REF2014: Impact template

Institution: Queen Mary University of London
Unit of Assessment: A1 (Clinical Medicine)

1. Context

Based in east London, Queen Mary has a strong tradition of undertaking socially relevant research at local, national or international level that contributes to the wider knowledge base. The College's research strength has grown rapidly in the past 15 years, and it was admitted to the Russell Group in 2012. Collaborative links with industry and the public sector have increased significantly. Based on Queen Mary's outstanding performance in securing external and commercial income in the HEIF4 funding period, it was awarded the maximum grant for HEIF5 (£2.85M pa) for 2011-15.

The School of Medicine and Dentistry (SMD) formed in 1995 when The London Hospital Medical College ('The London', founded in 1785) merged with St Bartholomew's ('Barts', 1123) and they were incorporated into the newly formed Queen Mary. This submission reports work from four SMD institutes: Barts Cancer Institute (BCI, basic and applied cancer research), William Harvey Research Institute (WHRI, pharmacological research in cardiovascular, inflammatory and endocrine diseases) and Wolfson Institute of Preventive Medicine (WIPM, epidemiology and trials focused mainly on prevention), all on Charterhouse Square campus and historically part of Barts; and Blizard Institute (with genomics, molecular medicine, immunology and translational research linking basic and clinical sciences), on Whitechapel campus and historically part of The London.

In the 18 years since the merger, some strong cross-institute collaborations have developed, particularly in cardiovascular medicine and cancer epidemiology. A major cross-faculty Life Sciences Institute is under development. The research whose impact is described here spans 1993-2013, a period of rapid and significant change for the four research institutes. Each has evolved from a (more or less) self-contained unit within one of two small London medical schools with proud histories and distinct identities to being part of a much larger, multi-faculty, multi-site organisation where collaborative research (both within and beyond the College) is now the norm.

2. Approach to Impact

SMD's approach to research impact has developed and matured considerably since 1993, becoming more explicit, more proactive and more central to our strategy and mission. Our current approach is underpinned by four guiding principles.

First, links between research, innovation, practice and policy are complex and multidirectional: they follow an organic rather than linear model of causality. For maximum impact, researchers need to be fully engaged with potential users and in active dialogue with them in all six stages of the research life cycle (Figure 1). Such linkage allows the separate communities of academia, business, policymaking, clinical practice and civil society to understand one another's perspective; achieve shared understandings of problems; negotiate priorities; plan and shape unfolding research programmes in a direction that maximises current and future impact; analyse and interpret data in a user-relevant way; and create a receptive context and infrastructure for dissemination and implementation of findings.

Our second guiding principle is that the knowledge, skills and techniques needed for achieving world-leading research *impact* are different from those needed for undertaking world-leading *research*. An institution whose traditions, ethos and processes are oriented to the former must undergo both 'hard' (systems, staffing) and 'soft' (organisational culture) transformations in order to excel at both. Orientation to impact requires a new set of expectations and rewards for academic staff; new training and development opportunities; and changes to research infrastructure.

Our third principle is that the impact agenda, linked as it is with closer ties to policymakers and industry, raises potential biases and conflicts of interest. Ethical principles and codes of practice must be applied through robust governance procedures that overlap with, but go beyond, the structures and processes for governing research.

Fourthly, world-leading impact activity demands ongoing learning and improvement, informed by systematic audit of performance and the emerging evidence base on knowledge translation.

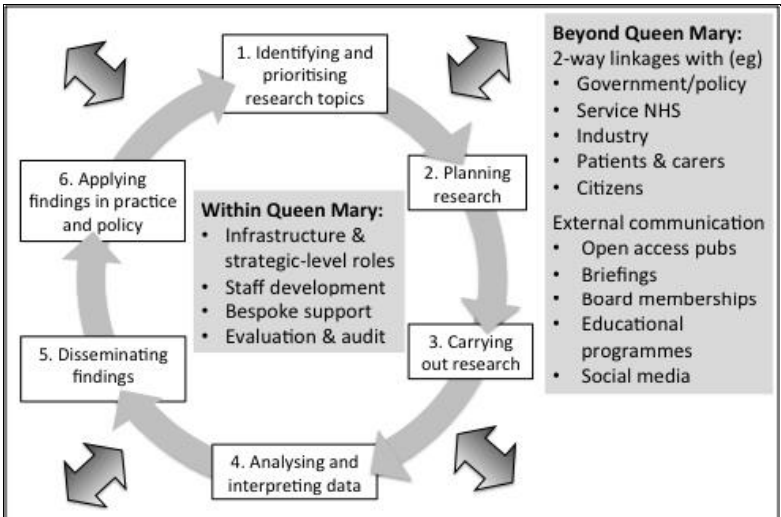

Figure 1: Queen Mary's 'life cycle' approach to research impact

Drawing on these principles, we have created opportunities for maximising impact using six key approaches. *Beyond Queen Mary*, we worked to (a) build and sustain **links with stakeholders** who may use our research and (b) develop diverse **external communication channels** to reach these audiences. *Within Queen Mary*, we established (c) **infrastructure and strategic roles** for delivering the impact agenda; (d) **staff development** to build capacity for impact activity; (e) **bespoke suport** for individual projects; and (f) **evaluation and monitoring** systems. We describe all these in more detail below.

