Institution: University of Sunderland

Unit of Assessment: UoA3 Allied Health Professions, Dentistry, Nursing and Pharmacy

a. Context

The University of Sunderland has a strong tradition in Health Sciences Research. Current research within this unit covers a range of different projects and disciplines, from molecular biology and microbiology of disease, though drug discovery and formulation, to healthcare and well-being research, offering potential benefits across varied user groups and audiences, such as patients, health professionals, industry, and the general public, through informed strategy and policy development, improved decision making and healthcare, decreased risk of harm, and knowledge leading to new treatment options. To this end, we address the impact of our work at different points along the pathway to knowledge exchange and delivery of impact. This includes engaging with patients, clinicians and industrial partners in the early stages of development of novel and improved therapies, engaging with healthcare and other organisations to develop and evaluate novel approaches to healthcare delivery and health improvement, engaging with staff to identify and develop novel approaches to dissemination of research findings, and, engaging with patients and the public to discuss how research impacts upon them and to identify what research is feasible and acceptable from their perspective. All of these interactions are, of course, two-way, not only aiming to improve the translation of our research findings, but also ensuring that our research is needs-led and has meaningful impact.

b. Approach to impact

Our approach to impact is informed by elements of the 'payback' model, identified by Banzi *et al.,* 2011[1], and by affiliation with the Pragmatic Impact Group, coordinated and driven from Brunel University, with a particular focus on knowledge advancement, informed decision-making, enhanced capacity to deliver quality healthcare and health improvements, delivery of new public health benefits to patients and the public, and socio-economic benefits. Knowledge exchange is fundamental to the delivery of impact and we work with a range of partners to identify stakeholders whom will be affected, what form the impact may take, how the effects can be measured and evaluated, and the timescale over which impact can be expected. Through these partnerships we aim to ensure that the key stakeholders are involved in all stages of decision-making in our research to help us deliver, measure and evaluate the impact of our research. Examples include:

Partnerships with Industry: We have a strong track record in industrial research partnerships, working closely with our collaborators to align research projects with national and international industrial priorities, through joint development of technologies and products that are fit for purpose and solve relevant problems. Collaborating companies involved in recent and current research projects include regional SMEs, such as SCM Pharma, Biosignatures and Molplex, and national and international partners, such as UCB Biosciences GmbH, bioMérieux and Servier. Through these close links, impact is focused directly upon the core business of the industrial partners and, through improved delivery mechanisms, to patients. KTP projects are another means of knowledge transfer and implementation of research results in industry. For example, a KTP project with Jobsons Farm Health in Cumbria aims to improve the stability and versatility of products for animal nutrition, and to reduce healthcare risks to manufacturing staff at the industrial site. The research has already had a significant impact through the reduction of health risks to staff by the KTP associate implementing and embedding new health and safety procedures into manufacturing processes.

Two impact case studies provide more detailed examples of impact through translation of knowledge into industrial products: **Improving clinical outcomes in the treatment of the 'superbug' bacterial pathogen – *Pseudomonas aeruginosa*** and **Commercialisation of analytical technologies: rapid and specific quantification of airborne actives in the manufacturing environment.**

[1] Banzi, R, Moja, L, Pistotti, V, Facchini, A, Liberati, A. *Health Research Policy and Systems*, 2011, **9**:26.

Partnerships with external organisations that provide or commission health and social care: We work with a number of charities and health-related organisations, not only to carry out research that is needs led, but also to ensure that the findings are disseminated to end users as appropriate. For example, recent findings from work commissioned by Age UK on older drinkers' experiences has been used to develop an Age UK guidance document for commissioners of older peoples' services, as well as those that support problematic drinkers. We have worked with Servier to carry out research into how patients make decisions about taking anti-depressant medication to help improve advice and ensure that more people, who are prescribed anti-depressants and want to take them, achieve a therapeutic dose.

We are partners in the Academic Health Sciences Network for the North East and Cumbria and were integral to the development and launch of the HIEC North East (HIECNE) which is a formal partnership between industry, NHS organisations and leading regional higher education institutions and aims to promote the adoption and dissemination of innovative ideas and research in healthcare. **Crosland** was a member of the Board of HIECNE and was the author of the knowledge exchange element of the original bid to the Department of Health in 2010. Other examples include the part-time secondment of a member of staff to Newcastle City Council, deputising for the Acting Director of Public Health, and the collaboration with Sunderland City Council on the development of their Health and Well-being strategy for the city.

Partnerships with Practitioners and staff: For six years the University has hosted the Building Public Health Futures Group, which is a workstream of the North East School for Public Health based within Public Health England. With responsibility for development of public health capacity across the North East, a team of three staff based at the University, led by **Crosland**, work with NHS colleagues to identify needs and harness resources to address gaps in public health capacity. Research carried out at the University informs this process, as well as forming the basis for the development of evaluation skills amongst the public health workforce. Through Building Public Health Futures, we have responsibility for the implementation of the 'Making Every Contact Count' initiative, which seeks to work with healthcare organisations and local authorities to implement evidence-based public health interventions and spread best practice, thus ensuring the best research leads to impact. An example of impact resulting from our research through partnership with health practitioners is provided by the impact case study **Expanding the donor pool for kidney transplantation**.

