Institution: The University of Manchester

Unit of Assessment: 3

a. Context

One of the three central pillars of the University of Manchester's (UoM) research strategy, formalised in the University's strategic plan "*Manchester 2020*", is for our research to have an impact beyond academia which yields economic, social and cultural benefits.

Key types of impact: Our research has international and national impact on: (i) healthcare policy, (ii) population health, (iii) clinical practice, (iv) efficient use of resources, and (v) wealth generation via industrial links.

Key audiences: Our research is adopted by international and national: (i) policy makers, (ii) commissioners, (iii) provider organisations (especially NHS), (iv) professionals, (v) professional and statutory regulatory and representative bodies, (vi) commerce in the health field, (vii) Non-Governmental Organisations and health charities, and (viii) patients and the public.

Key beneficiaries: Our research impact benefits patients and the public. Our work is intended to improve health and wellbeing through improving the evidence base for (i) community and public health interventions, (ii) quality of patient care, (iii) supporting carers, (iv) cost effective use of resources, to reduce the burden of health and social care on the tax payer (or healthcare purchaser), and (v) supporting innovation and economic competitiveness for commercial partners in the health field.

The impact of our research is not solely confined to the impact case studies we have returned. This document provides additional examples to illustrate the breadth and significance of impact produced by the health schools in Manchester, which make up UoA3.

b. Approach to impact *(Names in bold are UoA3 returned staff, those in italics are UoM staff/ retired not in UoA3 return. Impact case studies are numbered ICS-01 to ICS-12: see table section d and case study titles.)*

Our research spans the translation pathway from discovery science to: proof of principle studies; systematic reviews and trials; and implementation of new evidence based policies, services, therapies and practice. Much of our activity focuses on bridging the second translational gap of getting evidence into practice. To support translation we concentrate our resources in four areas.

1. Providing the infrastructure to support impact: UoM and its partners have developed structures and processes to support impact. For example, the Manchester Academic Health Science Centre (MAHSC) supports our core partnership with NHS care providers across Greater Manchester (GM). Key to supporting impact within MAHSC is the "Population Health and Implementation Domain" which is led by the Chief Executive of Salford Royal Foundation Trust (SRFT) working closely with **Tickle,** the academic lead for the domain. UoM funds the Business Engagement Support Team (BEST), which links commercial organisations to relevant UoM expertise to support impact through research partnerships, knowledge transfer and commercialisation. UoM's innovation company UMI^3 supports the development of, and offers generous rewards for, commercialisation of intellectual property (IP). For example in 2012 UMI^3 supported the incorporation of StrataStem Ltd with *Mohamet* and **Ward** as directors, and BBSRC awarded a Follow-on-Fund to develop the technology to proof-of-concept. The company uses patented technology to produce neural cell types from pluripotent human cell lines, for the diagnosis and development of therapies for Alzheimer's disease. BEST also runs the Knowledge Transfer Partnership Initiative, which forms partnerships between UoM and business to create income, jobs, workforce skills, research opportunities and commercialisation of IP. We have successful Knowledge Transfer Partnership Projects e.g., **Tyson** with the Manchester Cardiac & Stroke Network, and **Yorke** with the Medicines Evaluation Unit. In future, the systematic capture and documentation of impacts arising from our research will be facilitated by a recently appointed dedicated research administrator in the Faculty of Medical and Human Sciences.

Patient and public involvement (PPI) in research informs our research objectives so that we address important issues for patients, ensures our methods of investigation are acceptable, and shapes

dissemination strategies so that our research is accessible to patients, public and the media. Our approach to PPI is implemented through schemes such as the NIHR INVOLVE advisory programme. We also engage directly with the wider community through programmes like the Manchester Beacon Network. Established infrastructure to support PPI includes: the MAHSC "Citizen Scientist" programme enables members of the public to find and participate in personally relevant research studies; the Primary Care Research in Manchester Engagement Resource, part of the Primary Care Centre in the Institute of Population Health; and the NIHR GM Collaboration for Leadership in Applied Health Research and Care (CLAHRC) for which **Luker** leads Health Care Research. The NIHR GM Primary Care Patient Safety Translational Research Centre, for which **Ashcroft** leads on medicines safety, has assigned 10% of its budget to PPI, including funding a post to coordinate PPI activity. Manchester School of Dentistry (MSoD) hosts the National Centre for Cleft Research (with funding from the Healing Foundation) and works with the Cleft Lip and Palate Association so that cleft research is PPI-driven. The Cochrane Oral Health Group (COHG) has a Consumer Coordinator to ensure reviews address issues relevant to patients. The Manchester Language Study, the largest study of Specific Language Impairment in the UK, has parents and patients on their advisory group and involves them in setting the agenda at each phase of the project. The NIHR Stroke Research Network identified PPI in the ACT NoW study (**Bowen, Hesketh**, **Sage**, **Young**) as an example of best practice. **Baker** and **Lovell** have developed a research methods course for users of mental health services and carers, which has been accepted and published on the NICE shared learning database as an example of implementation related to the NICE guideline *CG136 - Service User Experience in Adult Mental Health.*

