether there is a case for certain e-mental health services to be commissioned at a national level.

5 Providers of NHS mental health services should consider how best they might leverage digital technology in their organisation:

a. As part of any service redesign work, considering how digital technology could help improve outcomes and reduce cost.

b. Consider how other digital services could help improve the overall experience of service users (eg through online appointment booking).

c. Think about how digital services could help support service users in terms of their wider recovery (eg online psychoeducation, crisis planning apps) and also improve information and support for carers.

d. Explore how they currently approach supporting innovation in their organisation, and consider whether establishing an in-house innovation unit might be appropriate in their case.

e. Consider how best clinicians can be supported to make use of monitoring apps and tools with service users where appropriate.

Time is pressing. The opportunity is here to capitalise on the potential digital technology offers us. In that version of the future, we can ensure more people have access to high-quality treatment, advice and support. We can ensure more people have a positive experience of using mental health services and are empowered to take control of their own recovery. Conversely, the risk is that, as a sector, we fail to capitalise on those opportunities and in doing so fail to deliver what the public will increasingly want. In that scenario, who knows what – or who – might fill the gap. As Jono Nicholas said when we met in Sydney: "Mental health hasn't had its Uber moment yet… *yet*".

Introduction

Background

Digital technology is central to how we live in the modern world. Nine out of ten people have access to the internet at home.[6] Seventy-eight per cent of UK adults use a smartphone, and 20 per cent of households have wearable technology such as fitness trackers.[7]

As the NHS celebrates its 70th anniversary, it is clear that our health service is both a treasured institution and an important part of our national identity. Increasingly, the UK public says that it wants to be able to communicate with the NHS in new ways. Research from Ipsos Mori shows us that while more than half (56 per cent) of people say that they would find it useful to be able to book GP appointments online, only 17 per cent of people report doing so.[8] There is a clear gap between how people want to communicate with the NHS and most people's every day experiences of treatment and care.

In mental health, our system is facing unprecedented challenges. While rates of severe and enduring mental illness among the population is broadly stable, we know that far too many people currently do not access the treatment and care they need. According to the most recent figures from the Adult Psychiatric Morbidity Survey, six out of ten people who screened positive for bipolar disorder were not in receipt of any current medication or treatment (59.2 per cent).[9] Nearly one in five people with a psychotic disorder (such as schizophrenia) are similarly not in receipt of treatment.[10]

At the same time, numbers of people experiencing common mental health problems are increasing. According to the same study, 18.9 per cent of 16-64 years olds surveyed in England met the criteria for a common mental disorder, such as anxiety or depression.[11] This represents an increase from 17.6 per cent in 2007 and, in turn, from 15.5 per cent in 1993.[12] Among this group, just over six in ten people are not in receipt of treatment.[13]

There is also some evidence of people being less happy with their experience of the NHS. The King's Fund reports that public satisfaction with the NHS overall dropped by 6 per cent to 57 per cent in 2017. Simultaneously, dissatisfaction with the NHS overall increased by 7 percentage points to 29 per cent – the highest level recorded since 2007.[14]

The expectations of service users and their families are changing. In mental health services, a shift towards recovery orientated models of care, an emphasis on co-production and shared decision making, plus wider societal and technological change have all influenced those changing attitudes and expectations. Increasingly, the public will want to use digital technology to engage with services in different ways, as well as make use of the information and data to understand and manage their conditions better.

As highlighted in the recently published long term-plan for the NHS,[15] digital technology presents us with new opportunities to deliver NHS services differently. Hopefully this will enable more people to access the treatment and support they need.

This is also a global opportunity. Across the world, people experiencing mental health problems face challenges accessing care and support. The stigma and discrimination faced by people with mental health problems is a very real issue, and in some parts of the world truly shocking. Among lower income countries particularly, the lack of resource available for treatment is sobering. The World Health Organization estimates that 45 per cent of the world's population live in a country where there is less than one psychiatrist to serve 100,000 people.[16] This compares with, in the UK, 14.63 psychiatrists per 100,000 people.[17]

Purpose of the project

As numbers of people experiencing poor mental health in the UK continues to rise, demand for services will inevitably grow. Currently, far too few people have access to appropriate treatment and support. Public finances are under strain and the expectations of the public are changing. Digital technology represents an opportunity to fundamentally rethink the way we design and deliver services.

The purpose of this project is to explore what we in the UK might learn from colleagues in the USA and Australia engaged in work relating to making better use of digital technology in the mental health sector.

Both represent developed countries with considerable cultural similarities to the UK. They both have thriving digital economies and similar changing expectations about how technology can be best utilised to improve the mental health of their populations. For these reasons, these systems present us with an opportunity for significant learning.

International context

To set the scene, first a word on the context of the American and Australian healthcare systems, both in terms of their operation and in terms of challenges associated with mental health.

United States

Provision of healthcare in the United States operates on a very different basis to the UK. The percentage of Americans with health insurance coverage for all or part of 2016 was 91.2 per cent. The majority of people hold private health insurance coverage (67.5 per cent), most commonly accessed through their employer. Americans covered by government insurance, such as through Medicare, total 37.3 per cent of the population.[18] While rates of uninsured Americans have reduced considerably since the passage of the Affordable Care Act in 2010, 8.8 per cent of the population is currently without health insurance.[19]

The amount of resource spent on the provision of healthcare is, by international standards, extraordinarily high. As a proportion of gross domestic product (GDP), the USA spends 17.2 per cent on healthcare.[20] This compares to 9.7 per cent of GDP in the UK and 9.1 per cent of GDP in Australia.

While most people in the United States access health services through insurance, public spending on healthcare (for example, through Medicare, Medicaid and the Veterans Health Administration) is surprisingly high. According to the Commonwealth Fund, public spending on healthcare totalled $4,197 per capita in 2013, more than in any other country except Norway ($4,981) and the Netherlands ($4,495). By contrast, public spending in the UK was $2,802 per capita.[21]

According to the American Hospital Association, 59 per cent of hospitals are owned by non-profit entities, 21 per cent operate on a for-profit basis and another 20 per cent are owned by state and local government.[22]

While the funding and delivery of health services in the United States are markedly different from the UK, there are a great number of similarities our countries face when it comes to challenges associated with mental health conditions.

Mental Health America, a leading non-profit organisation, estimates that 18 per cent of Americans – more than 43 million people – have a mental health condition.[23] Access to services is also a challenge, with 56 per cent of adults with a mental health condition thought to not be in receipt of treatment.

One out of five adults with a mental illness report seeking treatment and facing barriers to getting the help they need – whether due to lack of adequate insurance or finances, lack of available providers, or a lack of available treatment types.[24]

14.7 per cent (more than 6.3 million) of adults with a mental health condition are uninsured.[25] The state prevalence of uninsured adults with a mental health condition ranges from 3.3 per cent in Massachusetts to 23.8 per cent in South Carolina.[26]

Australia

The Australian healthcare system is best described as a hybrid model. Medicare was introduced in 1984 to provide free or subsidised access to public hospital services and to treatment by other sorts of health professionals (including doctors, optometrists and other workers).[27]

Medicare offers fee-free treatment as a public patient in a public hospital, by a doctor appointed by the hospital. Outside of hospital, Medicare will reimburse 100 per cent of the Medicare Benefits Schedule (MBS) fee for a GP and 85 per cent of the MBS fee for a specialist. If the doctor bills Medicare directly (bulk billing), individual patients pay nothing. If, however, a doctor charges more than the MBS fee, the individual patient has to pay the gap. While Medicare also provides for subsidised prescription medicines, it does not generally cover ambulance services or most dental services.

Medicare is ostensibly funded by a form of hypothecated taxation. In addition to general income tax, taxpayers pay a levy of 2 per cent of their taxable income. For individuals earning above $90,000 (or for families earning more than $180,000), a further surcharge of 1–1.5 per cent of taxable income is levied if that individual or family does not take out a suitable private health insurance policy.

For that reason, many Australians purchase private health cover. In 2015, 11.3 million Australians (47 per cent of the population) had some form of private patient hospital cover, and 13.3 million (56 per cent) had some form of general treatment cover.[28]

Like the UK and USA, Australia also has significant challenges relating to mental health. According to the well-respected Black Dog Institute in Sydney, one in five Australians aged 16-85 experience a mental illness in any year.[29]

Fifty-four per cent of people in Australia with mental health problems do not access any treatment.[30] The proportion of people with mental health problems accessing treatment is estimated to be half that of people with physical disorders.[31]

Research questions and methodology

The following research questions guided the project:

• How is digital technology being utilised in the design and delivery of mental health services in the USA and Australia?

• What examples of good practice already exist that the NHS could learn from?

• What are the barriers and enablers to adopting new technology?

• What role have national and local government played in the move towards making better use of digital technology?

To address those questions, over the spring and summer of 2018 I met with more than 50 people working in more than 25 organisations to interview them about their work. In the United States I visited Boston, New York, San Francisco and Washington DC. In Australia I met with colleagues in Melbourne, Canberra and Sydney. Across both countries I met with a wide cross section of inspiring people, all demonstrably committed to improving the lives of people with mental health conditions. They included peer workers, psychiatrists, psychologists, academics, policy makers and campaigners.

This report summarises my findings from those interviews, drawing out some of the main learning points for the UK system.