2a: Building and sustaining links with key stakeholder communities

In keeping with Queen Mary's tradition as a socially engaged higher education institution, our links with external stakeholders are many and varied. Rather than an exhaustive list, we have given below some illustrative examples taken mostly but not exclusively from our 15 case studies.

- **Government and national policymaking.** We have had very strong representation on national-level policymaking groups in 2008-13 including NICE, DH committees, select committees and so on. To give three examples, **Wald** (CS13 and CS14) was a member of the Independent Scientific Committee on Smoking and Health in the early 90s, the Scientific Committee on Tobacco and Health 1993-2002 and the Antenatal Subgroup, National Screening Committee 1997-2005. **Sasieni** (CS11) was on five separate national advisory groups including the Advisory Committee on Cervical Screening (England) and National Cancer Screening Service (Ireland)**. Cuzick** was on the National Cancer Research Network for several decades (until 2010), Cancer Research UK's Scientific Advisory Committee and the NHS Cancer Reform Strategy Group.
- **Local policymaking and NHS services.** Our researchers link closely to the local health economy (eg approximately half the researchers in this submission are also NHS clinicians). Through National Institute of Health Research funding streams in particular, we have built a strong portfolio of studies whose research questions emerge from clinical practice and whose outputs have immmediate and direct application to patients (see examples in Section 4).
- **Industry.** In 2008-13, our academics were involved in research collaborations with over 150 different companies. SMD's research income from industry partners has increased from £4.5M (of £42.9M total ie 10.5%) in 2008-09 to £6.1M (of £52.8M total ie 11.6%) in 2012-13. Our industry partners include international pharmaceutical and biotechnology companies (including GSK, AstraZeneca, Genentech, Genzyme, Novartis and Abbott); research intensive SMEs; medical technologies; diagnostics companies; clinical research organisations as well as manufacturers of consumer products. Between 2008 and 2013, SMD researchers were awarded 16 industrial CASE studentships providing high quality training placements with leading industry partners including GSK, Novartis and AstraZeneca. We have implemented Knowledge Transfer Partnerships linked to industry eg Foster linked with ImmunoBiology to develop new geenration vaccines for hepatits.
- **Third sector / charity / patients and citizens.** Over 150 different **medical charities**, many of them patient-led, funded our research in the period 2008-13 and play a crucial role in disseminating the findings. Several of our flagship research programmes owe their success at least in part to strong input from patients (see examples in Section 4d). We work with the **Patient Advice and Liaison Services** in our partner NHS trusts and with **faith-based organisations**, eg East London Mosque, with whom we have collaborated closely in research on access to services and genetic risk in minority ethnic groups (e.g. **Hitman** in diabetes). We also link with **community charities** specialising in communicating with

underserved and minority ethnic groups (eg **Foster** is partnering 'Maslaha' – a **community based educational group** to develop DVDs on his viral hepatitis screening research for the Muslim community). We have set an international standard for promoting public understanding of the basic science underpinning clinical medicine in **'Centre of the Cell'** (http://www.centreofthecell.org), an interactive science centre, outreach project and educational website which has had over 70,000 participants (and 700,000 website hits) since 2009. Its centrepiece is Cell Pod, a **biomedical education centre** suspended above the large open-plan research laboratory of the Blizard Institute. This has enabled 150 of our scientists to engage with the public directly eg by creating digital interactives, delivering science workshops, and training 150 STEM ambassadors for schools.