2. Building key relationships: We have developed strong relationships with UK policymakers in each discipline; case studies *ICS-01*, *ICS-02*, *ICS-03*, *ICS-05* and *ICS-10* provide examples of our influence. In addition, **Hassell**, **Tickle** and **Brocklehurst** worked with the Centre for Workforce Intelligence (CfWI) on workforce planning in pharmacy and dentistry. **Hassell** serves on the joint CfWI and DH Technical Advisory Group to develop the Pharmacy Workforce Model. **Tickle** and **Brocklehurst's** research was cited by the Office of Fair Trading in their 2012 report on dentistry, which led to the General Dental Council removing barriers to direct access to Dental Care Professionals. *Shaw* co-directed a UK national study resulting in the report of the Clinical Standards Advisory Group, which produced a change in policy, restricting cleft care services to a network of 17 specialist centres across the UK. The General Medical Council commissioned **Ashcroft** and **Tully** to investigate medication errors in secondary care, which resulted in a requirement for all final year medical students to undergo a prescribing assessment before graduation. **Schafheutle's** research demonstrating the negative impact of prescription charges on the uptake of prescribed medicines resulted in changes to the system of charges. Our research has affected international policy, for example, a collaboration between Audiology and Social Care on the Newborn Hearing Screening Programme underpinned health policy in Canada, four EU countries, Australia and Sub-Saharan Africa (*ICS-04*). **Glenny** recently completed a series of systematic reviews commissioned by the US Centre for Disease Control (CDC), which will influence US federal public health policy. The CDC and Public Health England have also implemented a new fluorosis diagnostic system developed by **Pretty** into their national disease surveillance programmes, which will support future policy decisions on water fluoridation.

NHS providers are key partners in our approach to impact. We encourage academics in each of the disciplines to hold honorary clinical contracts to ensure evidence based care is embraced. For example, the School of Nursing, Midwifery and Social Work (SNMSW) has worked with the chief nurses of all MAHSC Trusts to identify priorities for implementation of research findings, which has helped to shape clinical practice in areas as diverse as dementia care, falls prevention and maternity care. The Manchester Pharmacy School (MPS) works with all the local Trusts to implement changes to prescribing and medication administration. Central Manchester Foundation Trust hosts MSoD and our research directly informs care provided in the University of Manchester Dental Hospital. We have a strong dental public health team with honorary contracts with the Strategic Health Authority and PCTs, now Public Health England. We also have links with international health services, for example **Lavender** leads a partnership with the University of Nairobi and practising midwives in Kenya, Malawi, Zambia, Uganda, Zimbabwe and Tanzania to ensure safe childbirth. Our mental health team has long standing relationships in South Africa implementing and assessing outreach work with volunteers in the care of people with serious mental illnesses in township communities. In 2013

SNMSW initiated a major EC funded network (ProFouND) with members from 22 countries to influence international fall prevention policy. MPS research, commissioned by the pharmacy regulator, is being used to develop the revalidation system for UK pharmacists, which through dissemination coordinated by **Schafheutle**, is informing regulators internationally. COHG set up the Global Alliance; a multi-national partnership committed to internationalising COHG work.

Over many years we have developed strong relationships with industry and business, which have led to new and safer treatments. These developments have contributed to the profitability and job creation of companies operating in the UK. Evidence includes the support offered by MPS to establish and build *Medeval,* which forged a worldwide reputation for "first-in-human" clinical trials. The Centre for Applied Pharmacokinetic Research (CAPKR) was established in 1996 to develop and improve existing knowledge, understanding and expertise regarding the prediction of drug metabolism and pharmacokinetics. CAPKR continues to be funded by a consortium which includes GlaxoSmithKline, Janssen Pharmaceutica NV, Lilly and Pfizer (*ICS-11*). MSoD hosts the Dental Health Unit, which has a 40-year history of continuous funding from Colgate Palmolive to undertake clinical trials and diagnostics research to support product development and marketing. The value of the current contract is £1 million over 5 years.

We have worked with charities and Non-Governmental Organisations and our research has influenced policy and practice in a number of areas. For example **Todd** worked with Help the Aged (now AgeUK) shaping their policy towards falls prevention, assisting in creation of the “Don’t mention the F-Word” campaign, their annual national falls prevention days and webinars (*ICS-05*). **Lavender** has worked with the National Eczema Society for the last 5 years, her research informed their campaign to prevent atopic dermatitis (*ICS-12*) and **Lovell** has worked with mental health charities, most significantly Anxiety UK, to set up telephone clinics (*ICS-09*), providing workshops, training and supervision to volunteer therapists. Supported by our work Macmillan Cancer Support (*ICS-03*) launched the “Working through Cancer” programme to help cancer survivors secure benefits and get back to work.