Project findings

As previously outlined, across Australia and the United States I visited over 25 organisations and spoke with over 50 individuals involved in the mental health sector. I interviewed peer workers, senior managers, clinicians, academics, policy makers and non-profit leaders. The following section sets out the main findings of the report, drawing on a number of case studies, as to what we in the UK might learn from colleagues in Australia and the United States.

Five overarching themes emerged. These included the following:

1. The opportunity provided by digital technology to rethink current service design and delivery.

2. How we can capitalise on the potential of technology to provide scalable options for prevention, self-help and peer support.

3. The potential of digital phenotyping to improve the quality of care.

4. How to best support innovation.

5. Digital technology in relation to research and insight.

The section also explores these themes in more detail, drawing on case study examples, and concludes with a discussion about key learning points for the UK system. The next, and final, chapter sets out a series of recommendations for further consideration.

Theme 1: Rethinking service design and delivery

Context

For people with an ongoing mental health condition, how might technology allow us to augment traditional models of care with further opportunities for psycho-education, peer support and self-guided care? How might options around telecare be best used to offer blended packages of care to best suit individual service users?

A large number of site visits highlighted examples of providers rethinking the delivery of mental health services, particularly for children and young people. At Massachusetts General Hospital, I met with Dr Janet Wozniak who talked to me about the importance of telecare for delivering treatment and care to young people with mental health problems across the state. Replacing some office visits with virtual sessions were making it easier for young people to engage in care, particularly in winter when travel is often disrupted in some areas.

Other providers, particularly Australian colleagues, were focussed on providing new routes into face-to-face services. In addition, of particular interest were a range of initiatives aimed at using digital technology as a platform for additional support to young people and families already using mental health services. These included interventions aimed at improving education and employment outcomes, better supporting carers and improving longer term recovery outcomes post-discharge.

eOrygen, Australia

Melbourne is home to Orygen, a world leading research and knowledge translation organisation focusing on mental ill-health in young people. The organisation, led by Professor Patrick McGorry, delivers research, policy development, training and education, as well as innovative services to young people experiencing mental illness.

eOrygen is a relatively new initiative, led by Associate Professor Mario Alvarez-Jimenez. The team at eOrygen team creates, in their own words, "lovable, engaging and effective evidence-based technology-based interventions for young people and their families". Their mission is to "reinvent youth mental health services through science and technology".[32] eOrygen is a collaboration between Orygen, The Australian Catholic University, The Centre for Youth Mental Health at Melbourne University and The University of Melbourne's Department of Computing and Information Systems.

Made up of 30 staff, the team is truly multidisciplinary – employing clinical psychologists and allied health professionals, computer programmers, award winning comic artists and professional writers, youth engagement staff, trained peer workers, mobile developers, virtual reality experts and health informatics experts.

eOrygen has a suite of projects currently underway or in development, including with additional partner organisations. These include:

Horyzons: The horyzons study is described as a world first randomised control trial being carried out over five years designed to promote long-term recovery in young people who have experienced a first episode of psychosis. Young people on this platform are recruited from The EPPIC (Early Psychosis Prevention and Intervention Centre) clinic at Orygen Youth Health and "interventions are specifically geared towards promoting confidence, self-efficacy and reducing social isolation in young people after they have been discharged from Orygen's outpatient program".

Affinity: The team describes affinity as "the first trial to assess how best to integrate face-to-face and online mental health services in young people experiencing suicidal ideation". Over a 12-week trial, young people aged 18–24 who are experiencing thoughts about and contemplating suicide will be recruited from the Mood Clinic at Orygen Youth Health. Affinity itself is "seeking to align with World Health Organisation recommendations that online and face-to-face mental health services be better integrated and tailored to empower and build the resilience, self-efficacy and confidence of young people in need of professional mental health support. Affinity will therefore seek to compliment not replace existing in person health services".

#yotes: Young people who experience mental illness are much more likely to have difficulty maintaining their commitments at school, university and work. Past research has, the team states, "indicated that young people who experience a mental illness rate returning to and thriving at work, school and university as among their top goals in recovery". This project is aimed at "developing a comprehensive web-based support package for 200 young Victorians aged between 15 and 24 who have or are experiencing barriers to obtaining meaningful employment and remaining at school or university. #yotes is designed to complement existing face-to-face services and over the course of two years will offer specialised vocational therapeutic content, personalised career support in real time from vocational professionals and youth peer workers as well as access to a vibrant social network where young people can enjoy meaningful social connections with other young people. If the pilot is successful, the MOST team, together with Orygen, hopes to roll the program out to thousands of young people across Australia".

Altitudes: A further project aims to use technology to enhance the support available to families and carers of young people receiving treatment for a first episode of psychosis. Altitudes, the team says, aims "to reduce the stress experienced by families and carers and to improve their overall sense of wellbeing and confidence in caring for a loved one with an experience of psychosis". "Altitudes offers families free online access to personalised support in real time from expert clinicians and trained peer workers who themselves have supported a family member through a mental illness together with specialised therapeutic content and collaborative problem-solving tools".[33]

🌐 www.orygen.org.au

headspace, Australia

headspace provides early intervention mental health services to 12–25 year olds across Australia. Established in 2006,[34] it is funded by the Australian Government Department of Health under its Youth Mental Health Initiative.[35]

There are more than 80 headspace centres located across metropolitan, regional and rural areas of Australia.[36] The organisation states that they "are built and designed with input from young people so they don't have the same look or feel as other clinical services". Young people visiting the centres can access the services of a variety of health workers – GPs, psychologists, social workers, alcohol and drug workers, counsellors, vocational workers or youth workers. Services at a headspace centre are either free, or have a low cost.

In Melbourne, I had the pleasure of visiting a number of colleagues working for headspace – both at their Bentleigh centre and also at their national eheadspace headquarters. Given their reach around the country, a large number of young people every year access mental health services through headspace centres, I was particularly keen to visit with colleagues at headspace to understand more about their model, and also how digital technology was being leveraged in the delivery of care.

In the face-to-face services, there is clearly enthusiasm for experimentation and finding new ways of delivering support to augment face-to-face clinical care. Collaboration between colleagues engaged in innovation was particularly evident, with some of the initiatives being used being part of eOrygen's slate of projects and pilots.

CASE STUDY headspace Bentleigh

Bentleigh is a suburb of Melbourne, approximately 13 kilometres south-east of the city's Central Business District. Bentleigh is home to one of more than 80 headspace centres around the country. The service is run by Alfred Health, a major healthcare provider in the state of Victoria.

As the service's website says: "Some of the reasons young people come to headspace Bentleigh include fights with family or friends, past or current concerns about bullying, relationship break-ups, mental health issues (such as depression or anxiety), problems at school or work, physical health concerns, sexual health and contraception, issues with alcohol or drugs... and many more".[37]

Services provided at headspace Bentleigh include mental health services, general practice, sexual health, alcohol and drug services, work and study support, as well as a youth early psychosis programme.[38] Through their Youth Advisory Committee (YAC), young people can get involved in a wide range of activities from research and evaluation of headspace services, to peer support, to leading projects in their local area. One member of the YAC spoken to in the course of developing this report, talked about the role she and her peers had in the local community, at music events and so on, campaigning and raising awareness about mental health and challenging stigma.

While undoubtedly there are a wide range of services and opportunities for support on offer at the centre, what is particularly notable is the way in which it partners with other organisations to pilot ways of providing more support to their users and carers through online means.

The service also has a focus on family peer support, with dedicated family peer workers and initiatives such as The Lounge, where once a month families are invited into the service for a discussion session. One family peer worker talked about their involvement in the Altitudes East-West programme, a cluster-randomised controlled trial study which is evaluating the effectiveness of online family cognitive behaviour therapy interventions with carers of young people with first episode psychosis. Such carers often endure high levels of stress and depression, as well as eroded social networks. One of eOrygen's projects discussed above (in partnership with the Australian Catholic University and the Telethon Kids Institute), the Altitudes study integrates social networking, expert and peer moderation, and evidence-based psychoeducation.[39]

The service also has an individual placement and support (IPS) service to support young people into employment. This element of headspace's work is also supplemented by digital innovation in the form of the #yotes service. Led by the team at eOrygen, in partnership with The University of Melbourne, The Australian Catholic University, Jobs Victoria, headspace and Whitelion are developing a comprehensive web-based support package for "200 young Victorians aged between 15 and 24 who have or are experiencing barriers to obtaining meaningful employment and remaining at school or university". The #yotes package "is designed to complement existing face to face services and over the course of two years will offer specialised vocational therapeutic content, personalised career support in real time from vocational professionals and youth peer workers as well as access to a vibrant social network where young people can enjoy meaningful social connections with other young people. If the pilot is successful, together with Orygen hope to roll the program out to thousands of young people across Australia".[40]

🌐 www.headspace.org.au/headspace-centres/bentleigh

A government-commissioned independent evaluation of the headspace programme was published in 2015. The evaluation team found headspace to be "a highly accessible, complex program, serving a diverse range of vulnerable young people". While some evaluation findings were certainly mixed, and considerable variation found, the team concluded that headspace had been "successful in attracting some young people from marginalised and at-risk groups, as well as young people traditionally disadvantaged in their access to mental health care". Recent figures suggest that 8 per cent of service users are from Aboriginal and Torres Straight Islander communities, and 21 per cent identify as LGBTQI.[41] Furthermore "economic and social benefits from improved mental health functioning are delivered through a number of positive outcomes, and to the extent that these can be attributed to headspace treatment, add value to the headspace investment". Beyond the delivery of services to young people, the report found that "the mental health promotion and community awareness work of headspace is valued by staff and clients, and appears to be having a positive impact in reducing the stigma of mental illness and encouraging help seeking among young people".[42]