Increasingly, knowledge translation work involves multiple stakeholder communities linked in a network (reflecting the 'organic' model of research impact described above). Our networks include:

- **Clinical Research Networks.** In national priority areas such as cancer, diabetes and cardiovascular disease, funding from diverse sources (charity, research council, industry) is channelled through national and regional networks that provide a forum for stakeholder communities (including patient representation) to negotiate priorities, oversee studies and play a major role in disseminating findings. Researchers from Queen Mary have played an active role in such networks both nationally and regionally since their inception in 2000. For example, **Lemoine**, Head of Barts Cancer Institute, is also Head of Research Implementation at the North London Cancer Network. **Hitman**, Head of the Blizard Institute, is also Head of the East London Diabetes Research Network.
- **Academic Health Sciences Network (AHSN).** We strongly support the principle behind AHSNs: to align education, research, clinical practice and industry input so as to maximise the health of the populations they serve, and to speed the development of new diagnostics and treatments into clinical practice. Along with UCL, Queen Mary is an academic partner in a large AHSN (UCL Partners, UCLP) that brings together researchers with NHS providers at Barts Health, UCLH, Great Ormond Street, Moorfields and Royal Free Hospitals. Our Vice Principal for Health (**Trembath**) and Principal (**Gaskell**) are Directors of UCLP.
- **Collaboration for Leadership in Applied Health Research and Care (CLAHRC).** Queen Mary is an equal partner (co-lead) in the recently awarded £9M 'London: City North and East' CLAHRC infrastructure grant (**Grigg** is Deputy Director). Themed programmes apply research findings in mental health, self-management and engagement in chronic conditions, and child and adolescent health. There is a cross-cutting workstream on methodology and another on 'Innovation in Systems and Models of Care' that addresses organisational-level challenges and barriers to change when implementing research findings in the NHS.

2b: External communication to reach a diverse range of audiences

A significant positive shift in our external communications in the past 15 years has been from a narrow focus on academic outputs (peer-reviewed papers, presentations at subject conferences) to a broad and **multi-modal portfolio of communicative activity** in which both the message and the medium are targeted to the needs and styles of the different potential users listed above.

Conventional outputs (eg journal papers) are important for acameic impact, but our policy is to publish our findings in **open access** journals where possible and use this as an opportunity to disseminate to policymakers and industry (eg through **briefings**, **web updates** or short summary articles), and to the public (eg through the **lay** and **social media**), as described in [2c] below.

We run a range of **specialist postgraduate courses** aimed at clinicians, industry and/or policymakers. These include our higly-rated MScs in Trauma Sciences for the Military (60 students annually) and Clinical Drug Development (33 students), and annual CPD Updates for local GPs.

2c: Infrastructure and senior staff roles for delivering the impact agenda

The College provides the following support for developing research staff in impact activity:

- Queen Mary's **Centre for Public Engagement**, led by our **Vice-Principal for Public Engagement**, aims to set a new international standard for the ways HEIs engage with the public. Using a £300K grant from RCUK and £1M HEIF5 funding for 2011-15, the Centre provides training, support and funding for new and existing public engagement activities for academics, postgraduate researchers and early career researchers. It awards >£100K pa, including £65.7K to the School of Medicine in 2012 (eg workshops for young people whose

parents have multiple sclerosis to interact with research and researchers in MS) and £18K in 2013 (for eg engaging cancer patient advocates with Queen Mary's cancer research).

- **The Centre for Academic and Professional Development** is Queen Mary's staff development arm. It provides a wide range of training and development opportunities including a suite of courses aimed directly at researchers at all stages in their careers from pre-doctoral to head of department. Courses include engagement and impact-oriented workshops including 'Business Writing' and 'Engaging the Public with Your Research'.
- **Queen Mary Innovation (QMi),** the College's technology transfer office, provides three dedicated staff to support SMD in identifying and protecting new technology disclosures, securing translational / proof of concept funding to develop new technologies, advising on intellectual property and exploiting research-derived technologies through licensing and new spin out creation. Since 2008, QMI has helped SMD deliver significant outputs including148 new SMD inventions identified; over £4.6M raised for externally-funded translational research projects, 50 new licenses of SMD technology to industry generating almost £1M of licence income, a new technology spinout company (Activiomics Ltd) and a new staff start up (Biomoti Ltd). A separate **business development team** (including four staff supporting SMD) supports the academic community in its relationships with businesses and other external organisations, seeking resonance between academic strengths and business needs and leveraging resources. They helped generate over £18M in research income to the medical school in the last 5 years. They facilitate commercial interactions and negotiations, help to identify and organise events with industry and help to foster an entrepreneurial culture.