3. Supporting and incentivising our academic workforce to achieve impact: UoM has implemented polices to support and incentivise researchers to achieve impact. For example, each member of staff and each research group are required to develop an impact plan, complementary to School, Faculty and UoM targets. The plan and progress are discussed as part of the mandatory Performance Enhancement review. Impact is a clearly recognised criterion to assess promotion applications. Individual schools provide opportunistic support and funding to support initiatives leading to impact. For example, UoM supported initiation work which enabled **Todd** to provide leadership for the EC’s European Innovation Partnership on Active and Healthy Ageing to move evidence into practice across the EU. Falls work has also been supported through funding of PhD research and internal grants from Manchester Interdisciplinary Collaboration for Research on Ageing (MICRA). Likewise UoM demonstrated its commitment to the development of CAPKR (*ICS-11*) by pump-priming the consortium in its first two years of operation and continues to provide funding support. UoM also provides funding for space and HEFCE-funded staff time to support the Cochrane Oral Health Group in recognition of its global influence on policy and practice in dentistry.

4. We use novel means to disseminate our research: We have created a number of bespoke websites to disseminate findings, and are using social media as part of this process. The ProFaNE website developed in our falls research was an early example of using RSS feeds. More recently we have used social media, for example the FARSEEING project uses Facebook and Twitter. Our Social Research with Deaf People uses YouTube to present information in British Sign Language, permitting access to research findings to an often-excluded group of users. The RALLI YouTube channel provides evidence-based information about specific language impairment using short video clips aimed at children, parents and professionals. To improve international reach, we have begun to employ social media preferred outside UK (e.g. Blogs, Hyves, iWiW, Pinterest, Google+, WeChat).

c. Strategy and plans

We will continue to support impact and build on our existing strengths by:

1. Strengthening our relationships with the NHS and Public Health: We will extend our strategy of embedding research leaders in NHS and public health organisations. MAHSC is closely aligned to the CLAHRC (recently refunded), the GM Academic Health Science Network (GM-AHSN) and Haelo, a newly formed health improvement centre based at Salford Royal Foundation Trust. The

restructuring of the NHS and public health has resulted in a GM-wide footprint for the Local Area Team of NHS England (NHSE), and the GM Centre for Public Health England (PHE). The Clinical Commissioning Groups (CCGs) have a GM forum and Directors of Public Health (DsPH) also work collaboratively under the Association of Greater Manchester Authorities. Researchers in UoA3 have honorary contracts with PHE and we have strong links with the GM DsPH and the CCGs through the CLAHRC and Haelo. These links are critically important for our research to influence GM-wide strategies through the GM Health & Well Being Board. We will formalise and strengthen our links with local government public health and social care agencies, and capitalise on joint initiatives such as MICRA. The geographical, functional and aspirational alignment of these bodies provides UoA3 with a unique environment for research collaboration and powerful levers to translate our research findings rapidly and at scale across GM.

2. Strengthening our relationships with national and international policy makers: We will strengthen our relationships with policy makers and government agencies such as NICE, professional regulatory bodies, MHRA, Health Education England, NHS England and PHE. We will further develop EC work, especially through leadership in the European Innovation Partnership scheme, as well as in countries where we already have strong partnerships such as Germany, Netherlands and Norway. We will continue to improve the reach of our impact by strengthening our international links through consultancies and contractual work for overseas government agencies.

3. Expanding a network of contacts among individual clinical practitioners: GM-wide clinical networks are developing through the CCGs and Local Professional Networks in dentistry and pharmacy supported by NHS England. Due to the recent structural changes in the NHS these new networks are underdeveloped. Over the next 5 years we will work with MAHSC, the AHSN, CLAHRC and Haelo to build up and strengthen these networks to support our aim of achieving impact at a grass-roots level to broaden the benefits of our research. UoA3 represents key professional groups; we will strengthen our well-established links with various professional and regulatory bodies within nursing, midwifery, pharmacy, dentistry, and allied health professions to ensure our research informs, and is informed by, public and professional agendas and priorities.

4. Consolidating and developing our links with industry and commerce: We have excellent, well-established links across UoA3 with commercial and industrial partners (see REF5). We will deepen existing relationships and broaden the number and scope of our relationships with industry, with existing multinationals and new and emerging companies through consultancy work and joint funding applications. This aspiration will be supported by Manchester: Integrating Medicine and Innovative Technology (MIMIT); a new and exciting initiative which facilitates international collaborations between clinicians, scientists, engineers and industry to develop innovative technologies for patient benefit. We will encourage enterprise and entrepreneurship among UoA3 academics to make use of the exceptional support provided by UMI^3 to develop spin out companies. CAPKR will pursue a long-term leading position collaborating with the pharmaceutical industry and offer new industrial memberships consistent with the long-term objectives of the consortium. We will continue our work with the BEST team to work with SMEs, larger companies and eligible organisations in the public sector to develop further knowledge transfer partnerships.