At a national level headspace are clearly undertaking a number of programmes aimed at prevention, education and support for young people at risk. Examples of these are highlighted in the box below.

headspace national programmes

In addition to the services provided face to face at headspace centres, the organisation also runs a number of related programmes aimed at supporting young people:

- headspace School Support works with schools in Australia to prepare for, respond to, and recover from suicide. The initiative is funded by the Australian Federal Government.[43] A wealth of resources relating to headspace's work with schools is available online at www.headspace.org.au/schools/headspace-in-schools

- headspace's Digital Work and Study Service is an online and phone service for people aged 15–24 who need support with work or study issues. The service can help young people figure out where they want to go and how to get there with work or study.[44]
  🌐 www.**headspace.org.au/young-people/digital-work-and-study-program**

- Further, the headspace National Telehealth Service is for people aged 12–25 based in regional or rural areas in Australia and are already accessing support at a headspace centre. This service requires a referral from a headspace centre which allows a young people to speak with a qualified psychiatrist online.[45]
  🌐 www.**headspace.org.au/our-services/national-telehealth-service**

eheadspace, Australia

Again in Melbourne, I met with Dr Steve Leicester, Head of Direct Clinical Services at eheadspace. eheadspace is a confidential and secure service where young people, their family or friends can web chat, email or speak on the phone with a qualified youth mental health professional.[46] Established approximately six years ago, initially in response to providing remote support to people affected by bushfires in Western Australia, it runs out of headspace's national office in Melbourne, Victoria.

eheadspace is a great example of a national initiative geared towards ensuring young people and their families not only have access to clinical advice and support, but also offers a novel medium for responding to changing patterns of help seeking behaviour among young people, and linking with face-to-face services where appropriate.

The service provides online and telephone support and counselling to young people 12–25, their families and friends. eheadspace is not a crisis service, but rather through email, web chat and phone support it provides flexible ways for young people who don't have a headspace centre nearby or don't feel ready to visit a centre, to get the help they need.

eheadspace provides support seven days a week between 9:00am and 1:00am, with 80 accredited mental health clinicians as staff working across three shifts.

eheadspace also aims to improve access to support for young people who are known to be less likely to use traditional services such as young men, Lesbian, Gay, Bisexual, Transgender and Intersex (LBGTI), Aboriginal and Torres Strait Islander, Culturally and Linguistically Diverse (CALD), homeless, rural and remote young Australians.

To access the service, young people register on the eheadspace website or over the phone with some basic information including an email address, postcode and age. They can remain anonymous (full name is not required for registration). Some additional information collected as part of the registration process such as age, sexuality, gender, postcode, education and other information to assist the eheadspace clinicians. 94 per cent of young people who begin the process to register with the service complete it.

eheadspace is staffed by qualified youth mental health professionals who can help young people by exploring what is on their mind, what help is available and how they can build coping skills. Depending on the needs of the young person, eheadspace may provide esupport or etherapy. Interventions offered will be based on assessment, formulation and shared decision making. On each shift, a team would typically be made up of one or two senior clinicians with at least five years clinical experience after graduation. These members of staff will pick up more complicated cases and provide supervision to other members of staff. There will typically be between 7 and 8 clinicians on any one shift.

The vast majority of young people (approximately 86 per cent) prefer webchat over other forms of communication. Among family and friends, more than 90 per cent of users prefer speaking to a member of staff over the phone. Single sessions generally run for 30–60 minutes.

For around half of users, contacting eheadspace is their first foray into mental health support. eheadspace is free.

The team says that use of the eheadspace service has grown organically by 12.5 per cent a year with no advertising push. Naturally, this is beginning to translate into capacity challenges within the service and a concern to avoid bottlenecks in delivery. With that in mind, the team is currently exploring other options for organising the delivery of their service other than through one-to-one support. Now, eheadspace are also holds monthly online information sessions where you can join group chats to talk on different things like sleep issues, self harm, helping out a friend and more.

eheadspace acknowledges that not all mental health problems can be appropriately addressed online. When this is the case, young people will be supported and encouraged to attend face to face services. eheadspace aims to make referrals and communication between eheadspace and other services as seamless as possible. eheadspace will offer assisted referral, where young people are supported to access face to face services (including headspace centres) and will continue to support young people while they await an appointment or are in the process of engaging with a face to face service. An eheadspace clinician may stay involved and be part of the overall care plan for a young person, even if they have been referred to face to face services. When young people accessing eheadspace already have face to face services in place, eheadspace aims to work collaboratively with these services.

Staff report observing that some of their clients appear to be presenting with increased levels of complexity and are actively expressing a preference for accessing ongoing mental health support online. As Steve Leicester, Head of Direct Clinical Services at headspace says, "for that reason, we can't think of this as an adjunct. We need to be able to work with complexity and risk, because the market will expect it. There is no form of commodity or service that is not available through online. We need to think with an e-commerce mindset".

🌐 www.headspace.org.au/eheadspace

Theme 2: Prevention, self-help and peer support

Context

Looking at both Australia, the United States and the United Kingdom it is clear that one massive challenge facing all of those systems is the fact that far too few people experiencing mental health problems have access to good quality treatment and care. The reasons why this is the case will differ from country to country, though some themes will remain the same – with stigma and lack of availability of easily accessible services being key. Looking at the population level, there is a clear gap in terms of making available scalable, low-cost, first-line interventions to people with emerging mental health concerns.

Speaking to clinicians, academics and non-profit leaders, a major theme coming through many of the conversations held was that of the opportunities provided by digital technology. On site visits across Australia and the United States I met with many colleagues, particularly from the non-profit sector, who were leading work to enable more people to access good quality information and support one another online.

This section outlines just a fraction of the exciting work being led by colleagues in this field.

ReachOut, Australia

In Sydney, I was fortunate to have the opportunity to spend some time with Jono Nicholas, then-chief executive of ReachOut. In 1997 the Inspire Foundation, now known as ReachOut Australia, was established by Jack Heath. The non-profit supports large numbers of young people and families every year and has a particular focus on e-mental health.

ReachOut describes their mission as "to deliver innovative e-mental health services that enable young people to take control of their mental health and wellbeing".[47] In 2016/17, ReachOut supported 1.59 million young people and parents. Young people spent a total of 782,000 minutes on its online forums.[48] The organisation has an annual turnover of over AUS$7 million.

Young people can access a wide range of tools and resources through ReachOut.Com, all of which are developed in partnership with young people and based on evidence. ReachOut uses an innovative approach and the latest technology to connect with young people, from a mobile site and apps including The Sorter and Recharge, to online games such as ReachOut Central. The organisation says that these digital tools have helped increase the number of young people who access help and information on ReachOut.com. Online forums also provide a safe space for young people to talk about whatever is on their mind. The service also provides pathways to clinical and emergency care for those who are in need.

In recent years, ReachOut has launched specific programmes aimed at better supporting parents and professionals. ReachOut Schools provides support for teachers and other professionals working with young people, including curriculum resources, teacher webinars and app reviews.[49]

Launched in 2016, ReachOut Parents builds on their youth service model, providing useful content aimed at helping parents understand a wide range of common issues (stress, bullying, alcohol use) plus tips and ideas on how to best support young people. ReachOut also expanded to the USA in 2005 and Ireland in 2009.

Speaking to a recent conference, Jono outlined the rationale for the organisation's focus: "The data in Australia shows that when a young person's experiencing a mental health difficulty they do one of three things. They turn to the internet, they talk to their friends or they talk to their parents… what we've been working on is how can you use digital strategies and digital tools to provide very, very scalable self-help as the first line of defence when those young people are going through a tough time but also then give them the knowledge confidence and skills to navigate to all the other services that exist in the community."[50]

Jono is a passionate advocate for the power of digital technology in improving mental health. When we met, he offered a thoughtful analysis of where mental health currently is on the digital journey and the potential for disruptive innovation to catch current service providers unawares.

Jono outlined some of these thoughts in 2017 speech at the International Technology Enabled Care Conference in Birmingham, a video of which is available on YouTube[51] and is highly recommended. In that speech, Jono painted a picture of our current system as one which is ripe for disruptive innovation. Current models of care leave too many people without help. He said: "We often present this as a choice between getting digital help or, what would often be called in Australia, 'real help'. And really what we're often talking about in mental health care is the choice between struggling by yourself at two o'clock in the morning in your own room, or getting some help."[52]

Poor mental health is both a problem that affects large numbers of people, and large amounts of money are spent every year in terms of providing treatment and support. Speaking to the same conference, Jono said: "I have been around the world and I have never come across a mental health system where everyone says 'this is a world-class system'. In fact, it is, by and large, described by both government providers and the community as dysfunctional. And there's a sense of very, very high irritation – even while people are getting services. What does that mean? It means that if someone comes along and offers you a slightly different and better opportunity, then the switch cost is actually very, very low. You're willing to move, and you're willing to move en mass". When we met in Sydney, we discussed this point further and talked about examples of people we knew who had found it hard to access the help and support they needed for a mental health problem. Jono suggested we can, of course, imagine someone saying: "Every time I try to get help, I'm not sick enough, the system is confusing, and then when I get in I have to wait, and then it's not great". The scale of the problem at population level, the amount of money already spent, and this sense of dissatisfaction among people all point to evidence of a sector ripe for disruption.

