Institution: The Open University

Unit of Assessment: A3 Allied Health Professions, Dentistry, Nursing and Pharmacy

a. Context The Open University's (OU) health research is framed in the wider context of Health and Well-being, as a multidisciplinary grouping operating across the Faculties of Science and Health and Social Care. Research into health is carried out at different levels, from the patient to the cellular and molecular level, thereby exploiting the synergies arising from translational approaches to health challenges. Our impact agenda is significantly influenced by The Open University's mission to promote educational opportunity and social justice (e.g. free educational resources in The OpenScience Laboratory and work on mental health in developing countries), and achieves impact in our three strategic areas of research expertise (neural dysfunction, mental health and long-term conditions; cardiovascular disorders; diagnostics and therapeutics). Our impact portfolio reaches a range of different stakeholders and audiences at both national and international levels, illustrated by the presented case studies (CS1-3).

1. Impact on practitioners and professional services, particularly in relation to mental health (CS1, 2), with the aim of utilising research methods in analysing and improving performance and treatment of patients. For example, in addition to the case studies, other research has focused on patient management and rehabilitation following stroke. We are a partner in the Oxford Academic Health Science Network and have close collaboration with a number of NHS Trusts. At the University of Cambridge Institute of Public Health, OU practitioners work as a partner in the IMPROVE study examining the GP experiences of patients from south Asian backgrounds.

2. Economic impact, in particular related to the development of diagnostic methods and industrial applications for diagnostics, neuroscience and vascular biology (CS3). For example, analytic methods to monitor the volatile organic compounds emanating from breath, body fluids and tissues have been developed in close collaboration with clinicians to ensure clinical relevance and greater societal impact as a means for rapid and non-invasive diagnosis, or for monitoring diseases such as diabetes, bladder cancer and tuberculosis.

3. Impact on society, culture and creativity, through our work with partners at NGOs and charities (CS1, 2), and also large-scale projects in public engagement and public participation in research. The latter initiatives include the University's contributions on iTunes U such as 'What do genes do?', 'Gate Control Theory' and 'Addiction and Neural Ageing', and BBC-landmark co-productions such as 'Pain, Pus and Poison' and 'Keeping Britain Alive: The NHS in a Day'.

b. Approach to impact

Our approach is underpinned by excellent research, often generated and applied through partnership and collaboration with users, discussing the research focus to jointly addressing challenges. Our work reshapes interactions with practitioners, and promotes public engagement. The external stakeholder groups we consider are statutory agencies, practitioners, industry, charitable foundations, NGOs, and the public.

The Science Faculty has created an impact team led by the Associate Dean (Enterprise and Engagement) with the professional skills to ensure that our approach to impact is structured around an analysis of stakeholder groups and an audit of the impact status and potential for each group. Interactions with industry are facilitated by enterprise champions, whereas interactions with practitioners such as the NHS are supported by a research and development manager in the Faculty of Health and Social Care with a cross-faculty multidisciplinary focus on research into health.

Engagement with users: Practitioners. A key factor in the impact of our work has been the development of close relationships with collaborative partners across the whole spectrum of our research activity. For example, our research on Diabetes and Depression (CS2) has led to our involvement as leaders of the International Epidemiology Working Group of the Dialogue on Diabetes and Depression. Our autism research has led to the design of optimal ways to increase autism awareness in rural health extension workers in sub-Saharan Africa whereas our research on the neurobiological basis of ADHD has led to the organisation of meetings in the House of Lords, including one entitled 'Attention Deficit Hyperactivity Disorder: The Efficacy of Ritalin'.

Interactions with business: OU specialists have formed links with industry, e.g. Stewart with Regen Therapeutics, Turner with Kore and Ionikon, Bootman with Stem Cell Science and the case study comprising Male, Romero and Philips (CS3), that are critical in informing our major project developments and supporting end-user focused research. Our commitment to undertake R&D has generated both new knowledge and tangible financial outcomes for our UK and international industrial partners.

Interaction with health organisations and NGOs. We place a high priority on collaborating with partners outside academia who help us to achieve our aims in health education. In a multi-million pound programme working with WHO, UNICEF and African Medical and Research Foundation (AMREF) and the Ethiopian Federal Ministries of Health and Education, The OU developed the Health Education And Training (**HEAT**) programme, providing upgrading training of frontline healthcare workers in rural Ethiopia. It is anticipated that by 2016 it will be taken by over 20,000 healthcare workers, thus transforming access to healthcare in the region (CS1). Dr B Davey, HEAT's lead and Co-Investigator on the mental health Ethiopian research project, was awarded an MBE in 2012 for services to health and higher education. In addition, we have played a major role in medical education training in Ethiopia supported by **Ethiopia aid** and the Ethiopian government http://www.open.ac.uk/platform/news-and-features/ou-develops-medical-distance-learning-ethiopia.

