
Building healthy cities: The role of universities in the health ecosystem



University Alliance Regional Leadership Series

About University Alliance

We are universities with a common mission to make the difference to our cities and regions. We use our experience of providing high quality teaching and research with real world impact to shape higher education and research policy for the benefit of our students and business and civic partners. We innovate together, learn from each other and support every member to transform lives and deliver growth.

Front cover image: Plymouth University is helping to lead a transformation in dental education in the UK through its Peninsula Dental Social Enterprise and focus on community-based teaching
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February 2016

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Foreword



Improving health and wellbeing for all is a central challenge of our time. With society facing issues of ageing, chronic co-morbidity, population expansion and rising rates of preventable illness, ensuring that everyone can live healthy, happy and productive lives is a cornerstone of virtually all areas of public policy – increasing fairness, helping to boost productivity and leading to better outcomes for all.

We face this challenge against a backdrop of budgetary pressure. The NHS needs to make savings in the order of £22 billion in the coming years, while the budgets of local authorities, responsible for public health and social care, face an ongoing squeeze.

This means we need to find ways of working smarter, in an innovative way – harnessing technology to deliver solutions more efficiently where we can – and shifting the focus of services towards prevention, rather than cure. For example, addressing public health challenges like obesity at source by supporting and encouraging healthy lifestyles, instead of dealing with the higher costs of medical and surgical interventions further down the line. As this report emphasises, creative thinking is also needed in how health and wellbeing are considered as part of the design process, incorporated into built environment and neighbourhood development, urban planning and job creation.

At the same time, in recent years there have been sweeping changes in the way both the NHS and public health responsibilities are organised, with the formation of a new institutional architecture. Alongside this, we are witnessing what promises to be the biggest shift in power, budgets and responsibilities away from Westminster and Whitehall in a generation.

While this has often been understood in terms of economic development – the Northern Powerhouse, the Midlands Engine – it is an agenda every bit as relevant to health and social care, with decisions increasingly being made ‘on the ground’ and different actors on a city or regional level working alongside the local population to identify and address specific needs.

Therefore, this paper sets out a case for the contribution universities make to health and wellbeing, in the context of the opportunities devolution offers as well as the challenges currently facing the NHS.

Most importantly though, it identifies solutions by mapping out the unique and crucial role universities can play – and are already playing – as anchor institutions: providing leadership and coordination, working in partnership to co-design solutions, making services more responsive to local needs, training the health workforce of tomorrow, and harnessing world-class research to make a real difference to health outcomes.

This paper is the first in a series that University Alliance will produce this year, looking at how universities act as anchor institutions in their cities and regions: active, engaged institutions, taking pride in our community, tackling real-world challenges. The series will examine the key components of regional prosperity, including – alongside health – skills, opportunity for all, research and innovation.

We envisage these as being short, evidence-based ‘think pieces’ to stimulate debate, inform discussions and policy and show how universities – within wider ecosystems – add real value to their cities and regions. As a group of universities we also want, through this programme, to demonstrate our shared commitment to regional leadership – this is intrinsic to our mission. It is clear that enterprise, creativity and innovation are going to be an important feature in meeting the global and local challenges we face.

Professor Steve West
Vice-Chancellor, UWE Bristol
Chair, University Alliance

A collaborative venture at Sheffield Hallam University brings together researchers from the disciplines of design, creative practice and healthcare to help people of all ages and abilities to live with dignity, independence and fulfilment. New technologies and devices such as this neck brace are among those developed through the Lab4Living initiative.



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Summary

With the NHS reporting a gap between spending and demand, there is growing pressure on health providers and commissioners to run more efficient services. At the same time, the NHS is having to tackle variations in service quality and access to care while dealing with long-term problems around staff retention. Local authorities – which are responsible for public health and social care in England – face similar, if not more acute, challenges after half a decade of budget cuts.

Britain is also braced for significant demographic change. The population is projected to increase from around 65 million in 2016 to more than 74 million by 2039. In the same period, the number of over-70s is expected to rise by a third. Although this will inevitably mean greater numbers with access to health and care services, the uptake of those services will be considerably higher if rates of preventable illness like obesity continue on an upward trajectory.

The promotion of physical and mental wellbeing is therefore critical. If effectively pursued, it will not only help to relieve pressure on services and save costs over time but also raise people's quality of living, supporting productivity and growth in the process. To achieve these ambitions, however, we need to look beyond the overstretched NHS and local government – important though they are – to other institutions that promote public health and wellbeing.

This report focuses on the role of universities. As well as training and educating the health workforce of the future, they already make significant contributions in two areas of health policy and planning. First, as anchor institutions, universities are uniquely placed to help integrate the complex web of local organisations that comprise the 'health ecosystem' and make health and wellbeing provision more efficient and more responsive to the needs of the surrounding population. Second, they are helping to produce healthier cities and regions through research-informed activities in design, planning, construction and engineering.

Our Bristol City Region case study in Section 3 shows that with the joint ambition and right mechanisms a more integrated approach to health and wellbeing is entirely possible. In partnership with others, the city's universities are working effectively with providers and commissioners as well as Bristol City Council – creating what could even be the structural underpinning for the devolution of health from central government.

The report also identifies how the research capacity and human capital of universities is being harnessed to produce healthier communities. The scope of this activity is exceptionally broad, covering everything from applied clinical medicine, to studies on improving the urban environment through effective planning, to the development of robots that enhance patient care or assist those with permanent health conditions.

In response to the cross-cutting nature of health and wellbeing challenges, there is an increasing volume of interdisciplinary research at UK universities. Many institutions also work closely with non-academic partners including businesses, charities and social enterprises. Incubation spaces on campus enable entrepreneurs to design products and innovate with the support of specialists at the university. This type of engagement will be further enhanced by University Enterprise Zones.

Finally, university research and innovation and the funding that enables it has the added benefit of supporting local services. Clinical research, for example, will often involve observing and trialing treatments with patients in a local hospital. From the perspective of providers and commissioners, this represents an investment additional to that coming directly from government. Similarly, university-based health academics are often specialists within a particular field of medicine, surgery or other health-related discipline. Through what is effectively a joint appointment with the NHS, their contribution is essential for maintaining the quality of clinical services in the region.

Key findings and recommendations

As anchor institutions in their region, universities are working with others to make health and wellbeing provision more efficient and more responsive to the needs of the local population.

In doing so, they can enable the UK government to fulfil its localism and devolution agendas while helping to integrate and improve health and care services. Universities' influence is potentially very significant in this respect – but it requires active leadership whereby senior university management focus on their role in the city and region as well as the organisation to which they belong. A number of university leaders do this already and represent excellent role models.

Universities turn out a vast volume of health-related research and are responsible for much of the technology used by medics and other health professionals in clinical settings.

To undertake this role effectively, they need a stable funding regime for research and innovation. The government must acknowledge this as it develops plans to restructure the research and innovation system and the allocation of research funding. University Alliance will address these issues in a forthcoming report on the role of universities in innovation.

Universities are training and educating the health workforce of the future – but cannot do it alone.

There is a risk that the changes announced in the 2015 Spending Review – which will see nursing, midwifery and allied health students moved off grant support on to loans and the lifting of the student numbers cap – could spell an end to workforce planning. The government must ensure that universities can continue to recruit effectively in line with forecast needs. Furthermore, the shift from grant to loan support could adversely affect the diversity of the applicant pool. To avoid undermining its widening participation targets, the government should monitor the impact of the changes and intervene where necessary.

1. Introduction

Beyond the multiple organisations that constitute the NHS at a local level are a number of other bodies working independently or in partnership to support our health and wellbeing. Some of these organisations are in local government. Some are not-for-profit or private, while others – such as social enterprises – fall somewhere between. Although ‘ecosystem’ is not commonly used in this context, the term describes quite neatly the complex web of people and institutions that make up a region’s health economy.