Jono drew a powerful analogy with that of city taxi services and the entry of Uber into that marketplace, stating that: "Mental health hasn't had its Uber moment yet… yet". What we are doing, he says, is: "We're creating innovation to sit in the system we already have. The risk is someone else will come in from outside". The window to get ahead, he warns, is narrow. Talking to the conference in Birmingham, Jono said: "I think for civil society to compete we need to have conversations not about what we do but about how we do it. How do we move capital? How do we develop IP sharing agreements? How do we respond at a level of speed, and a level of quality, and with a level of money that allows us to do amazing things?"[53]

🌐 www.au.reachout.com

Hello Sunday Morning, Australia

Hello Sunday Morning is a great example of an entrepreneurial approach to both encouraging social change and innovating new ways of delivering support. When we met in Sydney, Chris said: "Drugs and alcohol are a mental health challenge. It should be part of the same sector... You need talented people to come up with great ideas and innovate".

The charity was established in 2009 when Chris Raine started a weekly blog documenting his experiences when he stopped drinking alcohol for a year. With a background in advertising and as a nightclub promoter, Chris also has an MBA from Oxford University.

By 2014 Hello Sunday Morning had grown into the world's largest online community of people supporting each other to change their behaviour around alcohol, with approximately 125,000 registered users. The 21-strong team in Sydney employs four psychologists, along with finance, operations and marketing specialists. Their work is funded through a mix of public and private sources, including corporate donors. The team employs a risk protocol for posts on their online forum, and encourages those users to access appropriate local services.

As mental health rises up the agenda, it is clear that the opportunities for such initiatives are more plentiful than perhaps they once were. Chris has taken, as said above, a very entrepreneurial approach to securing funding including from large corporate donors who are taking a keen interest in mental health issues and seeing this as a priority for activity relating to corporate social responsibility.

More recently, Chris has established Daybreak, an online programme that helps users change their relationship with alcohol through "a supportive community, habit-change experiments, and one-on-one chat with health coaches". The programme has 8,000 active users and growing.

🌐 www.hellosundaymorning.org

This Way Up, Australia

Based in Sydney, the Clinical Research Unit for Anxiety and Depression (CRUfAD) is a joint facility of the University of New South Wales and St Vincent's Hospital. It combines clinical and research expertise in the recognition and treatment of the anxiety and depressive disorders. The Unit was founded in 1964 by Professor Gavin Andrews, who was kind enough to meet with me in Sydney to talk about his work and that of his team. The team takes a particular approach to the challenge of improving access to first line interventions for people experiencing poor mental health or who might be at risk.

The central purpose of CRUfAD is to combine clinical and research expertise to reduce the impact of anxiety and depressive disorders on individuals. The Unit focusses its work on three main areas of work – one of which is the This Way Up programme.

This Way Up is sponsored by both St Vincent's Hospital and the Australian Government. The initiative provides a wide range of online courses for to be completed either on a self-guided basis or under the supervision of a clinician. The team shared that around 6,000 people accessed the courses last year, with around a third of those people being referred by a general practitioner or a psychologist, and two thirds of people self-referring. Around 70 per cent of users access the courses via the internet on computers or tablets, and about 30 per cent use phone applications.

Alongside a number of online lessons and supporting materials, users accessing courses also receive reminder emails, SMS notifications and progress tracking. A small number of courses are provided entirely for free (relating to, among other topics, managing stress and insomnia). Others are provided for low cost (currently set at AUS$59). The challenge of making evidence-based treatment and support available to those people who might not otherwise be able to afford it is clearly a major motivation for the team. Professor Andrews says: "The cost is about a tenth of what it would be to deliver face to face, and for the same benefit".

Each CBT-based course targets a particular mental health concern, such as depression, anxiety, and other types of common problems. The team also delivers more targeted offerings including a depression course in Chinese, and online courses aimed at women going through pregnancy or having given birth (MUMentum). The team is doing further work developing programmes aimed at people with major or long-term physical health conditions (including cancer).

There is a clear focus within the programme on the importance of evidence, with Alison from the team saying: "It's in our clinical DNA", and on international partnerships with colleagues seeking to establish similar programmes in other countries. Eleven programmes have been subject to randomised control trials, and five have been independently replicated. For example, the depression programme has been subject to two randomised control trials (RCTs) with the results replicated by independent scientists. The programme has also been subject to a study of effectiveness in practice. Studies found that on average, most people benefit a little from each lesson completed. Eighty per cent of people who complete all lessons benefit substantially, 50 per cent to the point of no longer being troubled by depression. Twenty per cent of people do not benefit and will need to seek further assistance.[54]

Speaking on the subject of making use of technology in the delivery of services, I asked about the perception of clinical colleagues and how their attitudes to making use of online platforms had perhaps changed over time. The team shared that it felt there had been a real change in perception particularly over last five years ago. Alison from the team explained that she thought: "Trainees now have a different attitude, partly because they're making it a priority. Ten years ago there was more resistance, with come colleagues viewing it as an insult to their professionalism" stating that in her view such programmes are a "beautiful adjunct to existing services. It's not a threat but a help".

🌐 www.thiswayup.org.au

University of Sydney, Australia

Dr Andrew Campbell and Dr Brad Ridout at the University of Sydney's Cyberpsychology research group are involved with a number of exciting projects relating to technology and improving mental health. The first case study outlined here relates to the potential of social media to be used as a platform for preventative activity.

Dr Andrew Campbell is the inaugural chair of the Cyberpsychology Research Group at the University of Sydney. He has been researching and teaching in cyberpsychology, eMental health and human development for the past 20 years, and has worked as a registered child and adolescent psychologist for over ten years.

Dr Brad Ridout is a Research Fellow with the Faculty of Health Sciences, specialising in the treatment of anxiety and depression. He has a special interest in using technology to support the psychological well-being of children and adolescents. He completed his PhD research at the University of Sydney.

Social media is a central part of modern life. Recently published research from Dr Campbell and Dr Ridout provide us with a fascinating example of how existing social media platforms can be utilised in the quest for improving the physical and mental health of young people.

A 2014 paper[55] sets out the findings of their study into how Facebook can be used as a platform to deliver social norm interventions to reduce problem drinking in young people. University students, Dr Campbell and Dr Ridout say, usually overestimate how much alcohol is consumed by their peers. This results in 'drinking up' to the level which those students perceive to be the normal level among their peer group. Taking social norms theory as a starting point, they suggest that by "correcting these inflated perceptions" it should be possible to reduce the amount of alcohol those students consume. Their earlier research findings demonstrated that "portraying oneself as 'a drinker' is considered by many students to be a socially desirable component of their Facebook identity, perpetuating an online culture that normalises binge drinking". For this study, 95 per cent of 244 university students screened positive for hazardous drinking and were randomly allocated to a control group or intervention group. The intervention group "received social norms feedback via personalised Facebook private messages over three sessions". The study found that "at one-month post-intervention, the quantity and frequency of alcohol consumed by intervention group during the previous month had significantly reduced compared with baseline and controls. Reductions were maintained three months post-intervention". Such findings showed that "correcting misperceptions of peer drinking norms resulted in clinically significant reductions in alcohol use" and that using Facebook for the delivery of such interventions proves itself to be "an innovative method for tackling problem drinking at university".

KHL Circles, Australia

Dr Campbell and Dr Ridout are currently leading a clinical trial relating to the provision of group counselling. Hosted by Kids Helpline, KHL Circles is an online support group for young people aged 13–25.[56]

Kids Helpline is a well-known Australian non-profit organisation, which describes itself as "Australia's only free, private and confidential 24/7 phone and online counselling service for young people aged five to 25".[57] Over the course of the 27 years the charity has been established, Kids Helpline has responded to over 7.5 million contacts and today has a turnover of approximately AUS$11 million per annum.

KHL Circles is a private and secure social network. The platform hosts "online peer to peer support groups (moderated by Kids Helpline counsellors) to assist young people to improve their self-management of mental health concerns". Membership is aimed at young people experiencing family conflict, depression or some other mental health related issue. Groups are brought together for a period of between four and eight weeks and are led by a tertiary qualified Kids Helpline counsellor. The counsellors post threads, questions and evidence-based activities aimed at helping young people better understand conflict in their own families and learn how to better manage and cope with them. Groups are encouraged to discuss a range of topics, including understanding different types of families and the kinds of conflict they may experience, making sense of emotions and experiences, developing communication skills and how to stay resilient.[58]

The groups tend to have 20 young people taking part in each cohort, all of similar ages and experiencing common issues. Once the group has completed a programme under the guidance of one of the counsellors, young people can access a 'macro group' bringing together larger numbers of users in a secure environment to continue discussions and conversations as part of a community of lived experience. Next year, the team hopes to support ten groups of twenty young people to go through the programme. The KHL Circles project is by the Future Generation Investment Company.

Speaking about help seeking behaviour, and why young people might opt for initially seeking help for a problem online, Dr Campbell says: "Young people want to speak face to face, but they're just terrified".

🌐 www.kidshelpline.com.au/khl-circles-research-project

myCompass, Australia

While in Sydney, I had the pleasure of meeting Professor Helen Christensen, Dr Judy Proudfoot and their team at the Black Dog Institute. The Institute is a provider of a range of clinical mental health services, as well as serving as a significant research facility with a particular focus on technology.

