**Institution: University of East Anglia**

**Unit of Assessment: 1 - Clinical Medicine**

## a. Context

This is the first return by the Norwich Medical School to a hospital-based research UOA, with 12 of the 16 academics being returned having joined UEA since 2010. Our research in clinical medicine is focused on gastroenterology, medical microbiology, musculoskeletal sciences and cardiovascular medicine. The Norwich Medical School is part of the Norwich Research Park which comprises six partners: UEA; three BBSRC-funded research institutes (Institute of Food Research, John Innes Centre, Genome Analysis Centre); the Sainsbury Laboratory, and the Norfolk and Norwich University Hospital Foundation Trust. This unique clustering of expertise gives the Norwich Medical School opportunities to develop impact beyond academia in each of our four research areas.

The main users of our research are the NHS, the Department of Health, other governmental organisations, commercial organisations and the general public. The main types of impact from our research arise from changes to clinical practice through our influence on national policy and guidelines, and from commercial exploitation of our research. Patient and economic benefits flow from the resulting changes in clinical practice.

## b. Approach to impact

Our approach to impact generation has four interlinked strands: (1) co-production and exploitation of research with users of our research; (2) involvement in policy and guideline development; (3) public engagement and use of the media; and (4) support and incentives for staff to generate impact. Our approach to ensuring impact from our research involves frequent face-to-face interactions with businesses, with civil society organisations and with senior policy-makers inside and outside government.

**Co-production and exploitation of research**: We interact with the users of our research at all stages of the research process from initial scoping, definition and design, through to refinement, completion and application. For example:

- Working with the Ministry of Defence, in response to a call for research, Fraser's research has produced changes in their practice to enhance injury/stress fracture prevention and improve vitamin D status of army personnel.
- Wain's work on antibiotic development has been exploited commercially through the biotechnology company *Discuva Ltd*, of which he is a founder and Scientific Director.
- *KRSS Ltd*, is a UK-based independent mass spectrometry service which has developed the Tandem MS assay based on research by Fraser.
- The Norwich Medical School is actively involved in the Patient and Public Involvement in Research (PPIRes) programme, a local initiative to enable and encourage volunteer members of the public to participate with researchers in delivering research studies. PPIRes is based with South Norfolk CCG, and contributes to the planning, conduct and dissemination of results for many of our research projects.

**Development of policy and guidelines**: We actively seek out, and respond to, opportunities to influence national and international policy and guidelines, working with a range of external bodies. Examples include:

- NICE: Fraser is the Royal College of Pathology representative on the NICE Technology Assessment Review Committees for technologies for the primary and secondary prevention of osteoporotic fractures (NICE Guidance TA160,161,204). Fraser's clinical trials of the treatment of osteoporosis and the measurement of vitamin D have informed the actions of these committees.
- Chief Medical Officer: Livermore contributed extensively to the chapter 5 on antibiotic resistance in the CMO's Annual Report for 2011 which set out priorities in the area for the next few years and is now informing the DH strategic plan on resistance (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/138331/CM

O_Annual_Report_Volume_2_2011.pdf).

- Government Advisory Committees: Livermore advises the Government's Antibiotic Resistance and Healthcare-Associated Infections Advisory Committee on new developments in resistance. This advice is based on his own research findings and those of others. To date specific advice has been:
  - That rapid diagnostics are key to improving antibiotic stewardship, allowing the earlier tailoring of a patient's treatment
  - That present targets on resistance and infection, predicated on MRSA and *Clostridium difficile*, both of which are declining problems, should be refocused more broadly
  - That we cannot be sure of containing resistance by better stewardship alone
  - That there is an urgent need to re-invigorate the discovery and development of new antibiotics.
- The American Heart Association: Potter's work influenced their 2013 Guidelines on the early management of blood pressure in patients with acute ischemic stroke.
- British Thoracic Society/Scottish Intercollegiate Guidelines Network: Wilson joined this group in March 2013 and is contributing to their Guideline development group on asthma, with the specific remit of developing guidelines for non-pharmacological intervention.
- Public Health England (PHE): Livermore has been appointed a member of PHE's Programme Board for health-care associated infection and antibiotic resistance for 2 years from September 2013.
- British Society of Rheumatology: the guideline working group on systemic vasculitis is chaired by Watts. Its guidelines on the management of ANCA vasculitis now recommend the use of rituximab for treatment of ANCA vasculitis and a treatment approach more based on clinical and serological phenotype. The guidelines draw on our research finding that there are distinct genetic and clinical phenotypes for ANCA vasculitis.
- Parliamentary Science and Technology Committee: Carding has provided evidence on probiotics and their commercial development.