This report is concerned with one element of the ecosystem: universities. In a variety of ways, some more visible to the public than others, universities play a significant role in protecting and improving our health. Without them, there would be no one to educate the next generation of health professionals and scientists. We would have to rely on others to develop lifesaving technologies and we would see a sharp reduction in health-related innovation and research. While clearly hypothetical, the absence of universities would affect other areas of health and wellbeing as well.

In particular, universities often assume the role of ‘anchor institution’ within their local region – a unique position by which they can help to integrate or join up the health ecosystem through networking and leadership and increase its responsiveness to the needs of the local population. Our Bristol City Region case study in Section 3 illustrates how this can work well in practice. Universities also contribute to health and wellbeing on a smaller scale. At faculty level, their impact ranges widely from the building of healthier cities through academic consultation, to partnerships with health technology firms, to better-informed practitioners who attended university CPD courses.

Taken together, these and other university-led activities play a substantive part in tackling today’s health challenges. Despite prominent campaigns around smoking, sugar consumption, alcohol abuse and other high-risk behaviours,

rates of preventable illness continue to rise in the UK. We are also living longer, leaving more time to develop long-term physical or mental health problems. Ultimately, a more integrated approach to health and wellbeing, which focuses on preventing as well as treating ill health, will not only help to relieve pressure on health and care services but also raise people’s quality of living.

This report proposes, therefore, that while universities cannot provide all the answers, they can and in many instances do make important contributions in two areas of health policy and planning. First, as anchor institutions, they are uniquely placed to help integrate the health ecosystem through networking and leadership – speaking directly to the UK government’s localism and devolution agendas. Second, they are helping to produce healthier cities and regions through research-informed activities in design, planning, construction and engineering.

This is in addition to supplying the workforce that cares for people in the case of an illness or emergency. With significant changes to nursing and allied health tuition funding announced at the 2015 Spending Review, there is suddenly a degree of uncertainty around the fulfilment of this role in future. The challenges associated with a lifted cap on non-medical student numbers and the shift from grant to loan support for these individuals are examined in Section 2. In the same section, we summarise what universities do within the health ecosystem, grouping their activities into five categories and giving examples from different institutions. To add depth to the discussion, we constructed a case study on the Bristol City Region which is presented in Section 3.

The health ecosystem

First, though, it is important to consider the parameters of the health ecosystem. Where does it start and end? The short answer is it depends who you ask. A national regulator will concentrate on the NHS and commissioned health providers, whereas a city leader will look at a much broader set of institutions that contribute to health and wellbeing, universities included. While this report is concerned with the role of universities in the local health economy, the ecosystem could easily be conceived in global terms, connecting institutions from a local level, through to the regional, national and international level. A university will operate across all of these domains at any one time.

In an attempt to simplify the discussion, we suggest that universities interact at the local level with four other components of the ecosystem. These are the NHS, local government, health providers and, what can loosely be termed, 'health networks and partner organisations' – all within the wider context of a global research environment. Figures 1a and 1b illustrate. (Since health is a devolved matter in the UK, different institutional arrangements exist in Wales, Scotland and Northern Ireland, but here we have opted to focus on the English system. This is because our case study looks at relationships in Bristol and its immediate surroundings.)