More information about the Institute's work is contained later in this report. Of particular relevance to this theme is the Institute's myCompass programme.

myCompass is a free cognitive behavioural therapy (CBT) based programme for people with mild to moderate symptoms of depression, anxiety and stress. Funded by the Australian Federal Government, it is a fully automated programme with no therapist input and is available on any internet-enabled device, including mobile phones. No referral is needed and registration is free.

myCompass provides a tailored online programme for the user based on the completion of a profiling questionnaire at registration. An algorithm determines which three symptom areas are highest ranked and recommends a suite of self-monitoring tools and psycho-education activities that may be of most benefit. Psycho-education activities are derived predominately from CBT, as well as other modalities including interpersonal psychotherapy and positive psychology.

myCompass users need to commit to the programme for a minimum of seven weeks to gain the full benefit. myCompass has demonstrated through RCTs significant improvement in symptoms of depression, anxiety and stress and in work and social functioning with improvements persisting for three months.[59]

The team at the Black Dog Institute is passionate about the potential of programmes such as myCompass to expand access to support by providing scalable solutions. It can, they believe, save clinicians valuable time and can help to reduce wait lists, by allowing clinicians "to focus on patients for whom e-mental health approaches are not appropriate". Such programmes provide "convenient, flexible and easily accessible support that is available anytime, anywhere". This is particularly valuable, says the team, "where face-to-face psychological services are limited". Among certain people, myCompass can provide a useful introduction to therapy, "or an alternative for people averse to face-to-face treatment".[60]

🌐 www.blackdoginstitute.org.au

Beyond Blue, Australia

Established in October 2000, Beyond Blue is one of Australia's best-known mental health charities. The organisation focusses on depression, anxiety and suicide prevention through its work driving change, providing information and support. Beyond Blue employs approximately 100 members of staff and is headquartered in Melbourne and has an annual turnover of more than AUD$60 million.[61] Beyond Blue's Chair is the Hon Julia Gillard AC, the first woman to serve as Prime Minister in Australia.

In Melbourne, I met with Sam Rosevear, Carolyn Nikoloski, and other members of the policy and strategy team at Beyond Blue. That was a great opportunity to learn more about it's work, and how the organisation is making the most of digital technology in support of it's mission.

There are numerous examples of excellent work being carried out at Beyond Blue, and only a small fraction of that in contained in this report. Beyond Blue's support service supports more than 150,000 people every year via telephone, email and web chat. In 2016/17, Beyond Blue's online peer support forums saw more than 900,000 unique visitors. As a direct result of using the peer support forums 67 per cent of respondents felt less depressed or anxious and 38 per cent of people said they contacted a health professional.[62] Through New Access, Beyond Blue provides an evidence-based early intervention programme offerings low-intensity counselling for people with mild to moderate anxiety or depression. This free service is operates in ten of Australia's 31 Primary Health Networks, and is available either over the phone, in person or via telehealth, using video chat like Skype or Facetime.[63] In relation to this theme, one particular case study example is highlighted below relevant to suicide prevention.

🌐 www.beyondblue.org.au

CASE STUDY BeyondNow, Australia

Launched in 2016, the BeyondNow safety planning app was downloaded more than 30,000 times in its first year. The app allows those at risk of suicide to create and store a mental health safety plan in their smartphone for easy access should they experience suicidal thoughts.

Based upon the safety planning intervention model developed by Professor Barbara Stanley and Professor Gregory Brown, it involves the person – ideally with support from a health professional – identifying coping and help-seeking strategies that are tailored for their needs, situation and personal relationships. This includes identifying actions within each of the steps below, which are reflected in the Beyond Now app:

- Recognising warning signs

- Creating a safe environment

- Identifying reasons to live

- Internal coping strategies

- Socialisation strategies for distraction and support

- Trusted contacts for assisting with a crisis

- Professional contacts for assisting with a crisis

Together, individuals and health professional can develop a list of strategies that gradually progress from things the person can do by themselves through to social and external ways of coping. The resulting safety plan is then used during times of distress and crisis.[64]

The team behind the app says that it is "convenient and confidential", and that using the BeyondNow app "puts your safety plan in your pocket so you can access and edit it at any time". Users can also email a copy to trusted friends, family or a health professional "so they can support you when you're experiencing suicidal thoughts or heading towards a suicidal crisis".

BeyondNow is free to download from the Apple Store or Google Play in Australia.

🌐 www.beyondblue.org.au/get-support/beyondnow-suicide-safety-planning
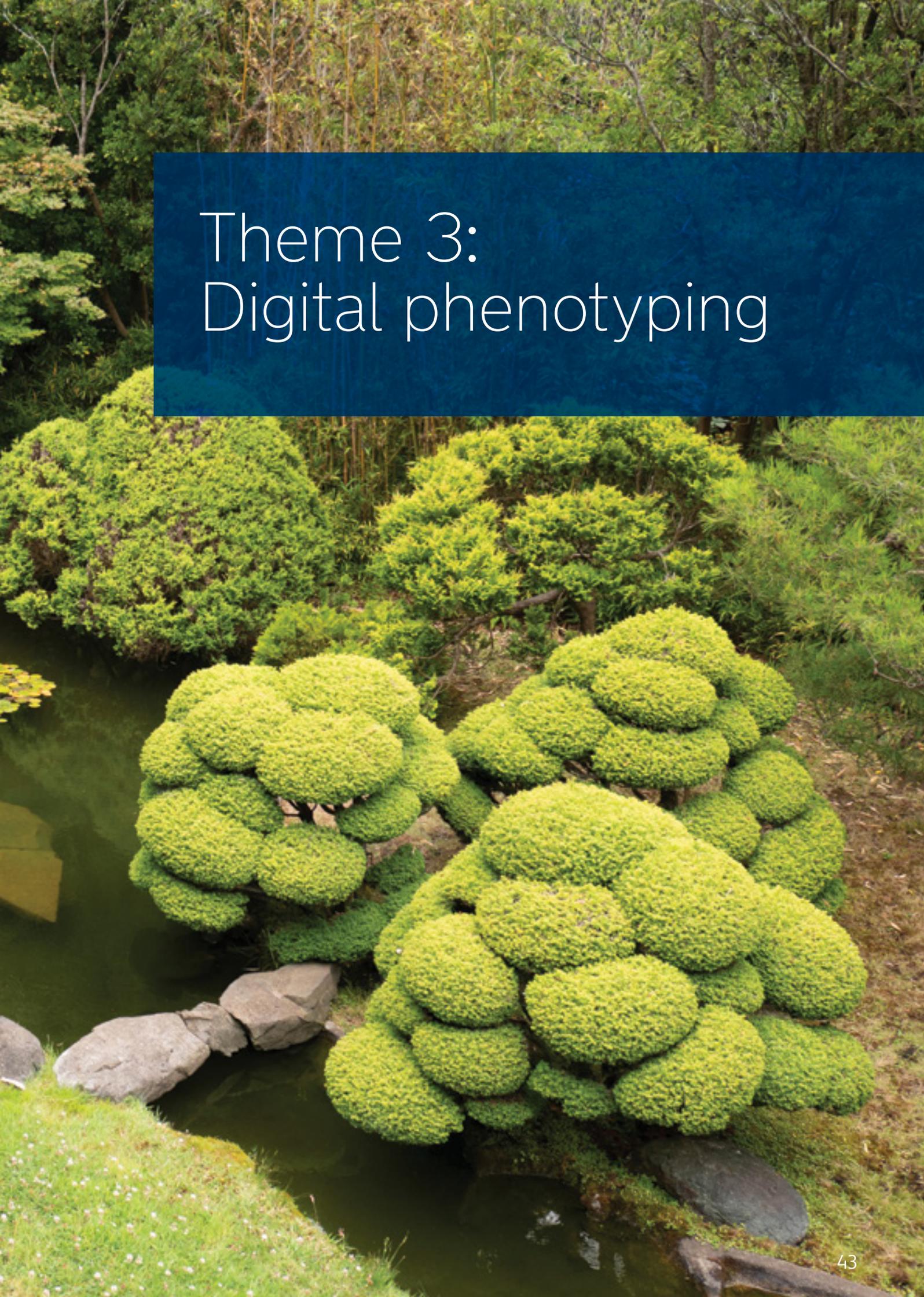
Theme 3: Digital phenotyping

Context

Imagine if we could harness the power of our smartphones and other devices to enable clinical teams to make better decisions about treatment and care? The potential for digital phenotyping, both now and in the future, to give clinicians more information relevant to treatment and care is enormous. In addition to improving the quality of clinical decision making, potential exists to avoid people entering crisis and avoid unnecessary hospital admissions.

In the United States, I had the opportunity to meet with a number of colleagues who were engaged in cutting-edge work relating to digital phenotyping. Similar work is being carried out by colleagues in the UK, and around the world. It has the potential to drastically improve both outcomes for individual service users and the operational efficiency of mental health services.

What is digital phenotyping?

Put simply, the term phenotype refers simply to a set of observable characteristics of an individual resulting from their interaction with the environment around them.