Within the School of Medicine and Dentistry, the following are particularly relevant

- The **London Research Design Service** (RDS, http://www.rdslondon.co.uk), whose East London arm is based in the Blizard Institute, provides support to research teams including techniques for engaging users at the design and planning stage of a study.
- Our **Pragmatic Clinical Trials Unit** (PCTU, http://blizard.qmul.ac.uk/research-groups/225-pragmatic-clinical-trials-unit.html) supports trials whose research question relates to whether an intervention works *under real conditions of use*. Its statisticians, facilitators and evaluators advise on embedding complex interventions in real-world NHS practice. We also have the UK's only **Cancer Prevention Trials Unit** (CPTU, http://www.cptu.org.uk) funded by CRUK.
- An annual round of **Research Theme Monies** (£200K) is available to build new collaborations at design stage of a project, and also on completion of a study for dissemination work with industry, the NHS or citizens.
- The School is (to our knowledge) unique among UK medical schools to have created a post of **Dean for Research Impact**, whose role is to promote, support and help evaluate knowledge translation and research impact across all Institutes. Her activities have included ensuring impact remains on the agenda of all key committees and boards; liaising with the Human Resources Department on training, incentives and rewards for impact activity and promoting the involvement of service users at the design stage of new research studies.

2d: Staff development

In the annual appraisal process, staff are assessed on past achievements and supported to set future objectives in areas such as patient and public involvement in research, engaging with industry and/or the third sector, presenting findings to non-expert audiences and dealing with the media. To support this, we offer training and mentoring in the knowledge, skills and techniques needed for research impact through our Centre for Academic and Professional Development described above. In 2010, criteria for academic promotion were updated to include "contribution to knowledge dissemination" including "public, business, and international engagement activities". The Business Development Team provides a series of interactive training seminars in building impact into research design, based on Research Councils UK's 'Pathways to Impact' programme.

2e: Bespoke support for individual research projects

Research teams are offered a flexible package of support through the structures and individuals listed above to ensure that attention to impact runs through the life cycle of each study. We draw actively on our external linkages to ensure that the rationale, hypotheses, design and execution of research studies are informed by ongoing dialogue with relevant users. Steering group members are appointed partly on the basis of their ability to contribute to the study's progress and reach target audiences. Thus we ensure two-way learning: the perspective and needs of research users

remain constantly in our gaze and user audiences become aware of, and come to value, the research we are doing and develop an appetite for the findings at an early stage. Researchers are encouraged to apply for annual funding rounds to support project-specific impact activity.

2f: Evaluating and monitoring our performance

Key performance indicators (KPIs) used for impact include the annual budget for translational research activity; number and range of inventions, industrial patents and spin-out companies arising from our research; and number and range of professional courses that disseminate our findings. Data on these KPIs are collated regularly and reviewed by the Senior Executive Group.

3. Strategy and plans

Our **goal** is to lead the field in research impact, contributing significantly to the science and practical application of knowledge translation and user engagement. Since 2008, we have made rapid progress in developing the infrastructure and internal processes described in section 2. We now seek to ensure that we make full use of these resources such that every research study is optimally designed (to reflect the needs and priorities of potential users), optimally supported as it unfolds (to maintain a focus on user relevance and future dissemination opportunities) and followed through (to maximise uptake and reach). To that end, our **strategic objectives** are:

1. Beyond Queen Mary, to continue our work to:
    a. Extend and strengthen strategic-level links with key user audiences through both outreach (eg our research leaders having membership of external boards and committees) and inreach (external representation as appropriate on Queen Mary's boards and committees);
    b. Optimise activity in our networked collaborations, particularly with the NHS (including the Academic Health Science System, Clinical Research Networks and CLAHRC);
    c. Develop and pursue leading-edge collaborative ventures with industry in both our traditional and our emerging strengths;
    d. Attract research users from all stakeholder communities to our postgraduate courses;
    e. Identify and incorporate examples of best practice from other HEIs and elsewhere.
2. Within Queen Mary, to continue our work to:
    a. Develop and refine our infrastructure to support impact throughout the research life cycle;
    b. Ensure that every researcher receives a personalised programme of training, support, incentives and rewards to develop the personal capability for world-leading impact activity;
    c. Identify and support particular individuals to become leaders and champions in knowledge translation and research impact;
    d. Promote organisational and team learning about research impact through knowledge-sharing events and bespoke support;
    e. Improve our performance systematically year on year.