Figure 1a: How universities perceive the local health ecosystem

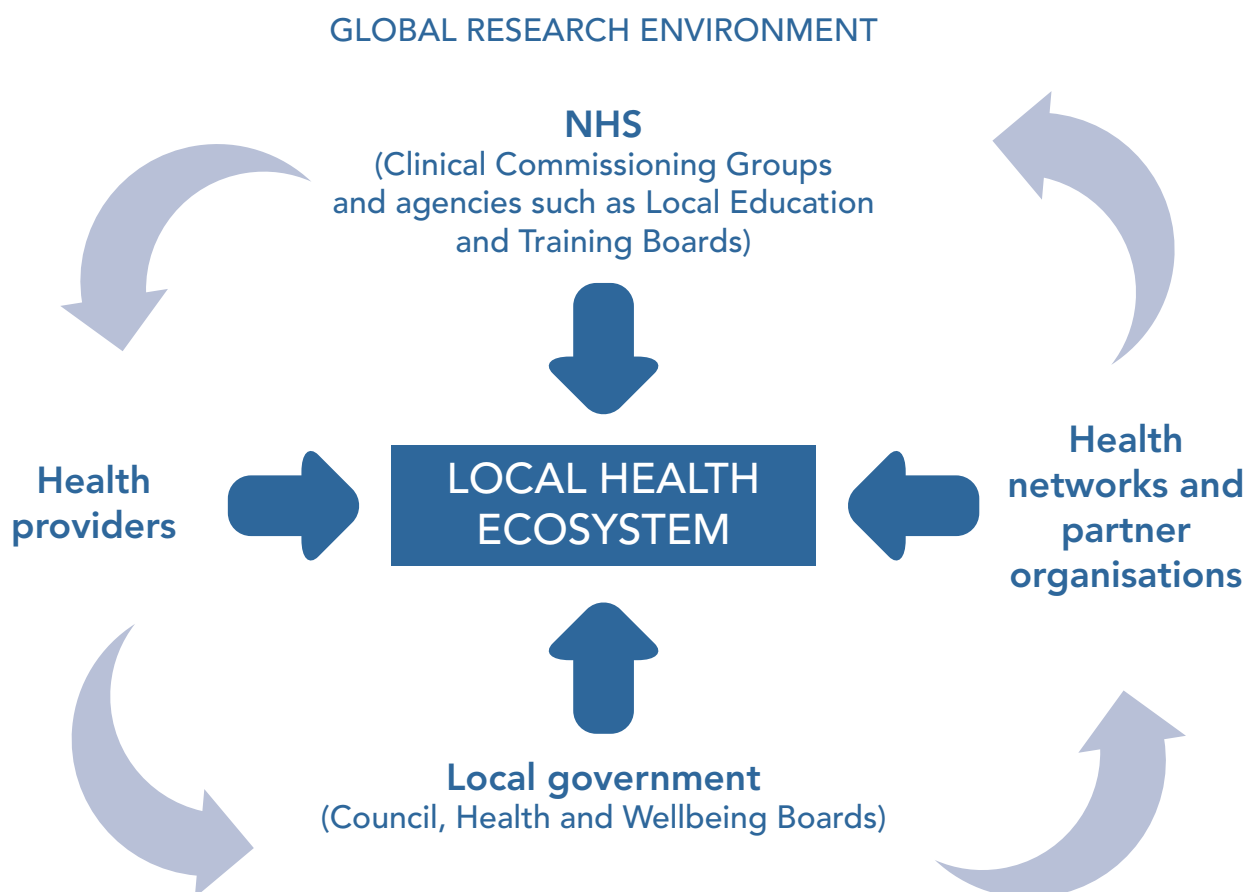


Figure 1b: Summary of institutions within the health ecosystem

NHS	HEALTH PROVIDERS	LOCAL GOVERNMENT	HEALTH NETWORKS AND PARTNER ORGANISATIONS
<p>NHS England has responsibility for commissioning primary care (general practice) and specialist services nationally and for overseeing local Clinical Commissioning Groups or 'CCGs'. Led by GPs and other clinicians, CCGs are in charge of planning and commissioning secondary care services in their local area.</p> <p>Working alongside NHS England are a number of other organisations under the Department of Health's remit. This includes Public Health England, which works with local government to improve people's health and wellbeing, as well as regulators (Trust Development Authority, Healthwatch England, Monitor, Care Quality Commission), data gatherers (NICE, Health and Social Care Information Centre), a research coordinator and funder (National Institute for Health Research – NIHR) and a training agency (Health Education England).</p> <p>Health Education England oversees 13 Local Education and Training Boards (LETBs) which coordinate the training and education of health professionals in their region.</p>	<p>Clinical Commissioning Groups can commission any service provider that fulfils NHS cost and standards criteria and is quality assured. For some services, that might be a social enterprise, a charity or a private provider. However, the main bodies commissioned to provide secondary care in England are public sector corporations – NHS Foundation Trusts and Trusts – which run hospitals, ambulances and other frontline services.</p> <p>Not-for-profit and private sector providers in the health ecosystem include hospices, dentists, care homes, private hospitals and doctors' surgeries, specialist clinics and nursing homes. They can provide services jointly with the NHS or operate independently.</p> <p>While much of universities' engagement in the health ecosystem is with the NHS, they also have a relationship with these alternative providers – placing students in different NHS/non-NHS settings depending on course requirements.</p>	<p>Statutory responsibility for public health falls to local government with support from Public Health England. Every county council and unitary authority has a Health and Wellbeing Board that produces a Joint Strategic Needs Assessment – setting out the health and care needs of the local population – and a Joint Health and Wellbeing Strategy.</p> <p>Additionally, county councils and unitaries employ a specialist Director of Public Health to fulfil their obligations in this area and have long had responsibility for overseeing social care. A hoped-for outcome of the new system is more universally-integrated health and care services. This ambition has been taken several steps further in Greater Manchester where services have been integrated, and the funding devolved, under the 'Devo Manc' initiative.</p> <p>Other areas of local government competence include housing, planning and schools for which there is the potential – sometimes realised – to create healthier environments where people live, work or study.</p>	<p>The final feature of the local health ecosystem are networks involving multiple agencies. The case study in Section 3 highlights the work of Bristol Health Partners, a collaboration between the city's political leaders, NHS Trusts, CCGs and two universities, as well as the West of England Academic Health Science Network.</p> <p>For present purposes, institutions that contribute to the health economy in some way other than as a health provider are labelled 'partner organisations'. This includes businesses, charities and social enterprises that are active in the health and wellbeing space.</p>

2. The role of universities within the health ecosystem

In Section 1, we divided the health ecosystem as perceived by universities into four categories. This next section looks at the role of universities themselves. While some institutions are more actively engaged in their local health economy than others, it is likely that every one of them makes a contribution to public health and wellbeing – whether through research, their learning environment, or in other ways discussed below. The extent of a university's leverage in the ecosystem will depend on its size and institutional mission but also on whether it has a relationship with local health providers through educating medical and non-medical staff.

Training and educating health professionals

Across all disciplines nowadays higher education is the principal supplier of healthcare professionals. If you want to be a doctor or a dentist, a higher qualification has long been the minimum requirement. The same is now true of nursing and midwifery as arguments for professionalising the non-medical workforce to improve patient care have become embedded in government policy. Naturally, this means that universities have a close working relationship with local health providers as well as Health Education England and its regionally based Local Education and Training Boards (LETBs). For 2014/15, Health Education England commissioned clinical professional education places in nursing, midwifery and allied health (etc.) for more than 32,000 students. In the same year, there were around 25,000 undergraduate and postgraduate medical and dental commissions.¹ Although some further education colleges train health professionals at foundation levels, the majority of these students will be coming through universities.

Responsibility for commissioning the training of non-medical health professionals in a particular region currently falls to LETBs. A workforce plan drawn up by the LETB identifies how many non-medical staff are required by the local health economy and, subject to the availability of finance, the board then allocates the same number of places to local education providers. From 2017/18, however, a different system will come into being. Under plans set out in the 2015 Spending Review, the cap on non-medical places will be lifted, giving universities the option to educate and train more or fewer undergraduates, and nursing, midwifery and allied health students will be moved off the existing NHS bursary scheme onto the student loans system. The objective is to increase participation and fill widely reported skills shortages in these areas. Numbers of medical and dental students, on the other hand, will continue to be determined at a national level by the Higher Education Funding Council for England.

¹ Health Education England (2013), *Workforce Plan for England: Proposed Education and Training Commissions for 2014/15*

Analysis of reforms to nursing, midwifery and allied health tuition funding in England

Many universities will welcome these changes – Universities UK and the Council of Deans of Health have previously argued in favour – but they do carry certain risks that need mitigation. First, while the effect of shifting non-medical students onto the loans system is unknown at present, it could potentially impact on the diversity of the applicant pool. In effect, it will mean participants have higher disposable income than under the old bursary scheme but significant loan debt at the end of their course which has to be repaid. Given the demographics of nursing and midwifery students in particular, who tend to be mature entrants (60% in the case of nursing) and/or from disadvantaged groups, there is a risk that debt aversion could put people off applying and thereby undermine the government's widening participation targets. That said, the evidence from the University of Bolton – which in 2015 launched a student loans funded nursing degree with the Lancashire Teaching Hospitals NHS Foundation Trust – suggests that this particular challenge may be overstated. The scheme was set up to address a nursing shortage in the Lancashire region and the application rate so far is believed to be positive.²

Further, the impact of the lifted numbers cap will need to be monitored. Effective workforce planning requires not only a sufficient quantity of qualified trainee health professionals, but a sufficient quality, and in the right areas of employment. Universities are obliged to recruit people with appropriate qualifications, attributes, motivations and values for healthcare practice who meet the requirements for registration through to a degree award. Those who are currently being rejected for these courses might not always be the most suitable candidates. In addition, there are ongoing difficulties in recruiting for different health specialisms (e.g. mental health and learning disabilities nursing) which a more liberalised system could end up compounding. To ensure that the needs of the workforce are being met, universities must continue to work closely with Health Education England and LETBs.



Almost 100 new nurses began work on the wards of Lincolnshire's hospitals in the summer and autumn of 2015 after completing their undergraduate degrees with the University of Lincoln in the 2014/15 academic year. It was the largest single cohort of nursing students to graduate from Lincoln since the university was selected to deliver all adult and mental health pre-registration nursing training for the county of Lincolnshire in 2012.

Image © University of Lincoln

² M Jenkin (2015), *Will scrapping nurse bursaries help or worsen the NHS staffing crisis?*, Guardian Healthcare Network

In educating health professionals, universities are intimately involved with local health providers including affiliated NHS Trust hospitals (i.e. university/teaching hospitals). For courses such as nursing, 50% of a student's time is spent on placement in a hospital or other clinical setting.³ In undergraduate medicine, students receive a combination of teaching methods including clinical learning in hospital wards and general practice. The relationship between universities and health providers runs much deeper though. University-based health academics, for instance, are often specialists within a particular field of medicine, surgery or other health-related discipline. Representing what is in effect a joint appointment with the NHS, the contribution of these individuals to clinical services is an important way that universities support the health ecosystem.

In many cases, universities offer advanced training facilities for students. Plymouth University's Peninsula School of Dentistry, for example, provides an ultramodern environment where dental undergraduates treat patients on site under the supervision of qualified dentists. At Kingston University, the Paramedic Clinical Simulation Centre, run jointly with St George's, University of London, uses 3D technology to train students in assisting patients in real life scenarios such as a road accident or a nightclub fire. It is the first university-based simulator of its kind in the UK. Similarly, the University of Portsmouth's Centre for Simulation in Healthcare offers students a replica hospital in which to learn. Facilities include a fully functioning operating theatre, an ultrasound suite, and a flexible simulation space that can be turned from an intensive care environment into a pharmacy or patient assessment area.

Continuous professional development

Importantly, the activities of universities in health education and training are not limited to full-length undergraduate and postgraduate study. Many institutions provide continuous professional development (CPD) as well. These shorter courses are typically commissioned by health providers (in some case LETBs) or professional bodies and

are designed to update the knowledge and skills of individuals working in the health professions and beyond. Courses vary in size and length and involve classroom-based training, online learning or a combination of the two.