Making progress in terms of medical research has always relied on the availability of high quality data. As the team at Harvard University's Onnela Lab points out: "A longstanding barrier to progress, both in clinical settings and research trials, has been the fundamental difficulty of accurately measuring the human phenotype, including but not limited to behavioural patterns, sleep, social interactions, physical mobility, gross motor activity, cognitive functioning, and speech production".[65]

Smartphones offer a unique way of harnessing a great deal of data relevant to medical researchers and clinicians. The team defines digital phenotyping as "the moment-by-moment quantification of the individual-level human phenotype, in situ, using data from personal digital devices, such as smartphones".[66]

Beth Israel Deaconess Medical Center and Harvard University, USA

In Boston, I met with Dr John Torous, director of the digital psychiatry division within the department of psychiatry at Beth Israel Deaconess Medical Center (BIDMC). BIDMC is a Harvard Medical School affiliated teaching hospital where he also serves as a staff psychiatrist and academic faculty.

I also was able to meet a number of colleagues he was collaborating with, including JP Onnela, associate professor of biostatistics at the Harvard TH Chan School of Public Health. The team at the Onnela Lab, who I had the opportunity to visit during my time in Boston, is engaged in research work relating to statistical network science and smartphone-based digital phenotyping.

Dr Torous is a passionate advocate for the role digital technology can play in delivering better services for people experiencing mental health problems and actively uses this in his work. My visit to Boston enabled me to develop my understanding of digital phenotyping and what it might mean for the way in which we deliver treatment and care.

The Onnela Lab team developed the Beiwe research platform which is currently being used in a wide array of research studies in the mental and physical health spheres (Beiwe's name meaning a Nordic goddess of sunlight and mental health).

Of particular interest here is the outcome of a recent pilot study exploring how passive monitoring data collected through the Beiwe smartphone app can help improve outcomes for people with schizophrenia. A short summary of that study is included below.

🌐 www.digitalpsych.org

CASE STUDY Beiwe, USA

It is clear that digital phenotyping holds great potential for improving the quality of services. As one small example of that, we might consider the recent results of a small pilot study involving the use of the Beiwe platform. The study involved seventeen service users with a diagnosis of schizophrenia being treated at a state mental health clinic in Boston. The study provides a useful real-life illustration of how digital phenotyping techniques could be applied to service improvement.

The study participants used the Beiwe app on their personal smartphone for a period of up to three months. The researchers found, "by testing for changes in mobility patterns and social behaviour" through their smartphone, that they "were able to identify statistically significant anomalies" in the behaviour of service users "in the days prior to relapse". The rate of such anomalies detected in the fortnight prior to relapse was 71 per cent higher than the rate of anomalies during other time periods. The researchers state that "our fndings show how passive smartphone data, data collected in the background during regular phone use without active input from the subjects, can provide an unprecedented and detailed view into patient behaviour outside the clinic". The team explains that detecting such anomalies in real time could help signal to care providers of the need for "an intervention before an escalation of symptoms", and in doing so both provide an opportunity to avoid an individual entering into a crisis and also potentially reducing the overall costs of care.[67]

🌐 www.hsph.harvard.edu/onnela-lab

McLean Hospital, USA

Also in Boston, I met with Dr Ipsit Vahia, a geriatric psychiatrist, clinician and researcher. Dr Vahia is also the medical director of geriatric psychiatry outpatient services at McLean Hospital. Founded in 1811, McLean is a leader in psychiatric care, research, and education and is the largest psychiatric teaching hospital of Harvard Medical School, Massachusetts. A further case study relating to Dr Vahia's work is contained later in this report.

As well as engaging in studies using the Beiwe platform, Dr Vahia discussed with me his work on digital phenotyping among elderly patients with dementia and mental health conditions with colleagues at the Massachusetts Institute of Technology.

The Emerald sensor uses wireless radio signals to determine the location and motion of a person in their living environment, and in doing so collecting a complex data analysis of a patient. It can tell if someone is asleep, standing or sitting. When a person is still, it can monitor breathing. As a passive, wall-mounted sensor, Emerald does not require patients to change their behaviour or interact with wearable technologies. The goal is to be able to use this technology to help older people with mental health conditions by providing clinicians with day-to-day information about how people live in their environment. Dr Vahia shared a number of examples of where this has improved outcomes for his patients. Originally, the device was designed to detect falls and help make the home environment safer. Now, he can see how well his patients are responding to medication and make adjustments as necessary. Further, Dr Vahia and his colleagues at MIT are looking at how, in the longer term, data from Emerald might be used to diagnose particular issues and contribute to clinical assessments.

🌐 www.mcleanhospital.org

Theme 4:
How to best
support innovation

Context

Visiting a number of providers in Boston, I was struck by both the commitment of the leadership of those organisations to support genuine innovation and of the establishment of dedicated departments within existing organisational structures. Considerable financial resource is dedicated to the establishment of innovation functions.

This section outlines some case study examples of how providers are approaching the question of how they might best support in-house innovation.

Brigham Innovation Hub (iHub), USA

While in Boston, I had the opportunity to spend some time with Dr Brian Mullen, innovation strategy manager at the Brigham Innovation Hub (iHub). iHub is part of Brigham and Women's Hospital, a major teaching hospital in Boston. Affiliated to Harvard Medical School, the hospital attracts patients from across Massachusetts, the wider United States and from around the world. The hospital's department of psychiatry is engaged in education, research and the delivery of high-quality psychiatric treatment and care.

iHub launched in September 2013 as a resource centre for Brigham and Women's Hospital employees to advance their ideas for improving care. Since its establishment, the iHub has evolved into a broader digital health consulting team, supporting internal innovation and also bringing in leading-edge digital solutions.

The iHub team describes its mission as "to drive more patient-centred, efficient, and safe care through use, development, evaluation, and commercialization of digital health".[68] It does this through:

- Identifying and evaluating internal and external technology to address the challenges being addressed.

- Matching potential solutions to meet hospital needs.

- Advancing early-stage ideas from internal hospital clinicians, scientists and employees.

- Leading internal hackathons – called the 'innovation series' by the iHub team – with pulmonary, surgery, radiology and other colleagues throughout the hospital to address clinical problems and develop solutions in the form of new products and services to improve patient care.

Dr Mullen explained to me: "Boston is great for innovation. Mass General, Brigham, Spaulding and McLean all have innovation teams that are there to support innovation in healthcare". Talking about the establishment of iHub, he says this was born out of consideration of several related questions: "How do we move internal innovation? How do we let [staff] know there's a place for them to go to make their idea happen? How do we bring in digital innovation into the hospital, so we can pilot and speed up implementation? And how can we be a collaborator of choice, from start-ups through to larger commercial organisations?" he said. The team holds regular lunches and a monthly speaker series to bring colleagues together from around the hospital.

Dr Mullen has a background in mechanical engineering. His colleagues include professionals with backgrounds in product developing, consulting, technology and a Harvard MBA graduate. Established with the enthusiastic support of hospital's president, the iHub team of seven is drawn from a wide variety of disciplinary backgrounds – something that Dr Mullen believes is a key ingredient of the team's success in bringing together the widest range of skills possible.

In the five years since formation, the iHub can point to a range of successful innovations supported by the team. These include projects applying virtual reality to the field of radiation oncology, and a team who has developed a 'virtual biopsy'.[69]

🌐 www.bwhihub.org

McLean Institute for Technology in Psychiatry, USA

McLean Hospital's Institute for Technology in Psychiatry (ITP) is a further interesting example of a major provider of mental health services establishing a centre for innovation within its existing organisational structure.

As stated earlier, McLean was founded in 1811 and is a leading organisation in the field of psychiatric care, research, and education. It is the largest psychiatric teaching hospital of Harvard Medical School, Massachusetts. The McLean Institute for Technology in Psychiatry was founded in 2016 to advance psychiatric research and practice through innovations in digital health technology and informatics. The team is led by Dr Justin T Baker (scientific director), Dr Laura Germine (technical director) and Dr Ipsit Vahia (medical director).

The ITP works with global leaders in academia, industry, and healthcare to innovate new technology-based methods for diagnosing, monitoring, and treating psychiatric disorders. They also seek to support technology-based solutions in research and clinical care, as well as to optimize new and existing technology to meet the needs of clinicians, patients, and the scientific community.

Examples of current projects taking place at, or in collaboration with ITP, include TestMyBrain. This is a web-based cognitive assessment platform that takes advantage of the strong public interest in the mind and brain as an engine for scientific advancement. Since 2008, the TestMyBrain project has tested almost 2 million people across over 50 web-based tasks specifically designed to engage the interest of research participants and provide high-quality research data.

The ITP's MultiSense project uses video to capture naturalistic face-to-face clinical interviews. Researchers then use these videos in combination with machine learning to improve the efficiency and robustness of mental health assessments through automatic sensing. The goal of the MultiSense project is to improve patient care and enable high-throughput behavioral characterizations for conventional clinical trials.

The ITP's medical director, Dr Ipsit Vahia, described the important role played by McLean's president. Their personal commitment is clearly seen as a major driver behind the successful establishment of the ITP. While the hospital has provided seed investment to ensure the Institute gets off the ground, it has generated grants of twice that amount.

The ITP holds an annual technology in psychiatry summit, bringing together thought leaders in healthcare, data science, technology, industry, patient advocacy, academic research, In addition, it holds regular 'community meetings' at McLean Hospital's main site just outside of Boston. These meetings, one of which I was able to attend when I visited the hospital, are where colleagues from a wide range of backgrounds share their work over a lunchtime session, with others sharing views and advice about the application of their ideas or next steps.