**Public engagement and use of the media**: Regular Open Days provide opportunities to present our research activities to members of the public. For example, in 2012 our gastroenterology research was presented to the public via an illustrated lecture on capsule endoscopy.

Targeted use of the media means that our research and the associated messages for health behaviour reach mass audiences. Our researchers appear regularly on national and international television and radio. One recent example is our work on risk factors for intestinal cancer (Watson and Hart) which was featured in BBC News in November 2011. The broadcast concerned the preventive effects of aspirin against colorectal cancer and endorsed the use of aspirin as an anti-cancer agent in patients not subject to the gastrointestinal side effects of aspirin.

**c. Strategy and plans**

**Developing Norwich Medical School research together with partners on the Norwich Research Park**: At the heart of our impact strategy is the continuing development of our relationship with the Institutes of the Norwich Research Park, a relationship which has already ensured impact from translational research into gastrointestinal disease, nutrition (reported in our UOA 6 submission) and medical microbiology. A recent tipping point in the development of our impact strategy is the £26M investment by the Department of Business, Innovation and Skills into the Norwich Research Park announced in March 2011. This is being invested in infrastructure, and in particular a new Centrum Building will provide a focal point for all partners. The creation of a new £14M Enterprise Centre, funded by ERDF, UEA and BIS, as a one-stop-shop for business interactions across the Research Park will bring together existing business-facing activities and provide a suite of new initiatives around five major themes: encouraging innovation; stimulating enterprise; enhancing skills; promoting employment; and supporting business.

A major recent development, which will underpin our impact strategy for the next five years, has been the creation of the Norwich Research Park Translational Fund, which totals £1.7M and comprises funding from BBSRC, UEA, the Norwich Research Park Institutes together with Local and County Council support. This fund will support priority areas of translational science across the

Norwich Research Park. Key areas for support have been identified and include clinical translational science, and in particular microbiology and luminal gastroenterology.

**Recruitment of staff with potential for commercialisation of research results**: A key strand to our strategy for realising impact from our research has been to add 'potential for commercialisation' as a recruitment criterion. For example, we have recently recruited John Wain and Michael McArthur to Chairs in Microbiology. They have both founded, and lead, the commercial companies, *Discuva* and *Procarta* respectively. Both companies work on antibiotic development and have significant potential for future impact.

**Structures to support impact activity**: The Norwich Medical School has a Director of Enterprise & Engagement who acts as the first point of contact for both staff and students interested in developing the wider impact of their research, either through commercialisation or public engagement. Where research can be shown to have potential in terms of industrial relevance, there are significant Proof-of-Concept funds held at both Faculty and University levels: within the Faculty of Medicine and Health Sciences there is an annual budget of £30,000 to pump prime small-scale enterprise activities and further institutional funding is available via a proof of concept fund (£120,000pa) and a strategic fund (£450,000pa) distributed at the discretion of the University's Enterprise Executive.

The Faculty has an Associate Dean for Enterprise and Engagement and a dedicated Business Development Manager, a senior administrator who promotes commercial exploitation of our research such as our work on antibiotic development mentioned above.

From 2008-2012, UEA hosted the CUE-East Beacon for Public Engagement, one of only six such Community Engagement centres in the UK. CUE East provided a focus for public engagement activity via a dedicated support service for staff and students together with associated individual awards for excellence. UEA has now established a permanent Community University Engagement Office.

**Support and incentives for staff**: Relevant training is delivered through UEA's Centre for Staff Education and Development, enhanced where appropriate by the use of external experts for example from PraxisUnico. All staff are required to report annually on past, and planned, impact-related activities. The Deputy Head of School has a specific responsibility to work alongside individual researchers in identifying wider impact opportunities as they arise and to provide support, as appropriate, for both the research findings and the beneficiaries. Importantly, the University promotion criteria recognise and value academic enterprise and impact generating activities. Study leave can be granted for impact-generating activities.

**d. Relationship to case studies**

Two impact case studies have been submitted, based respectively on the work of Fraser and Potter. These case studies exemplify how the clinical and laboratory-based research in UOA 1 can make a major contributions to policy development, guideline implementation and involve public/private engagement in research performed at UEA.

The case study "*Accurate measurement of Vitamin D to develop guidelines for health*" illustrates how the development of new technologies, in this case a new clinical assay methodology, can have far reaching clinical and commercial impact, together with wider societal impact by enabling new clinical studies. Fraser's assay is now the methodology of choice for all clinical trials of Vitamin D and this is reflected in the large number of international multicentre trials for which he is undertaking the Vitamin D assays.

The case study "*Influencing guidelines on management of hypertension following acute stroke*" relates to management of hypertension and stroke with the scientific investigations influencing world-wide policy on hypertension and stroke management. It illustrates how our research strategy engages with important clinical issues to improve patient outcomes.