Institution: University of St Andrews

Unit of Assessment: Panel A1

a. Context

Research in the School of Medicine informs and benefits society through four avenues: **patients and the NHS,** through patient management, innovation and translation of evidence to practice; **opinion formers, politicians and policy makers** (nationally and internationally) including governments and international organisations such as WHO, **industry** including diagnostics, medical device, SME and large pharmaceutical companies; and **the wider public** through public engagement, popular science communication and school links. Our strategy maximises individual and population health gains by making the outcomes of our research widely available, and implementing them rapidly.

Molecular medicine researchers license patented technology to diagnostics and medical technology companies (6 patents granted). Our clinical trials methodology and diagnostic biomarkers research is presented to pharmaceutical and diagnostics regulators e.g., US Food and Drugs Administration) directly or through the Clinical Pathway for Tuberculosis Regimens (CPTR) (http://c-path.org/CPTR.cfm) (see Case study 1).

The Health and Behaviour group informs public policy nationally and internationally. Systematic review and primary research has influenced policy on glaucoma management at national level (SIGN guideline) and cancer patient anxiety management. Internationally, they have shaped policy on adolescent health, substance misuse, and violence reduction (World Health Organization), see Case Study 2.

b. Approach to impact

Our approach to impact begins with a focus on scientific excellence represented by world-class peer-reviewed publications and securing intellectual property. Growing rapidly from a small base, our efforts are focussed on areas where we can influence policy and practice significantly. Our senior researchers are internationally recognised and are frequently consulted to inform policy and to work with industry. Undergraduate medical students are closely integrated into this environment: it is noteworthy that two have contributed significantly to recent patent applications.

Success depends on investment and the University has provided £45m to build the new Medical School within the Science campus. A further £18m from Wellcome Trust and the University has created a translational, interdisciplinary environment to integrate Physics, Chemistry, Biology and Mathematics with medical research and clinical practice.

The School prioritises IPR developed from research and supports engagement with commercial entities and to progress promising ideas. The School achieves impact as the hub of a network comprising NHS, industry and policy makers, to provide expertise, advice, field testing, validation and discovery; all senior researchers have active international profiles and lead collaborative networks; new researchers are appointed to develop critical mass within a few selected areas; new "Research Clinics" review grant ideas, identify IP opportunities and review research outputs; medical undergraduates complete a research dissertation in third year. The University subscribes to Easy IP; an open, technology exchange platform (University Technology - www.university-technology.com/) and is a member of the Business Innovation Exchange "Business Tailor" (businesstailor.org.uk/) that targets regional and national enterprise bodies. Secondments, internships, short visits and other personnel exchanges with business and other organisations are encouraged. The University retains a consultant who has brokered deals with venture capitalists and angel funds, and has been involved in successful University spin-outs. We engage with industry and Enterprise bodies, for example, Scottish Enterprise, the Fife Economy Partnership and the Scottish Institute for Enterprise.

Wider influence is sought through interaction with parliamentarians in the UK and abroad (e.g., Scottish Government, APPPG Tuberculosis, US Milbank Memorial Fund, Violence Prevention Alliance, WHO) patient advocacy groups. We engage in a range of public engagement activities for school age children including health messages and research careers advice.

c. Strategy and plans

Support for translation nationally and internationally through leadership and providing benefit beyond our own institution and community are important elements of our future strategy; evidenced by oversight of a charity, Medical Research Scotland, that funds an SME/academic programme across Scotland; Medical Director of Innovation (Med Tech) of the new NHS Scotland Health Innovation Partnerships; Board membership of the industry-led Scottish Lifesciences Association facilitating NHS, academic and SME links; senior executive roles in Scottish Intercollegiate Guideline Network (SIGN) and Royal College of Pathologists; deputy chair of the Committee on Toxicity; pathology leadership of the MRC Scottish Clinical Pharmacology and Pathology Clinical Training Fellowship scheme. New staff are supported by mentors locally and in a joint scheme with Dundee that includes approach to developing impact. We encourage all staff/ & students to be involved in KE and officially recognise the contribution that impact in all forms brings thorough the promotions process and through the allocation of workload.