5. Developing our workforce to produce impact: We will continue to develop the abilities of our staff to deliver impact through rigorous objective setting in the University's Performance Enhancement process, allied to support for personal development. For example, we will provide academics with training in implementation science through MAHSC's newly established Improvement Science for Academics programme, which brings clinicians and academics together to learn from national and international experts in improvement methodology, thereby equipping our investigators with an understanding of how to translate their research into healthcare improvements at a pace and scale. We will continue to build research and implementation skills in the NHS and Public Health across Greater Manchester by encouraging clinicians, public health practitioners and NHS managers to become co-applicants on grants and supporting local evaluation of implementation of evidence-based interventions. We will also strengthen our methodological expertise in implementation science in partnership with NHS initiatives and through our affiliations with the research institutes of the Faculty and wider University. For example we work in partnership with Manchester's significant improvement and implementation capacity housed within the NIHR CLAHRC and the newly established Greater Manchester Academic Health Science Network.

Complementary investments in implementation science made by SNMSW, the School of Psychological Sciences and Manchester Business School increase our expertise and capacity to implement large-scale change at pace.

6. Effective dissemination of research findings and involvement of users: We will continue to develop our use of new communications technologies. For example, the COHG has started using Facebook/Twitter and blogs to engage with users to disseminate findings and identify topics. More recently podcasts aimed at professionals and patients/public are being developed to summarise review findings. SNMSW works with the School of Computing Science to implement mobile technologies for effective dissemination. We are also developing a cadre of user researchers. **Tickle** and **Lovell** have started this process in NIHR Programme Grants for Applied Research and Research for Patient Benefit grants. We will develop this approach further within the MAHSC Citizen Scientist 'Engagement in Research' training programme, which will provide training to members of the public who wish to be involved in research. We will further engage with schools and colleges through the UoM sixth form lecture series, and we will ensure our websites are kept updated to reflect our collaborations with the wider community nationally and internationally.

7. Engagement with the voluntary sector/charities: We will build on the links we already have with the third sector and help charities implement evidence-based interventions. For example, the largest pharmacy charity, *Pharmacist Support*, is planning a new programme of stress prevention and management, informed by **Hassell's** research.

d. Relationship to case studies

We have returned 12 impact case studies; the table below maps them to the key types of impact we aimed to achieve over the assessment period (set out in section **a. Context** above).

Author / ID	Example of impact as a result of UoM research
Influencing healthcare policy	
Hassell (*ICS-01*)	Establishment of a nationwide pharmacy minor ailments service provided by 5000 pharmacies.
Challis (*ICS-02*)	Personal Budgets in Social and Health Care and National Strategies to Improve Dementia Service affect services for 1.2 million people and have £6,600m budget.
Grande (*ICS-03*)	Directly impacted on policy on access to treatment for older women with breast cancer, affecting treatment for 10,060 cancer sufferers in England per annum.
Improving population health	
Young (*ICS-04*)	Establishment of a national hearing screening programme; 5 million babies have been screened and over 9,500 identified with permanent bilateral hearing loss.
Todd (*ICS-05*)	Falls prevention and training programmes used by 54% of NHS Trusts, and influence on US CDC and WHO guidance on fall prevention programmes.
Noyce (*ICS-06*)	Preventable drug related morbidity indicators have been incorporated into general practice computer systems in the UK and internationally to improve patient safety.
Improving clinical practice	
Worthington (*ICS-07*)	Our research led to a 76% reduction in the prescription of antibiotics for patients with heart conditions undergoing dental procedures.
Stratford (*ICS-08)*	Our research work combining a hypoxic radiosensitizer with radiotherapy can increases 5 year survival rates of head and neck cancer patients from 45 to 65%.
Efficient use of resources	
Lovell (*ICS-09*)	Cognitive Behavioural Therapy programmes to manage depression and anxiety have moved 45,000 people off benefits.
Tickle (*ICS-10*)	Stopping a national screening programme redirected some £17m per year to frontline treatment services for vulnerable groups.
Wealth generation via industrial links	
Houston (*ICS-11*)	Simcyp® predictive pharmacokinetics modelling was acquired by Certara™ for US$32m in 2012 and is used by 18 of the top 20 pharmaceutical companies.
Lavender (*ICS-12*)	Research on skincare in neonates increased sales of Johnson & Johnson baby skin care product by 15%.