Public engagement and community groups. The OU aims for all its research to make a distinct and material contribution to the economy, and to society and cultural life because knowledge exchange is fundamental to our mission to be 'open to people, places, ideas and methods'. The reach and large scale of our web presence on YouTube, Facebook, iTunes U and OpenLearn engages millions of people with free access to new knowledge and opportunities to tweet and blog with OU researchers. Our BBC / OU TV and radio programmes attract more than 150 million viewers and listeners. Programmes related to health form an important component of this output, with major input from the staff in our unit. One example in health education is the OpenLearn material about the OU/BBC2 production, '*Keeping Britain Alive* (The golden hour): The NHS in a Day (http://www.open.edu/openlearn/whats-on/tv/ou-on-the-bbc-keeping-britain-alive-the-nhs-day). This documentary series chronicles the life of the NHS in a single day and captures the stories of the staff and patients at one specific moment in time. The BBC1 prime time programme, *Bang Goes the Theory*, also addresses health topics for which OU health staff were academic consultants (http://www.bbc.co.uk/programmes/b00lwxj1/episodes/guide#b01r6yqk). Our staff were involved in a recent BBC4-OU co-production explaining the history of medicines (http://www.bbc.co.uk/programmes/p01f51s5). In the local area, we are contributing to the RCUK-funded School–University Partnership Initiative (SUPI) project 'Engaging opportunities' (http://www.open.ac.uk/engaging-opportunities), where our researchers engage directly with Key Stage 3, 4 and 5 students from 12 schools that constitute the Denbigh Teaching School Alliance.

Institutional resources. Because of the geographical spread of its student body, the University has developed a particularly wide range of online databases accessible via the web and has developed its own usage guides, available to all staff and research students. The OU has made effective communication of research findings a priority. Hence, any peer-reviewed publications arising from research are registered on the OU's open access institutional repository – Open Research Online (ORO, http://oro.open.ac.uk). ORO is one of the largest repositories in the UK. The site receives an average of 40,000 visitors per month from more than 200 countries and territories, and has received more than 2.5 million visitors since 2006. It enables access to research outputs via common search engines, such as Google, by using the Open Archives Initiative Protocol for Metadata Harvesting.

Making practical science available to a wider audience is a major aim of The OU and is supported by the **OpenScience Laboratory** (OSL) co-funded by £1 million grant from the Wolfson Foundation http://www.open.ac.uk/researchprojects/open-science/. The virtual microscope, funded by JISC with a grant of £100,000 to Male, is housed within the OSL and it presents collections of histology and histopathology slides from many collaborating laboratories. It is available to University-level educators anywhere in the world (who work with us to develop shared assets) and to the general public.

c. Strategy and plans

The OU's research into health is embedded as part of its wider research strategy which acknowledges the need for a clear and strong strategic focus on impact. Our research strategy highlights our role in producing innovative applied science for the biotech and pharmaceutical industry, shaping the future of public engagement and participation with scientific and social care research, and engaging practitioners with robust research-based evidence. Our research communication strategy seeks to be recognised nationally and internationally among key stakeholders for innovative research of the highest quality and rigour. Maintaining and developing our relationships with research users, deepening their engagement, and evidencing the impact of our work will continue to be a key task for our research into health. This will be achieved through the following key goals.

1. Maintain and develop relationships with key user groups in policy, practice and industry, drawing on professional and research networks.
2. Develop and implement clear plans for public engagement and impact, identify synergies with colleagues in Education from across the University and extend the visibility and recognition of researchers who are undertaking public engagement and impact work.
3. Support research teams in developing impact by assisting in the identification and elaboration of impact objectives in research planning, supporting translation activities and gathering and monitoring impact metrics.
4. Strengthen our focus on impact from applied and translational health science research following the leadership of the Associate Dean for Enterprise and External Affairs, liaising both internally and externally.

This impact strategy will focus on bridging multidisciplinary research across three core themes:

- Neural dysfunction, mental health and long-term conditions
- Cardiovascular disease, vasculature and inflammation
- Diagnostics and therapeutics.

Over the assessment period The OU has retained its commitment to long-term capacity building around a core theme of biomedical and health research, and will continue to do so, with strategic appointments spanning the disciplines of Biomedical Science and Health and Social care. All new staff undergoes induction training which includes sessions on pathways to impact for research.

d. Relationship to case studies

There are three impact case studies, of which two involve practitioner-level impact and public engagement (**CS1, 2**) and one involves economic impact (**CS3**). **CS1** discusses the impact of Hoekstra's autism research, which encompasses impact on several levels, ranging from clinical practice to raising mental health and autism awareness in the UK, in the Netherlands and in Ethiopia. Her involvement in developing a rapid quantitative instrument of autistic traits has greatly aided diagnostic practice, particularly in The Netherlands, where it is the most widely used tool in clinical practice to aid autism spectrum diagnoses in adults. **CS2** is another example of how our research engages with the end users and it emphasises the extensive international collaborations of our research, its impact and the communication of research findings to a wider audience (by, for example, workshops and focus groups for service users with diabetes leading to the design of culturally appropriate tools for identifying knowledge deficits in diabetes self-care as well as screening tools for depression in people with diabetes). This work also informs practice by showing how stressful experiences lead to poorer diabetic control and poorer mental health, thereby underpinning the establishment of a new psychology service within the Diabetes Centre, Birmingham Heartlands Hospital. **CS3** describes how researchers in the Biomedical Research Network have developed novel technologies with economic impact in the production of engineered neural tissues that model the central nervous system, and in the development of a brain endothelial cell line to model the human blood–brain barrier for drug delivery studies. This involves the adoption of patented technologies by industrial partners, who have either invested in its further development and are automating the production process to generate neural tissue model kits, or adopted the technology for their own use following licence transfer and/or temporary industrial contracts.