For example, the Open University Business School and the Hay Group have established a 12 month CPD course with the NHS Leadership Academy to prepare practitioners for a leadership role. The programme blends online learning with face-to-face training and involve a work-based service improvement project. Face-to-face sessions are provided regionally and enable participants to network and share their experiences with people from different organisations and professions. In a similar vein, Plymouth University's School of Health Professions and Faculty of Business provide specialist management and leadership modules in health and social care. These and other modular options at Plymouth cover a range of disciplines and form part of a flexible award structure that allows individuals to study up to an MSc in Advanced Professional Practice, or take individual CPD modules, through face-to-face learning on campus and wider practice-based locations such as NHS Trusts.

Universities also offer courses that are fully internet-based. The University of South Wales, for instance, has created an online CPD platform on wound management called the Larval Academy. Developed with pharmaceutical firm Biomonde, the academy trains clinicians in the use of larvae from the green bottle fly to remove dead tissue. Another example is a four week course on palliative care provided by Sheffield Hallam University and St Luke's Hospice. It is aimed at nurses, allied health professionals, carers, volunteers and service users and topics include talking about death and dying, spiritual and cultural aspects of end of life care, and preparing for dying and bereavement. The University of Greenwich hosts longer (12 week) online courses accredited by the Institute of Biomedical Science, with topics ranging widely from advanced human genetics and diagnosis of breast cancer, to quality systems management and robotics and automation.

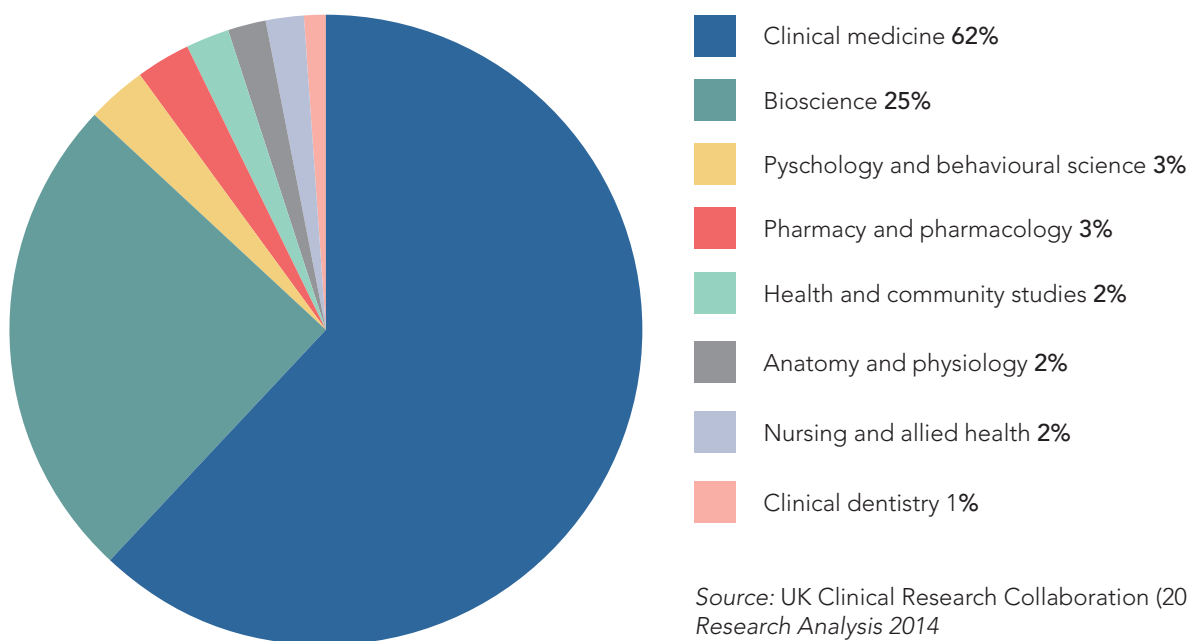
³ The placement component affords additional funding to the placement provider which is paid by Health Education England. This arrangement will continue after 2017/18 when universities can set their own numbers.

Research

The full scope of universities' health-related research is difficult to capture but a good starting point is to look at where the money goes. In 2015, the UKCRC Health Research Analysis Forum published a comprehensive audit of public and charity-funded health research in the UK.⁴ Using figures from the Higher Education Statistics Agency (HESA), the analysis identified that the majority of universities' health-relevant research income in 2013/14 went to clinical medicine (62%). Bioscience received the second largest share

(25%) followed by psychology and behavioural science (3%), pharmacy and pharmacology (3%), health and community studies (2%), anatomy and physiology (2%), nursing and allied health (2%) and clinical dentistry (1%). The total research income for these eight HESA cost centres – as they are known – was £2.7 billion, representing more than half of universities' total research income (£5.1 billion) across all 45 cost centres.⁵

Figure 2: Distribution of public and charity-sourced research income across different HESA cost centres



Source: UK Clinical Research Collaboration (2015), *UK Health Research Analysis 2014*

This is one way of understanding health-relevant research activity. However, it somewhat understates the scale of university research applicable to health and wellbeing. Public health-relevant cost centres such as sports and leisure science or architecture, built environment and planning, for instance, are not considered.

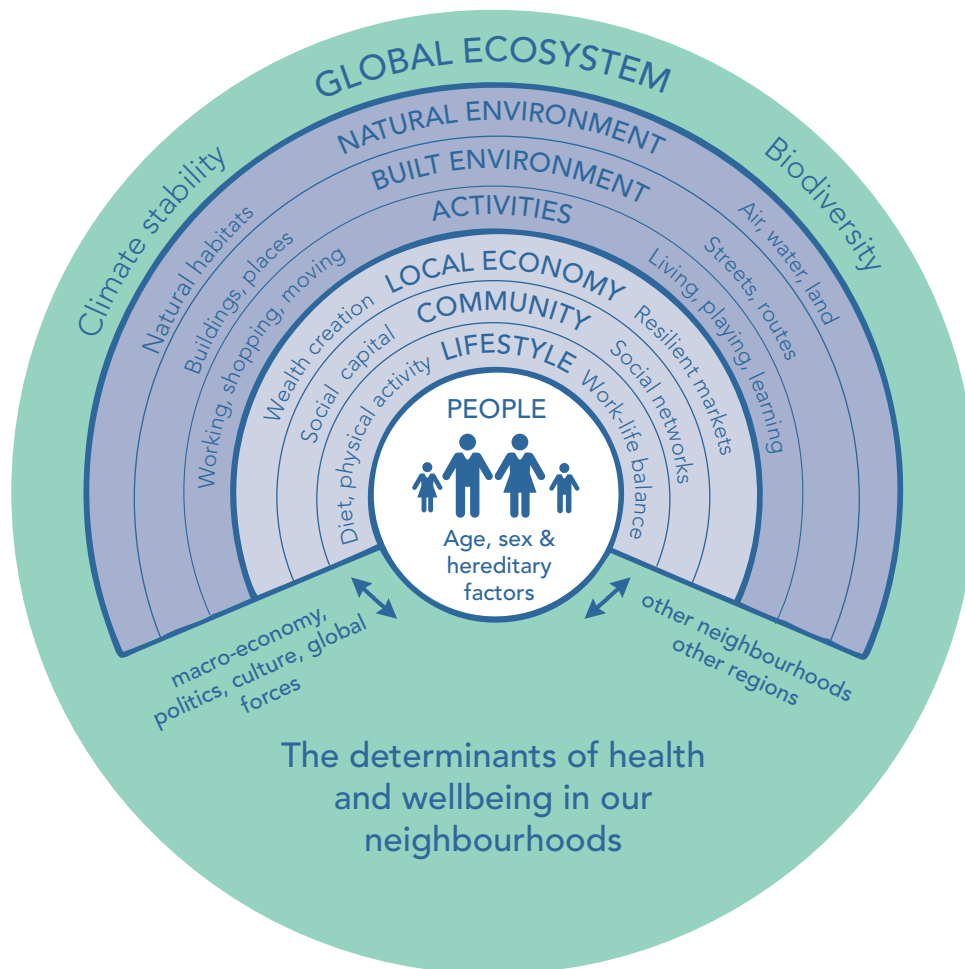
Yet, as Figure 3 illustrates, the determinants of health and wellbeing are multifarious, covering everything from the built and natural environment through to people's diet and work-life balance. To put it another way, there is a health-related research topic – or series of topics – for virtually every university faculty.