To achieve these strategic objectives we are implementing the following **specific plans**:

3. Plans for developing our externally-facing impact activity:
    a. Establish a strategic level Advisory Board on Research Impact with wide external representation including industry, NHS, front-line clinicians, patients and the public;
    b. Incentivise and reward high-impact external appointments for academic staff;
    c. Develop and extend our strong portfolio of local, NHS-linked applied research via UCL Partners, our newly established CLAHRC, Clinical Research Networks and Barts Charity;
    d. Aligning with Queen Mary's new-build accommodation and Life Sciences Institute, emulate the model of 'ImpactQM' (http://www.qmul.ac.uk/research/ImpactQM/, a specialist unit to develop and support academic-industry links via CASE studentships, secondments, exchanges and so on) within the School of Medicine and Dentistry;
    e. Rationalise and expand our specialist postgraduate courses and the marketing of these;
    f. Organise exchange visits to other higher education institutions, industrial partners, policy think tanks and so on to capture ideas and models of good practice in research impact.
4. Plans for further developing our internal structures and processes:
    a. Build themed collaborations across SMD's four research institutes and establish the cross-faculty Life Sciences Institute, thereby increasing potential for large-scale impact;
    b. Review and revise in-house training opportunities (Centre for Public Engagament, Centre for Academic and Professional Development, QMI, Institute-level seminars). New courses

planned for 2014 following staff survey on training needs for impact include 'Building Industry Contacts and Experience', 'Startups and Spinoffs from Your Research', 'Recruiting and Running a Cross-sector Steering Group' and 'Involving Patients in Research Design';

c. Work with the Human Resources Department to further formalise the integration of staff development for research impact with the probation, appraisal and promotion system;
d. Increase the overall resource available for researcher-led impact activity;
e. Introduce, deliver and evaluate a programme of activities to raise awareness of research impact, including an annual showcase event to share best practice among research teams.
f. Extend, refine and apply key performance indicators in a continuous quality cycle.

4. Relationship to case studies

Our case studies illustrate a number of longstanding and highly successful linkages between particular research groupings and key stakeholder communities:

4a: Impact through links with clinical practice and NHS priorities: In four case studies (CS2: Coagulopathy of Trauma; CS9: Growth Hormone Deficiency; CS12: Improving Clinical Services for Coronary Heart Disease; and CS15: Colorectal Surgery), clinician-researchers addressed questions arising in their clinical practice. These studies illustrate how a research lens, applied rigorously in a front-line clinical setting, can produce high-quality research outputs that are rapidly and widely implemented because the lead clinician-researcher is well networked and an opinion leader in their clinical field. The research in all these cases was funded directly by the NHS and/or National Institute for Health Research (who require "benefits to NHS patients within five years").

4b: Impact through links with policymakers: Two case studies (CS13: Antenatal Screening for Down's Syndrome; and CS14: Evidence Base for Harms from Passive Smoking) were funded by via the Health Technology Assessment Programme (policy-led call) and Department of Health (DH) respectively. As set out in Section 2, Queen Mary researchers were members of key national committees or working groups before the research began (hence influenced the framing of the problem and content and timing of the research call), during the research (hence influenced policy awareness of emerging findings) and after completion of the study (hence influenced dissemination and application of findings). See individual case studies for further details.

4c: Impact through links with industry: Only one case study (CS10: Enteral Nutrition in Paediatric Crohn's Disease) was funded solely by industry. In three more, (CS3: Cardiovascular Clinical Trials; CS4: Aromatase Inhibitors in Breast Cancer and CS7: Treating the Intractable Smoker), the pharmaceutical industry was a significant stakeholder. As set out in the individual case studies, preliminary research was often funded by charities or internal sources; proactive efforts by the principal investigators then led to academic-industry partnerships, filing of patents for new technologies and industry-funded clinical trials. In all five cases, lead researchers had pre-existing relationships with the relevant company and worked with senior executives to negotiate the research questions, expected deliverables and scientific freedom. Strict governance measures ensured that the industry partner(s) were not involved in data analysis but they contributed significantly to dissemination efforts once findings were signed off.

4d: Impact through patient and public involvement (PPI): PPI has increased in significance in the past 20 years, and has had a particularly powerful effect in studies that commenced most recently. For example in CS3, engagement with research participants (in this case, with diabetes and high blood pressure) led to a well-informed and committed patient advisory group, emergence of patient champions for an electronic recruitment scheme, and co-production of research findings in formats (including personal decision aids) that patients found useful. In CS8: Monogenetic Diseases, laboratory researchers studying rare genetic diseases became part of a close-knit global community that included other research teams, clinical geneticists, and patients and their families who lived with the condition and/or raised money to research it.

4e: Impact via multi-stakeholder networks: Multi-stakeholder networks bring together academics, NHS, industry, policymakers, charitable funders and service users in potentially powerful alignments. Four case studies (CS5: Treating Ductal Carcinoma in Situ; CS6: Sentinel Node Biopsy in Breast Cancer and CS11: Prevention of Cervical Cancer) received funding via the NHS National Cancer Network and one (CS1: 1 v 2-view Mammography in Breast Screening) via UK Coordinating Committee on Cancer Research. The pivotal role of Queen Mary academics in these networks is described in Section 2.