🌐 www.mcleanhospital.org/research/mclean-institute-technology-psychiatry

The role of government in supporting innovation

In both Australia and the United States I had the opportunity to talk to many colleagues about the role of government, statutory agencies and other national bodies. Those discussions touched upon a range of questions, including issues relating to public policy, regulation and how best to support the development of digital health ecosystems.

The Australian Government has long advocated of making better use of digital technology to ensure more people are able to access the help and support they need. In 2012 the Australian Government published its first ever national e-mental health strategy.[70]

In Canberra, I had the opportunity to talk to a ministerial representative from the federal government. They believed that the reasons why there had been quite such a focus on digital mental health interventions are related to the specific characteristics of the Australian population. Outside of the major metropolitan areas, there are significant numbers of people living in rural populations, some of which are geographically isolated and number less than 500 people, where it may be financially difficult to support the delivery of a traditional service. For these reasons the government has supported telehealth initiatives. "The government funded Lifeline very early on as a mechanism to reach those communities". "In rural Australia you also have the effects of bush fires and droughts". Speaking about innovation in the field, they said: "A lot of innovation is also driven from the ground up, and individuals and organisations have the opportunities to seek support from the government for their ideas".

Taken all together, it is clear that in the Australian system national government is viewed as both a valuable partner in terms of setting the agenda through policy, and also a key player in supporting and scaling innovative ideas which have a national reach.

In Massachusetts, I saw a noteworthy example of how the state government there were taking active steps not just to support the better use of technology in healthcare settings, but also to help support wider economic development.

The Massachusetts eHealth Institute (MeHI) represents a case study in how government can actively support the development of a flourishing digital health ecosystem by establishing dedicated agencies.

CASE STUDY   The Massachusetts eHealth Institute, USA

The MeHI a division of the Massachusetts Technology Collaborative (MassTech), a government agency working to support the formation of new businesses and growth in the state's technology sector.

I met Laurance Stuntz, Director of MeHI, at the agency's offices in Boston. Laurance describes his role, and that of MeHI, as working to help Massachusetts leverage digital health innovation for better economic and care delivery outcomes. "We want Massachusetts to be the best place in the world to start and grow a digital health company, that's our mission" he explained.

Boston has established itself as a major centre for digital health. Thanks to the likes of Harvard University, MIT and other universities the city acts as an engine room for developing talent. Major healthcare providers are headquartered in the city, and many opportunities exist to secure investment. Today, supported by organisations such as MeHI, there are said to be more than 300 companies related to digital health in Massachusetts.[71]

The MeHI's small and dedicated team develops insight into the needs and requirements of healthcare providers and other organisations through surveys, stakeholder meetings and outreach. That information, and the expertise of the team, is then used to inform the delivery of a range of programmes and other activities. These focus on eHealth education, implementation support and funding, business development and stakeholder collaboration.

The team makes available a range of educational materials and toolkits to assist healthcare providers accelerate the adoption of healthcare technology. It also holds a number of educational events throughout the year, including webinars, seminars, workshops, and conferences.

MeHI also provides grants and incentives and subsidies to healthcare organisations, providers and other parties. Capital is provided through the eHealth Institute Fund, federal government and other sources. Through the use of such funds, MeHI focus on advancing the adoption, effective use and development of Health IT in Massachusetts.

MeHI's programmes also focus on growing the world's largest digital health ecosystem. Laurance describes making connections between entrepreneurs and clinicians as "a key part of our role" in encouraging innovation across a number of areas, currently including finding new ways of tackling the opioid crisis. These efforts include the development of the Digital Health Marketplace, a unique market access programme that aims to build strategic connections between entrepreneurs and healthcare leaders statewide. MeHI has a strong focus on public – private partnerships and bringing organisations together. As an example of this, along with Massachusetts Competitive Partnership and the City of Boston, MeHI is a partner in the Massachusetts Digital Health Initiative. The initiative acts a digital health innovation hub, which provides space, programming and strong industry network for digital health startups.

🌐 www.mehi.masstech.org

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Theme 5:
Research and insight

Context

The sixth, and final, theme that emerged as part of site visits undertaken in Australia and the USA relates to the interplay between digital technology and the research agenda. Among researchers and non-profit leaders I spoke with, colleagues talked about the ability for digital technology to enable larger numbers of people to take part in research. At Swinburne University in Melbourne, their ongoing ORBIT study into interventions for people with bipolar disorder is using digital technology to enable people with the condition to take part in research from all over the world. Similarly, digital technology enables us to gain new insights into population level mental health through data science. Finally, many colleagues talked about the need to invest in research which will allow us to determine the effectiveness of digital interventions. Many academic clinicians particularly were passionate about the need to carry out randomised control trials with online interventions to generate the right evidence base.

A small collection of case studies relating to this theme follows below.

Crisis Text Line, USA

Crisis Text Line offers free, 24/7 support from trained volunteers for those in crisis. Founder and Chief Executive Nancy Lublin first established the organisation in the United States in August 2013. The organisation recently launched in Canada, and is establishing a presence in the United Kingdom. In the United States to date, Crisis Counsellors have processed more than 80 million messages.

The team at Crisis Text Line describes it's priority as helping people move from a 'hot moment' to a 'cool calm', and guiding individuals "to create a plan to stay safe and healthy".[72] At the end of each conversation, counsellors ask texters the question: "Did you find this conversation helpful?" The organisation states that, consistently, 86 per cent of people say "yes". Of those who say "no", most still note a positive mood shift, such as "more hopeful" or "less alone".[73]

Roughly three-quarters of texters are under the age of 25, and two-thirds of those people do not describe themselves as having ever been in contact with traditional mental health services.

In New York, I met with chief data scientist Bob Filbin who explained more about their work and their approach to data.

Crisis Text Line's approach to data analytics enables the organisation to operate efficiently. Bob describes this element of their work "being about answering practical questions such as do we have capacity to respond to demand? Do we have a high quality service? Are we reaching the right people we are serving? How do we measure outcomes? How are we doing around retention of our volunteers?".

Where Crisis Text Line is particularly interesting is around its approach to data science. This helps the team better assess risk among people contacting the service and also to target practical suggestions for further help. Speaking to Wired magazine, Nancy Lublin explained that by using geographic data along with keywords, Crisis Text Line can also provide scripts for conversation-specific suggestions to its Crisis Counsellors. As software carries out analysis on incoming texts, it can send those counsellors targeted messages such as, "there's a 99 per

cent chance this texter has a substance abuse issue. Here are three rehab programs within the texter's area code".[74]

The organisation has an open and transparent approach to data sharing, making insights available to the public. Researchers have the opportunity to join a fellowship programme, and partnerships are also in place with a wide range of organisations, including state and city governments – all with the aim of helping others to make more informed decisions around mental health. Partners range from the University of Alabama to the State of Montana. As a practical example of where this data has been useful, the team pointed to an example of working with an LGBTQ organisation who offered text support services on a Friday. Data showed that this was the day in the week with the lowest volume of texts relating to LGBTQ issues, and that by switching their service days to a Monday they could reach many more people in need of support.

🌐 www.crisistextline.org and www.crisistrends.org.

All of Us, USA

At the National Institutes of Health (NIH), outside Washington DC, I had the opportunity to spend some time with Holly Garriock at the All of Us research programme.

The All of Us programme is immense in scale. It seeks to extend precision medicine to all diseases by building a national research cohort of one million or more U.S. participants. As the team explains, more Americans "are engaging in improving their health and participating in health research more than ever before, electronic health records have been widely adopted, genomic analysis costs have dropped significantly, data science has become increasingly sophisticated, and health technologies have become mobile".[75]

Participation is open to all. Anyone over the age of 18 who is living in the United States can join the programme. Participants will be asked to contribute information about their medical history and lifestyle. Participants may also be asked to have their physical measurements (blood pressure, height and weight, etc.) taken at a local enrolment centre, or donate a blood and urine sample. Participants will have access to their study results, along with summarized data from across the programme.

Holly explained that the team was seeking to leverage digital health technology in a range of ways – by engaging people in the programme and by sharing information with them which could be useful. The central team at NIH has a digital technologies team who is constantly looking at new opportunities in this space, including through the deployment of wearable devices to study participants.

The team states that scientific opportunities presented by the programme include being able to develop ways to measure risk for a range of diseases based on environmental exposures, genetic factors and interactions between the two. Further, they hope they will be able to identify the causes of individual differences in response to commonly used drugs (commonly referred to as pharmacogenomics) and to discover biological markers that signal increased or decreased risk of developing common diseases. By using mobile health technologies they hope to be able to correlate activity, physiological measures and environmental exposures with health outcomes.[76]

In a statement about the programme, the NIH's director (Dr Francis S. Collins) said that the ambition of the programme will be to "seek to extend precision medicine's success with certain types of cancers to many other diseases, including common diseases such as diabetes, heart disease, Alzheimer's, obesity, and mental illnesses like depression, bipolar disorder, and schizophrenia, as well as rare diseases. Importantly, the cohort will focus not just on disease, but also on ways to increase an individual's chances of remaining healthy throughout the lifespan".[77]

🌐 www.allofus.nih.gov

Black Dog Institute, Australia

In Australia, I met with many colleagues in Melbourne, Canberra and Sydney who were engaged in the research field. In Sydney, the work of the Black Dog Institute is particularly noteworthy. As outlined earlier, the Institute is a provider of a range of clinical mental health services, as well as serving as a significant research facility with a particular focus on technology.