Partnerships with end users of research: Research initiated and guided by **Anderson** focuses on understanding the underlying cellular pathobiochemistry in cystinosis patients and improving the existing treatment. This research is financially supported by charitable funding, raised by the essential stakeholders: the patients, their carers and supporters. A key element of this project involved understanding the problems encountered by patients and their clinicians, and their primary objectives for better treatment, all gained through discussion and input from these end-users; thus, in a bedside-to-bench approach, the research priorities for these projects are directly informed by those who will benefit from the research. Although the development of this new treatment is driven by patients suffering from a rare disease, its relevance to the treatment of Huntingdon's disease and non-alcoholic steatohepatitis has not gone unnoticed and it thus has significant potential to impact upon the treatment of a large patient population worldwide. A new member of staff, **Nazar**, is working on improving the administration of insulin in the treatment of diabetes in collaboration with a consultant in Sunderland Royal Hospital and with a local patient group; the impact of this innovative research is eagerly awaited.

c. Strategy and plans

The identification of distinct research themes within Health Sciences Research, and the formation of coherent groups around and across the themes, focuses and effectively supports research, such that a greater potential for impact, its capture and evaluation can result. All of our researchers collaborate with others within their field and all are encouraged to engage with organisations, practitioners/staff and end users of their research results, with a view to using stakeholder input to ensure their research achieves relevant and beneficial impact. Several long-term collaborations with hospitals, industry and public health bodies have enabled early stakeholder engagement in

our research projects and have ensured that the findings have been implemented and translated into impact, directly upon health and indirectly through practice, products, and informed decision making.

As our Health Sciences research has evolved, we have reviewed our strategy to facilitate the routes available for the translation of research results and findings into impact through greater engagement with professionals in practice. Several new academic appointments were made jointly with four regional healthcare trusts to build upon, and consolidate, our relationships with local and regional healthcare partners through contracts that combine professional practice with teaching and research. **Wilkes**, an academic, Director of NYREN the Northern and Yorkshire Primary Care Research Network, and practising GP, leads the link with the Clinical Commissioning Groups and primary care. Through Building Public Health Futures, we have strong links with national organisations, such as the UKPHR, with whom we have worked on the development of a public health practitioner registration scheme. We also work with the 12 Directors of Public Health to help them develop their senior practitioners as they move towards registration.

Our development of impact with industry continues to evolve dynamically, retaining traditional models of collaboration that continue to produce results with a strong potential for future impact, such as fully- or part-funded PhD studentships, while developing and testing new models of collaboration that are fit for purpose in a changing economic landscape. An example is provided by the collaboration of **Dodou** with UCB Biosciences, which has evolved from a traditional collaborative model involving a funded PhD studentship into a broader collaboration involving other international pharmaceutical players and has resulted in a dedicated Transdermal Laboratory based at the University, in collaboration with several additional staff.

Health Science researchers are encouraged to identify impact potential for new and future projects at the conception and design stage, with SMART objectives linked to measuring and evaluating impacts, informed by Banzi *et al*., 2011, and the work of the Pragmatic Impact Group.

d. Relationship to case studies

Recent successes from Health Sciences research are based on technology developed in this Unit and are expanded in the impact case studies. In all examples, knowledge exchange and engagement with external stakeholders has been central to the successful research outcomes, resulting in impact in the form of health benefits for patients, informed decision making, and economic and commercial benefits.

The first case outlines how a problem for healthcare decision makers, due to the bacterial pathogen, *Pseudomonas aeruginosa*, can be effectively solved through a multi-disciplinary multi-centre collaboration with clinical scientists, industry and academia, giving rise to a new product that directly informs clinical decisions and improves clinical outcomes in vulnerable groups of patients. The results also bring economic impact, via development of new knowledge and technologies and translation into new products, and highly skilled professionals.

The second case illustrates how close collaboration with healthcare professionals, in this case transplant surgeons, resulted in a positive impact on the donor organ pool and healthcare benefits for patients who would not have been likely to receive a donor organ otherwise. These results also have the potential to inform UK and international procedures and policy (e.g. www.nhsbt.nhs.uk/to2020/), which have identified serious concerns that the potential donor pool will continue to diminish. Its aims to improve the donor pool and the success of transplantations are supported by the impacts outlined here.

The third case highlights translation of initial academic research results into commercial impact with the application of nanotechnology to health: from laboratory, through the creation and out-licensing of patented technology, to a spin-out company with new jobs, commercial investment, and new specialist roles. As this research continues to develop, future impact bringing health benefits to employees in the manufacturing industry is likely.