Impact and translation is being developed by, for example:

- Enhancing our links with the NHS locally (Fife, Lothian and Tayside as part of the East of Scotland node) and nationally.
- Senior management and advisory roles within Laboratory Medicine in two NHS Health Boards
- Participation in guideline, national and international policy groups including SIGN, Scottish Government Health Directorate, FDA, UNICEF and WHO
- Hosting and attending conferences to translate research into policy, e.g., http://medicine.st-andrews.ac.uk/documents/seminar-2013-06-14.pdf) and using local facilities to host opinion leaders to speak at policy fora
- Training the next generation of health service science staff (e.g., Wellcome Trust Advanced Course in Genomics and Clinical Bacteriology)
- Effective links with the University Knowledge Exchange (KE) group
- Collaboration with Scottish Enterprise and SMEs to translate new ideas into products and to validate pre-market tests and devices
- University support to achieve patent protection for new inventions and IP.
- Research groups have their own web space with news feeds, and related Twitter feeds to draw attention to new discoveries
- Engagement with diagnostics and biotech industry, and leadership in Scottish Lifesciences Association and NHS Health Innovation Partnerships

Building on our success in growing translational research in molecular medicine, we will appoint a number of clinician scientists. This will consolidate current areas of strength e.g., infection and genomics and open new clinical areas such as maternal and child health.

We will expand the Health and Behaviour component of our research portfolio whose principle goal is to engage international agencies, government and parliamentarians in policy development and linking it to our molecular medicine strand. We continue to engage WHO, UNICEF as well as national and regional governments. A considerable private donation has allowed the creation of a new group in global health implementation research that will establish a base in sub-Saharan Africa and provide a bridge for translational research (Health and Behaviour and Molecular Medicine). Developing this strand will be an important objective of the next REF cycle. We have appointed a Consultant in Knowledge Exchange to disseminate the findings our violence reduction research at home and abroad.

Plans for Outreach
We endeavour to disseminate research findings to the most appropriate constituencies as quickly as possible through a multiplicity of media, and where possible to support a new users specific

needs through expert engagement. The use of web and social media (including a dedicated School site) is used to promote our research findings.

The University supports the hosting of international conferences, for example the conference that marked the 30th anniversary of Health Behaviours in School-age Children (HBSC) in June 2013. A novel aspect of this conference was the involvement of young people from five countries and their engagement in knowledge exchange and determination of their own perspectives on future research agenda. This new approach to public engagement for this international study is one that we will build on for other projects.

d. Relationship to case studies

Our impact case studies demonstrate the approaches that we use to translate research into commercial opportunities, practical improvements in health-care and better-informed Public Policy, as well as demonstrating how the School supports these activities. Research Impact may take years to mature and it is inevitable that some of our cases are at a relatively early stage. The reach of each of these is significant as they are already transforming the landscape of their disciplines.

Case Study 1 This developing story is changing the face of early phase tuberculosis drug development. Its future value will be enhanced through the development of a mathematical model created in partnership with the School of Applied Mathematics. Through research collaborations with public private partnerships (PanACEA Consortium www.panacea-tb.net and (Global Alliance for TB Drug Development www.tballiance.org [GATB] and Clinical Pathway for TB Regimens www.c-path.org/cptr.cfm [CPTR]) this will be developed to create improved clinical trials methodologies that are cheaper and more rapid and approved by regulators such as the Food and Drugs Administration. The Standard Operating Procedure for this development is being made available through the IMI supported PreDiCT-TB consortium www.predict-tb.eu and the creation of a Standardised Laboratory Manual for Tuberculosis Clinical Trials that is being published under the aegis of GATB illustrating the benefit of linking with international public-private partnerships and Pharma.

Case study 2 Through collaboration with WHO and our engagement with the Global Violence Prevention Alliance we have influenced Scottish and UK government policy. Interaction with opinion formers is illustrated by the fact that the team was consulted by the UK government in the wake of the 2011 London Riots and the research is now contributing to the reshaping health and criminal justice policy in the UK. This is underpinned by our approach of hosting conferences where opinion formers and those exposed to the risk of violence meet and exchange experience and where policy can be developed.

Case study 3
The translation of a psychological approach, from conception, practice to a programme of staff training for managing distressed cancer patients demonstrates the value of our engagement with health service partners as this enhanced intervention has been developed within a case series in NHS specialist services, improved and tested. Our approach to outreach is illustrated by the one-day workshops run by Prof Humphris to explain the intervention manual at multiple sites in Scotland so that the health professionals attending (psychologists, counsellors and specialist cancer nurses) can implement the intervention in their own NHS services. International engagement and dissemination is illustrated by invitations to train in, for example Belgium and Canada in advance of local implementation. The work translating the AFTER into the public service domain has attracted strong interest resulting in frequent workshops to train specialist clinical staff within cancer services in the application of AFTER in Scotland, England and international cancer centres.