⁴ UK Clinical Research Collaboration (2015), *UK Health Research Analysis 2014*

⁵ *Ibid*, pp 81-82

Figure 3: The determinants of health and wellbeing

Source: H Barton and M Grant (2006), *A health map for the local human habitat*, *The Journal for the Royal Society for the Promotion of Health*, 126 (6) developed from a concept by Dahlgren and Whitehead (1991).



Inevitably, the cross-cutting nature of these topics gives rise to cross-faculty working. The University of Greenwich, for instance, has established a Centre for Positive Ageing that draws on research across the institution to address the challenges posed by demographic change. The Salford Institute for Dementia – which focuses on research, innovation and education in supportive design and care for people living with the condition – engages more than 50 academics from the School of the Built Environment, the College of Health and Social Sciences and the School of Arts and Media at the University of Salford, as well as external organisations like Alzheimer’s UK. At Sheffield Hallam University, a collaborative research venture called Lab4Living involves researchers from various design and healthcare disciplines. The goal is to develop future living environments that promote dignity, independence and fulfilment. Sheffield Hallam has

also opened the Advanced Wellbeing Research Centre with Toshiba and health insurance firm Westfield Health. The facility will enable engineers and researchers from the university to design new products such as diagnostic imaging systems and wearable biosensors for athletes.

It is important to acknowledge that universities operate within a global research environment. This means that their research has national and international relevance (even though the activities and human capital are located in a particular region) and is translated outwards. To illustrate, the Community Health and Research Unit at the University of Lincoln has been working to improve the quality of pre-hospital care during emergencies. Although the research was initially undertaken with East Midlands Ambulance Service NHS Trust, it has since precipitated changes in the behaviour of ambulance service

providers nationally. Another example is a joint investigation between Plymouth University and the city's National Marine Aquarium on the health and wellbeing effects on people of subaquatic scenes such as aquaria and fish tanks. The research activity, while undertaken locally, led to national coverage in academic journals and the media as well as involvement in a United Nations working group.

The Centre for Public Health at Liverpool John Moores University gathers intelligence from various sources including those in the Merseyside region to inform drug policy, practice and interventions. It recently provided evidence for new guidelines on alcohol consumption produced by the UK Chief Medical Officers and previously contributed to two successive UK national drug strategies. A further example of research being translated outwards is the VitalPAC early warning clinical system developed by The Learning Clinic with help from medics at Portsmouth Hospitals Trust and clinical outcome modelling experts from the hospital and the University of Portsmouth. The software, used in a handheld device such as an iPad, enables nurses to monitor patients' vital signs and was first used by Portsmouth Hospitals Trust in 2006, where hospital deaths reportedly fell from 7.8% to 6.4%. Owing to this early success, more than 30,000 doctors and nurses across 51 hospitals now use the VitalPAC technology.

The funding for universities' health-related research activity comes from a mix of sources. Public sector funders include the UK Research Councils, the National Institute for Health Research (NIHR) and Innovate UK. Universities also receive a sizeable proportion of their research income from the private and not-for-profit sectors. Beyond advancing our understanding of the determinants of health and wellbeing, the research and funding that underpins it has the added benefit of supporting other parts of the health ecosystem. Clinical research, for example, will often involve observing and trialing treatments with patients in a local hospital. From the perspective of providers and commissioners, these activities signify an investment in local services additional to that coming directly from government.

Health networks and partnerships

As anchor institutions, universities are represented on numerous public-facing bodies. In the current context, it includes organisations such as the NIHR Collaborations for Leadership in Applied Health Research and Care (CLAHRCs) and Clinical Research Networks, Local Enterprise Partnerships, as well as Academic Health Science Networks (AHSNs) and most LETBs.

NIHR CLAHRCs, of which there are 13 across England, are responsible for translating clinical research into practice. Led by established health academics, they work closely with health providers, commissioners and industry as well as members of the public in a process known as Public and Patient Involvement (PPI). The latter is considered to be an effective way of gathering patients' feedback to improve services. In addition, the NIHR runs the Clinical Research Network with branches in 15 regions of England. Each branch oversees research across 30 different clinical specialties with advice and support from the network. It also has an industry manager to help commercial pharmaceutical, medtech and biotech companies access the network's services.

Local Enterprise Partnerships (LEPs) are collaborations between local authorities and businesses which replaced Regional Development Agencies in 2012. Universities act as advisers to their local partnership and many are also represented on LEP boards and committees. Depending on a particular region's strengths, LEPs' Strategic Economic Plans often focus on the contribution of pharmaceutical and other health-related sectors to local jobs and growth. As a result, academic-led AHSNs – and universities themselves – will work with LEPs on everything from helping to engage local businesses to smart specialisation.

As well as engaging with health networks and providers, universities collaborate with partner organisations in the health ecosystem. Again, these are businesses, charities or social enterprises that contribute in some way other than as a health provider. An example of university-business engagement (additional to those cited above) is the relationship between Oxford Brookes University and Virtus Consult, a firm with offices in Oxford. While Virtus Consult had already been working with Heart of England



A Knowledge Transfer Partnership between the University of Huddersfield and Avita Medical Ltd is helping the company to better understand the ability of its lead product ReCell® to work so effectively on treating burns, skin defects and scars. ReCell® can be used by a clinician to rapidly create a treatment solution called Regenerative Epithelial Suspension (RES™) using a small sample of the patient's skin. This image shows RES™ sprayed using the Avita's ReCell® device.

NHS Trust on a hospital energy-saving scheme, it did not have the expertise or resources to extend the programme more widely. However, a Knowledge Transfer Partnership (KTP) formed subsequently with Oxford Brookes has made it possible for the company to work with other NHS Trusts.

Similarly, scientists at the University of Huddersfield have established a KTP with local firm Paxman on the manufacture of cooling caps that can prevent hair loss through chemotherapy. The university is also developing a better understanding of wound and skin defect treatments through its relationship with Avita Medical Ltd. An example of a partnership with a not-for-profit, on the other hand, is a Big Lottery Fund supported study at the University of Greenwich. Working with children's palliative care charity ACT, the university is undertaking the UK's first detailed study into how well the needs of children with conditions such as cancer or muscular dystrophy are being met across the country.

Additionally, universities have facilities for engaging many partners at once. Coventry University's Health Design and Technology Institute, for instance, provides design, prototyping and product evaluation services to entrepreneurs and companies developing new products. The Sensor City University Enterprise Zone, a forthcoming collaboration between Liverpool John Moores University and the University of Liverpool, will allow high tech firms working on medical and other sensor-focused technologies to innovate and expand. Finally, there are cases where universities not only work with other universities – in the mode of Sensor City – but also make joint appointments together. A good example, discussed in Section 3, is the Bristol Robotics Laboratory. This is a joint venture between Bristol's two universities and its management is consequently accountable to both institutions.

Campus health and wellbeing

A further way that universities contribute to the health ecosystem is by promoting health and wellbeing among students, staff and the wider community. The University of Portsmouth's Dental Academy, for example, offers free dental treatment to the local population as well as oral health promotion and screening to hard-to-reach groups, schools and care homes. At Plymouth University, the Dental Social Enterprise has provided more than 2,000 items of advanced care that would otherwise have been referred out to local services. Its Community Engagement Team – which recently won a Green Gown Award – focuses on raising oral health awareness across Plymouth and assisting those who find it difficult to access mainstream services.