The Institute describes its aim in this field as to "reform and improve the detection, treatment and delivery of e-mental health tools and programs".[78] e-Mental health services, the Institute says, "are an effective and complementary sector to traditional face-to-face mental health services. By providing accessible and anonymous prevention the Internet can play an important role in overcoming obstacles for seeking help".[79]

Staff at the Institute are engaged in a wide number of research projects relating to mental health. A small selection of these include:

• Ethics in eHealth and mHealth for mental health.

• The Good Night trial of SHUTi: a trial of an internet-based cognitive behaviour therapy intervention for insomnia, to examine whether depression could be prevented in those with concurrent subclinical depression symptoms and insomnia.

• Living Lab: aims to establish an online hub that provides a virtual laboratory where healthcare users, practitioners, and researchers can exchange information and ideas with the aim of improving the prevention and treatment of mental illness.

• ImpleMentAll: development of a toolkit to support the implementation of evidence-based digital interventions and evaluate impact.

• Rewiring RESPECT: adapting an evidence-based workplace mental health programme for high school year advisors.

• Socialise: examining whether social activity patterns detected by the Socialise app can be used to accurately detect mental health conditions.

• SpringboarD: Examining whether an online self-help tool can help people diagnosed with type 2 diabetes.[80]

🌐 www.blackdoginstitute.org.au

Conclusion and recommendations

The Churchill Fellowship represents a fantastic opportunity to learn from other countries who are often tackling some of the same systemic challenges we are confronted with in the UK. In the case of mental health, colleagues are absolutely right when they observe that we are working in a sector that is ripe for digital disruption. As Jono Nicholas says: "I have been around the world and I have never come across a mental health system where everyone says, 'this is a world-class system'".

As in the UK, our colleagues in Australia and the USA see significant challenges in terms of access to treatment and support, but also see huge opportunity in the potential of digital technology to improve this picture.

We have much to learn from one another.

I saw fantastic examples in Australia, too many to include in this report, of how digital technology can be used to redesign the delivery of mental health services. I was particularly taken with our colleagues at eOrygen, eheadspace who together had thought so deeply about this challenge. At eheadspace they could see clearly how help seeking behaviour was changing among young people and ensuring their service model responds to ensure people can access help when they needed it. At eOrygen and headspace I could see clearly the opportunities to not only help empower individuals to take charge of their own recovery, but also to make support and advice better available for families and carers.

Spending time in the USA was an education in innovation. I saw how providers can create the right structures and culture necessary to support in-house innovation, and how government agencies can support that. Spending time with Dr John Torous and Dr Ipsit Vahia in particular was a fascinating opportunity to learn more about digital phenotyping and how this is starting to be applied in their clinical practice.

In both countries, I met with wonderful researchers who were building the evidence base for new interventions and developing new ways of supporting people with mental health problems. Among the many colleagues I met from the non-profit sector I found real examples of innovation aimed at helping to educate, inform and support people experiencing a mental health problem. I hope that the case studies set out in this report spark the imagination of colleagues working in mental health about what we might do differently in the future.

In the section below, based on the learning outlined in the previous chapter, I highlight five recommendations for the NHS.

Five recommendations for the NHS

Mental health services in the UK are facing unprecedented challenges. Finances continue to be constrained and demand for existing services continues to rise. These sorts of tough environments can mean that the immediate horizon dominates an organisation's focus. It is exactly for this reason however that we must focus on innovation as a way of delivering improved outcomes and finding much needed efficiencies.

For this to happen, at a national level, there is a critical role to play for NHS England and others to both make resource available to support innovation and create the circumstances for adoption and spread. It is positive that NHS England's the recently published Long Term Plan for the NHS has a significant focus on digital technology.[81] We must build on this enthusiasm and start to take practical steps by which we can start to deliver services differently.

It is this context that the following recommendations are made:

1 NHS England should significantly expand its current Global Digital Exemplars programme to make learning accessible to all. As part of the programme, more mental health services should be given access to significant levels of dedicated funding to support digital innovation.

In Australia, it was apparent that a great deal of the most exciting initiatives in this field were at least partly due to the financial support of the federal government. In the UK, we must increase the amount of funding being directed at digital initiatives in mental health. In the NHS, NHS England is currently supporting seven digitally advanced mental health trusts, through funding and international partnership opportunities, to become global digital exemplars. These organisations are Berkshire Healthcare NHS Foundation Trust, Birmingham and Solihull Mental Health NHS Foundation Trust, Mersey Care NHS Foundation Trust, Northumberland Tyne and Wear NHS Foundation Trust, Oxford Health NHS Foundation Trust, South London and Maudsley NHS Foundation Trust and Worcestershire Health and Care NHS Trust. NHS England announced in September 2017 some additional funding to support the recruitment of 'fast followers' to partner with mental health Global Digital Exemplars.[82]

It is recommended, so that NHS mental health services might go further and faster in relation to digital innovation, the current programme is significantly expanded. Through supporting formal learning networks and dissemination of early learning from the work of the Global Digital Exemplars we might better support innovation in all parts of the NHS. In making dedicated funding available, more providers might be able to best establish a dedicated structure to support innovation and redesign work.

2   NHS England should consider developing and articulating a national vision for digital mental health.

Again in Australia, the federal government's clear articulation of a national strategy appears to have sent a clear message about the importance of digital mental health as a priority for investment and focus.

As part of work to implement the NHS Long Term Plan, NHS England colleagues should consider developing a national vision for digital mental health. This would outline how, from the point of view of people using mental health services, it is envisaged digital services might develop over the next decade in order to support strategic investment decision making.

3   NHS England, the NHS Digital Academy and Health Education England should ensure that NHS workforce and development strategy appropriately considers the impact digital technology is having, and will continue to have, on the future NHS.

A common theme from visits across both Australia and the USA was that of the workforce challenges presented by a changing digital world.

Many clinicians talked about the need to be able to confidently engage with people using services about their digital life, and how to make best use of apps, wearables and other monitoring tools in their own clinical practice. Colleagues involved in designing curricula for trainees across a wide range of professions should consider how best to respond to that challenge and may find useful learning from other countries tackling the same issues.

Visiting colleagues in the USA, it is clear that providers engaging in digital innovation are seeing the benefit of employing staff members with non-traditional backgrounds. At Brigham's Innovation Hub, for example, I was struck at the wide range of professional backgrounds among the team. The NHS of the future will need to employ staff with specific skills relating to digital technology. In work to develop future strategy, national bodies should ensure this is informed by a thoughtful analysis of how the workforce of the future should look. In the nearer term, the NHS Digital Academy and others should continue to expand their development programmes, as set out in the Long Term Plan for the NHS, to provide more opportunities for existing NHS staff learn valuable new skills.

4 NHS England should give consideration to whether there is a case for certain e-mental health services to be commissioned at a national level.

The Australian experience demonstrates the value of nationally commissioned initiatives in the field of e-mental health. Taking eheadspace as an example, it would be hard to see such a service being appropriately and efficiently commissioned by all 31 local Primary Health Networks in the country. Currently, there is no equivalent portal in the UK where young people could access NHS advice and support from clinicians. It is recommended that this is considered.

5 Providers of NHS mental health services should consider how best they might leverage digital technology in their organisation.

a.   As part of any service redesign work, considering how digital technology could help improve outcomes and reduce cost.

b.   Consider how other digital services could help improve the overall experience of service users (eg though online appointment booking).

c.   Think about how digital services could help support service users in terms of their wider recovery (eg online psychoeducation, crisis planning apps) and also improve information and support for carers.

d.   Explore how they currently approach supporting innovation in their organisation and consider whether establishing an in-house innovation unit might be appropriate in their case.

e.   Consider how best clinicians can be supported to make use of monitoring apps and tools with service users where appropriate.

The case studies contained within this report all have considerable relevance to providers of NHS mental health services. Building on the observations from site visits, considering the above set of questions may prove a useful starting point for senior leaders considering their next steps in developing their capacity and capability in relation to e-mental health services.

Providers of all sectors have an imperative to innovate, in line with the 'triple aim' – that is the simultaneous improvement of the experience of care, population health, and reducing per capita costs of healthcare.[83] The NHS and partners make use of a range of models in supporting innovation, as well as the adoption and spread of good ideas. Provider colleagues may want to consider whether replicating some of the models outlined here (such as Brigham's Innovation Hub or McLean's Institute for Technology) may make sense in their own organisation.

Conclusion

I am truly grateful to the Winston Churchill Memorial Trust for allowing me to have the opportunity to visit colleagues across Australia and the USA to explore what is such an important issue for our sector.

While our health systems are different in many ways, at a population level we all face broadly similar challenges. Currently, far too few people have access to good quality mental health treatment and support.

Time is pressing. The opportunity is here to capitalise on the potential digital technology offers us. In that version of the future, we can ensure more people have access to high-quality treatment, advice and support. We can ensure more people have a positive experience of using mental health servicess and are empowered to take control of their own recovery. Conversely, the risk is that, as a sector, we fail to capitalise on those opportunities and in doing so fail to deliver what the public will increasingly want. In that scenario, who knows what – or who - might fill the gap. As Jono Nicholas said when we met in Sydney: "Mental health hasn't had it's Uber moment yet... yet".

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