In most cases, universities provide clinics, health centres, counselling and other support as part of their general duty of care to students – but less formal activities are facilitated as well. Oxford Brookes University, for instance, uses its Wellbeing Week in October to promote healthy living through yoga, team sports and stress resilience workshops among other things. Teesside University hosts an annual Festival of Wellbeing where students and staff are encouraged to engage in various group activities. The Chatterbox Café, a social enterprise initiated at the University of Huddersfield, provides an informal environment for talking about mental health.

The literature suggests that holistic approaches to campus and health and wellbeing, which are embedded across the institution, are likely to be the most effective. An example is the healthy settings approach promoted through the UK National Healthy Universities Network and inspired by the Ottawa Charter for Health Promotion. A report by UCLan and Manchester Metropolitan University – which co-manage the network – found that the approach “creates contexts and environments that are supportive to health and wellbeing” and can “contribute positively to a setting's performance and productivity”.⁶

Membership of the network has grown from a handful of healthy universities in 2006 to more than 70 today.

More generally, it is evident that participating in higher education yields positive long term health benefits for the individual. Research shows that graduates can expect to live eight years longer on average than those with lower levels of education. They are also less likely to drink to excess, smoke or become obese, and more likely to have better mental health, enjoy greater job satisfaction and seek preventative care such as cancer screening.⁷ In short, the lifetime advantages of going to university extend well beyond the acquisition of higher level skills.



Staff and students at Teesside University are able to access a range of activities to encourage them to improve their health and fitness during the annual Festival of Wellbeing. Held throughout September and October, the Festival offers the opportunity to try out a wide range of sports and activities, from rock-climbing and Tai Chi, to yoga and table tennis.

Image © Teesside University

⁶ M Dorris and S Powell (2012), *Developing leadership and governance for healthy universities: Final report*, UCLan and Manchester Metropolitan University

⁷ Department for Business, Innovation and Skills (2013), *The Benefits of Higher Education Participation for Individuals and Society: key findings and reports "The Quadrants"*, BIS Research Paper No. 146

3. Bristol City Region deep dive

Having summarised universities' activities within the health ecosystem, we turn now to look at the experience of a specific city region. Bristol in the South West of England makes for an interesting case study because it harbours significant health inequalities that local institutions are working hard to address.

Although the city is relatively prosperous overall, the wealth – and the wellbeing associated with it – is unevenly distributed. There is a life expectancy gap of more than nine years between the richest and poorest electoral wards, and the gap between the least and most deprived individuals is nine years for men and almost six years for women. Moreover, the disability-free life expectancy (or average time a person can expect to live without a debilitating health problem) for the most advantaged males is 14 years higher than for the least advantaged.⁸

Inequalities also persist in other areas relating to health and wellbeing. Despite educational attainment showing improvement over the last

decade, pupils in Bristol on free school meals remain well behind their more advantaged peers in obtaining good GCSE grades. Furthermore, virtually all of the city's wards to the south and east are in the bottom quintile of university participation nationally, while those in the north-west sit in the top quintile. The availability and costs of housing are big concerns too. Bristol South MP Karin Smyth recently identified that more than 10,000 people are on the waiting list for social housing as demand continues to exceed supply. Bristol is also experiencing above-trend house price inflation and, like everywhere else, an ageing population with implications not just for housing but for local planning and services.

Figure 4: The Bristol City Region health ecosystem



⁸V M Harrison (2013), Paper for Bristol Health and Adult Social Care Scrutiny Commission: Health Inequalities in Bristol

Near the epicentre of efforts to address the city's health and wellbeing challenges is Bristol Health Partners (BHP). This is a membership-funded body involving Bristol City Council, three Clinical Commissioning Groups, three NHS Trusts and two higher education providers – University of the West of England (UWE Bristol) and the University of Bristol (UoB). Although health partnerships exist in other regions of the UK, BHP is said to have a unique approach to health and wellbeing which is both holistic in scope and inclusive. It focuses not just on the application of clinical research but on public and population health as well, and it connects a wide network of partners. Perhaps the most innovative aspect of BHP's work, however, are its Health Integration Teams or 'HITs'.

HITs bring together different institutions within Bristol's health ecosystem to focus on specific health and wellbeing challenges. Their objective is to achieve healthier lives, earlier prevention of illness and disease, and better integration of services across the region. Case Study 1 below provides more detail. Working closely alongside BHP and the HITs are other health and wellbeing integrators such as the West of England Academic Health Science Network (WEAHSN), discussed in Case Study 2, and the NIHR Collaborations for Leadership in Applied Health Research and Care West (CLAHRC West) and Clinical Research Network which draw on expertise from Bristol's universities and beyond.

The West of England Local Enterprise Partnership (LEP) has recently established a working group to help develop the health and life sciences business sector – there are already more than 400 health technology companies operating in the South West. A strategic priority of the LEP is to promote the region's expertise in robotics and automation. This is driven most visibly by the work of the Bristol Robotics Laboratory, highlighted in Case Study 3, which will soon be accompanied by one of four government-backed University Enterprise Zones.

Bristol's universities are unique in the health ecosystem in that they interact with every other institution. They not only contribute to the leadership and integration of health and wellbeing through BHP, WEAHSN and other public-facing bodies but also meet the needs of the local health workforce (in partnership with Health Education South West) while turning out a vast volume of health-related innovation and research. The applied end of this research activity is illustrated by Case Studies 4 and 5, on the WHO Collaborating Centre on Healthy Urban Environments and West of England Genomic Medicine Centre respectively, and through Case Study 6 which gives some selected examples of research with impact. Finally, Case Study 7 looks at the role of UWE Bristol as a provider of continuous professional development in the region.

CASE STUDY 1: Bristol Health Partners

What?

A strategic partnership set up to improve health and wellbeing in the Bristol City Region including South Gloucestershire and North Somerset

Who?

University of Bristol, UWE Bristol, three NHS Trusts, three Clinical Commissioning Groups, and Bristol City Council

Details

Working with others in the city and city region, Bristol Health Partners (BHP) supports efforts to improve the health of those who live in and around Bristol and to help improve the delivery of the services on which they rely, acting as a positive mechanism for change in the Bristol health and care community and city region. Its mission is to generate significant health gains and improvements in service delivery by integrating, promoting and developing local strengths in health services, research, innovation and education.

As a membership organisation, BHP can serve the needs of its partners and the local population in a way that a more distant funding body with its own agenda could not. The partnership includes commissioning and public health, which is rare among England's health partnerships, giving a broader interpretation of health and its determinants. This means BHP not only focuses on illness but on addressing lifelong health and how to prevent people becoming ill in the first place.

Underpinning the partnership's work are three objectives. These are to achieve improvements in 1) patient care and public health outcomes; 2) equity of access, provision and outcome; and 3) the translation of research into health practice. BHP is also working towards a joint strategy for the integration of health and care in Bristol and is seeking to develop coherent responses as a community to national initiatives. With Bristol City Council becoming a full member of the partnership in 2015 – the first local authority in the country to make such a move – BHP now has the platform to join up local health policy and planning in a uniquely integrated way.

The most distinctive feature of the BHP model are its Health Integration Teams. These are interdisciplinary groups of health professionals, academics from Bristol's universities and beyond, patients and the public that focus on a specific health challenge or condition. Each HIT is required to evaluate, involve patients and the public and adopt a 'whole system' approach.

Examples include:

- **The Improving Care in Self-Harm HIT** which is working to reduce the number of suicides and self-harm episodes in the Bristol City Region. Achievements include the expansion of the Psychiatric Liaison Team at University Hospitals Bristol NHS Foundation Trust to ensure that more patients who have self-harmed receive psychiatric assessment, and the Bristol Self-Harm Surveillance Register providing crucial information for the city's emergency departments.
- **The Bones and Joints HIT** covering osteoarthritis, osteoporosis and inflammatory arthritis. Among other advances in each of these disease areas, the HIT has increased the proportion of older patients receiving cemented hip replacements from 40% to 92% across Bristol. This has resulted in better patient outcomes and annual savings of £170,000.
- **The Dementia HIT** aimed at achieving the best quality of life for patients and their families through public and patient involvement and research. Dementia diagnosis rates have increased in Bristol from 50% in 2012/13 to more than 60% in 2014/15.

CASE STUDY 1: Continued

To illustrate the wide-ranging scope of the model, HITs have also been established in integrated pain management; child injury; respiratory infections; immunisation; integration to avoid hospital admissions; Parkinson's and other movement disorders; retinal outreach, integration and research; psychological therapies in primary care; equality in early years health and wellbeing; improving perinatal mental health;

promoting healthy life expectancy; supporting inclusive neighbourhood environments; chronic kidney disease; sexual health improvement for population and patients; and addictions. BHP is currently working with the NIHR Collaborations for Leadership in Applied Health Research and Care WEST (CLAHRC West) to describe and evaluate the HIT model.



Alongside advances in osteoarthritis, osteoporosis and inflammatory arthritis research, the Bones and Joints Health Integration Team has increased the proportion of older patients receiving cemented hip replacements from 40% to 92% across Bristol. Image © Bristol Health Partners

CASE STUDY 2: West of England Academic Health Science Network

What?

One of 15 regional Academic Health Science Networks funded by the NHS

Who?

Nine person executive based in Bristol City Centre and a board, chaired by the Vice-Chancellor of UWE Bristol, comprising academics, health practitioners, NHS bodies and members of the public

Details

The West of England Academic Health Science Network (WEAHSN) was established in 2013, along with its counterparts in 14 other regions, to achieve measurable gains in health and wellbeing and improve patient care. While many of the network's projects carry national significance, WEAHSN is focused on the West of England including Bristol and surrounding areas.

Its activities are grouped under seven themes:

- 1) Bringing innovation into practice
- 2) Enhancing patient safety
- 3) Involving patients and the public
- 4) Creating a more joined-up health service
- 5) Taking a more evidence-informed approach to healthcare improvement
- 6) Skills and knowledge development – West of England Academy
- 7) Improving patient outcomes through genomics (see Case study 5: West of England Genomic Medicine Centre)

Activities under each theme range from project work and feasibility studies through to networking events and training. The network is steered by – and seeks to engage – universities and research institutes, health and social care providers, businesses, patients and members of the public.

Operationally, WEAHSN has three units covering the activities above. There is the Quality Improvement Team – which focuses on improving patients' experience of healthcare – and the Patient Safety Team – which concentrates on reducing variation in clinical practice (i.e. avoidable mistakes) across the region. The third unit is the Enterprise Team which engages with businesses in the South West to bring innovation into practice.

To date, the Enterprise Team has provided advanced stage assistance to 63 companies wanting to work with the Bristol City Region healthcare community, while supporting 16 businesses, 30+ health and social care providers and four universities and research bodies in 14 live collaborative projects in the West of England. In total, it has helped to generate more than £12 million for the local economy.

The Enterprise Team was also the first to map out the health and life sciences business sector in the West of England. In doing so it has created a regional register of 435 medical technology, biotechnology and pharmaceutical companies which is being used to target new ideas in the way healthcare is provided.

WEAHSN has supported ten joint projects linking the healthcare industry and academia, which have generated over £6 million in externally funded grants. These have included the Universities of Bath, Bristol, Cardiff, UWE Bristol and Swansea.

Examples include:

- supporting clinical trials for the Plessey Impulse cardiac monitor at the Clinical Trials Evaluation Unit at the University of Bristol.
- supporting the Innovation 4 Growth fund for small businesses run from UWE Bristol.

CASE STUDY 3: Bristol Robotics Laboratory and University Enterprise Zone

What?

Internationally-recognised robotics laboratory and associated University Enterprise Zone

Who?

UWE Bristol and the University of Bristol



Assisted Living Lab in the Bristol Robotics Laboratory, a collaborative partnership between UWE Bristol and the University of Bristol which is the most comprehensive academic centre for multidisciplinary robotics research in the UK.

Image © Bristol Robotics Laboratory

Details

Bristol Robotics Laboratory (BRL), a collaborative partnership between UWE Bristol and the University of Bristol, is the most comprehensive academic centre for multidisciplinary robotics research in the UK. Based at UWE's Frenchay Campus in South Gloucestershire, it is home to more than 150 academics, researchers and industry practitioners with expertise ranging from human-robot interaction to drones and driverless cars.

Underpinned by the fundamental principles of academic excellence, cutting-edge education and training, and industrial engagement, BRL also offers a full range of taught courses at undergraduate and postgraduate levels. It is a UK Centre for Doctoral Training in Robotics and Autonomous Systems, which uses industrial engagement to ground research and training on real world challenges.

In the context of the health ecosystem, BRL's residents are developing a host of assisted living technologies and medical and rehabilitation robotics. Examples include:

- The CHIRON project developing a connected system of modular robotic components which can be adapted to different assistive tasks.
- The Manipulation of Objects for the Extraction of Text (MOET) system which can detect and identify text on rigid objects.
- MOBISERV – an integrated intelligent home environment that provides health, nutrition and mobility services to older adults.
- The Self-help for Anxiety Management (SAM) mobile app enabling users to monitor their anxiety levels.
- A robotic exoskeleton for restoring stroke victims' hand motor function capabilities.
- Technologies that assist medical surgery through precise sensing and movement capabilities.

Situated within BRL is the Centre for Innovative Medical Technology. A collaboration with specialists from the Bristol health community, it allows clinicians to work and innovate within the laboratory while giving scientists and roboticists an understanding of what clinicians need in their environment to provide safer, better care for patients. BRL also houses an indoor assisted living facility (instrumented bungalow), which enables robotics researchers, people with assistive needs and those supporting them, to work together to devise and test new robotic solutions in a realistic home environment.

In addition, BRL is involved in the application of robotics for commercial and industrial use. Its Technology Business Incubator provides physical space and facilities for early stage start-ups along with business support including mentoring, technical guidance and access to industry specialists and investors. Companies that have grown out of the BRL incubator include:

- Folium Optics, a company developing plastic display technologies. Its innovations include My Health Tags – a prototype product to help improve medicine adherence – and Smart Inhalers – which show the user how many doses are left and give instructions on correct usage.
- Open Bionics, an award-winning start-up developing low cost bionic hands for amputees, researchers and hobbyists.

BRL's employer engagement will be further enhanced with the launch of the West of England University Enterprise Zone (UEZ) in August

2016. Led by UWE Bristol, the UEZ will provide additional incubation space for businesses specialising in robotics and autonomous systems, bioscience, health science and other related sectors. It will bring together industry, academic expertise and networks from Bristol's two universities and the wider city region while offering access to advanced technical facilities and support. Other benefits will include undergraduate and postgraduate placements, projects and graduate recruitment opportunities for businesses.

CASE STUDY 4: WHO Collaborating Centre for Healthy Urban Environments

What?

One of only two World Health Organization Collaborating Centres set up to promote healthy and sustainable urban settlements through research, training, consultancy and publications. The centre is creating a shared knowledge base while promoting and supporting partnerships between public health and built environment professionals in the South West region and nationally. At the core of its research

and knowledge transfer strategy is the mainstreaming of health within planning decisions and strategies as well as more generally the integration of public health evidence into local and supra-local strategies.

Who?

UWE Bristol

Details

The WHO Collaborating Centre (WHO CC) is linked to a network of 90 urban settlements in the healthy city network across Europe. Situated in the largest higher education planning department in the UK, at UWE Bristol, the centre has established itself nationally by promoting better understanding of the interconnected nature of health and planning – working with national, regional and local interests from both traditions.

Although much of this work is globally relevant, the centre has undertaken numerous projects with a specific focus on Bristol. One study examined the “walkability of Bristol” and how this related to the level of physical activity of residents and their overall health and wellbeing. The WHO CC also supported the development of the ‘Bristol Protocol’ – an agreement between public health authorities (then NHS Bristol) and Bristol City Council integrating a rapid health impact assessment into selected planning applications and pre-application processes. This involved carrying out an audit of applications, and surveyed the city council’s planners to assess how far public health evidence was able to influence planning decisions.

The WHO CC works with South Gloucestershire Council as well. In the past, it carried out an audit of the mainstreaming of health into planning decisions and policies. With the transfer of public health responsibilities to local authorities in 2013, the centre was commissioned by South Gloucestershire Council to develop a series of seminars examining how current local health challenges (such as obesity and ageing) can be tackled through cross-sector approaches and how public health evidence can help shape West of England spatial and transport strategies and the development of healthy neighbourhoods and communities.

Additionally, the WHO CC collaborates with the local private sector. For instance, a new pilot project funded by the Wellcome Trust to factor in health outcomes into urban development is the result of a collaboration between the WHO CC and local consultancy DB+A and University of Bath. The aim is to deepen the centre’s relationship with the regional private sector in future.

CASE STUDY 5: West of England Genomic Medicine Centre

What?

New NHS Genomic Medicine Centre which is part of the 100,000 Genomes Project aimed at transforming diagnosis and treatment for patients with cancer and rare diseases

Who?

A consortium partnership between the University of Bristol and UWE Bristol, NHS health providers in Bath, Bristol, Cheltenham and Gloucester, the West of England Academic Health Science Network, commissioners and patient organisations

Details

Launched by the government in 2012, the 100,000 Genomes Project is currently the largest initiative of its kind with the intention to sequence 100,000 genomes – complete sets of individuals' genes – from around 70,000 people nationally. The West of England Genomic Medicine Centre will work with patients who have a rare disease, plus their families, and patients with cancer in the South West region.

The aim of the project is to create a new genomic medicine service for the NHS – transforming the way people are cared for. Patients may be offered a diagnosis where they would not have been before. In time, this should lead to new and more effective treatments. Combining genomic sequence data with medical records is considered to be a groundbreaking resource. Researchers will study how best to use genomics in healthcare and how best to interpret the data to help patients. The Genomic Medicine Centre will also assist the development of the medical skills base in the region.

The consortium partners worked closely together at board level to develop the bid for the centre and this enabled them to present a successful case to NHS England. The lead delivery partner is the University of Bristol and responsibility for the centre's internal communication to primary care stakeholders, as well as its Patient and Public Involvement, will fall to the West of England Academic Health Science Network (Case Study 2). Off the back of the project, the consortium partners have bid to run a new MSc Genomics degree offering students access to cutting edge methods informed by the latest research. If successful, provision will commence in late spring/early summer 2016.

CASE STUDY 6: Research with impact

What?

Examples of research that is advancing our understanding of health and wellbeing

Who?

UWE Bristol and University of Bristol



Dr Elizabeth Anderson, Senior Lecturer – Haematology is working on a research project to test the efficacy of chemotherapy drugs for leukaemia at the Centre for Research in Biosciences (CRIB) at UWE Bristol. Image © UWE Bristol

Details

The Centre for Research in Biosciences (CRIB) at UWE Bristol brings together leading academics in the fields of biomedicine, biosensing technology, agri-food, plant and environmental science, to address a range of fundamental, applied and translational aspects of research. Much of this work is health and wellbeing related. Projects include:

- Novel technologies for cancer screening. CRIB has developed rapid screening tests for prediction of patient responses to chemotherapy. It has also undertaken research on biomarkers for prostate and breast cancer.
- Delaying the progression of Alzheimer’s disease. The centre is working towards early interventions to slow down or prevent progression of Alzheimer’s including a supplement that would delay the condition’s development.
- “Sniffing out disease” to speed up diagnosis. Inspired by stories of dogs sensing cancer in their owners, CRIB has developed an ‘electronic nose’ that can sniff out diseases ranging from the superbug clostridium difficile to bladder and prostate cancer.

The Research for Health Challenge, initiated by the Elizabeth Blackwell Institute at the University of Bristol, brings together health practitioners and UoB researchers to develop innovative thinking around clinical problems. Selected challenges in 2015 included:

- Develop a method to measure kidney transplant perfusion in real time.
- Predicting patient responses to immunosuppressive treatment in autoimmune thrombocytopenia (ITP).
- Is there any direct correlation between anxiety disorders in young people and time spent using screen technology?

Public Health and Wellbeing Research Group at UWE Bristol focuses on community health, wellness and inequalities. It aspires to enable ethical and reflexive contributions to public health policy and practice. Examples of research include:

- Bristol Ageing Better focusing on community involvement in reducing loneliness and social isolation in older people.
- Bristol Girls Dance Project aimed at increasing physical activity in young girls.
- Bristol Golden Key Evaluation concerned with reducing loneliness and social isolation in disadvantaged groups including ex-offenders and armed forces personnel.

The TRACK Awards (Translational Acceleration and Knowledge Transfer Awards) at the University of Bristol support health-related research projects which have translational/commercial potential but need to undertake an additional, specific piece of work in order to secure further funding. Successful examples include:

- The development of a novel detector system to monitor the X-ray therapy beam shape and intensity in cancer treatment.
- A study providing the first evidence that there is a difference in back pain between women with and without vertebral fractures. It forms a basis for understanding why only a fraction of women with vertebral fractures comes to clinical attention.

The Centre for Health and Clinical Research at UWE Bristol undertakes research in collaboration with the public, clinicians and academics in the fields of long term conditions, emergency and critical care, children and young people, patient and public involvement, ethics and evaluation. Projects include:

- Improving Outcomes from Out of Hospital Cardiac Arrest (OHCA). The centre is looking at how to increase survival and the quality of that survival following OHCA which effects 60,000 people in the UK each year.
- The Healing Foundation Children's Burns Research Centre. Researchers at UWE Bristol are working with universities of Bristol, Cardiff and Bath on the prevention, care and rehabilitation from burns and scalds in children and young people.
- 'Baby Buddy' App. This is a free mobile phone app for parents with personalised content approved by doctors and midwives that spans from pregnancy through to the first six months after birth.

CASE STUDY 7: Continuous professional development

What?

University provided continuous professional development (CPD) courses

Who?

UWE Bristol

Details

UWE Bristol provides a range of CPD courses pertinent to health and wellbeing. The modular nature of many of these courses allows individuals to work towards a named award including BSc and MSc, if they so choose. Specifically in health, the university offers CPD in diagnostic imaging, radiotherapy and oncology, occupational therapy, paramedic science, mental health, physiotherapy and sports rehabilitation, music therapy and nursing and midwifery. Many of the modules are endorsed and validated by the relevant professional body and some courses, such as brachytherapy and end of life care, are jointly delivered with NHS trusts and voluntary sector providers.

UWE's courses are designed and delivered by a range of healthcare professionals, and therefore appeal to multi-professional audiences. The university is currently commissioned by Health Education South West to provide accredited courses across the South West region with contracts in community and primary care workforce development, advanced practice, acute and urgent care, return to practice and non-medical prescribing.

UWE is responsive to workforce needs and evolving patient pathways. For example, it is in the process of setting up a new Physician Associate course which will support both the primary and secondary care workforce in the region. UWE also offers modules in public and environmental health and courses in environment and sustainability. The latter are run by the Air Quality Management Resource Centre which has 60 years' experience in air quality, pollution and planning. In addition, the university provides professional short courses and study days for a range of laboratory disciplines including environmental, forensic and biomedical science.

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