

Institution: University College London
Unit of assessment: 3B - Allied Health Professions, Dentistry, Nursing and Pharmacy: Pharmacy
<p>a. Context</p> <p>The UCL School of Pharmacy is a leading international centre for pharmacy education and research with a long tradition of interaction and communication with stakeholders and user groups. These interfaces have developed through both direct input of our scientific findings and provision of expert advice based on our research achievements. The recent (2012) merger of the School into UCL has resulted in a range of additional impact opportunities that are outlined in more detail below. Our impacts manifest in three principal areas: (i) <i>Improved practice in the public health sector via policy and educational strategy development</i>. This is informed by our established research strengths in medicines safety, workforce development, drug misuse and regulatory requirements. The associated impact manifests via our interaction with national and global public health professionals and policymakers, healthcare education organisations, government departments and regulatory organisations including the Food and Drug Administration (FDA) and Medicines and Healthcare products Regulatory Agency (MHRA); (ii) <i>Development of novel medicines and therapeutic strategies</i>. This relates to our expertise in drug discovery, formulation science and neurological disease and is exemplified by new formulation approaches, provision of new analytical methods that have now become industry standards, new diagnostic approaches to neurological disease and a range of enabling activities such as consultancy and the establishment of spin-out companies for technology transfer. Whilst the pharmaceutical industry, and hence indirectly the public, are obvious beneficiaries of these activities, our work also has impacts on related industries such as instrument manufacturers and special interest groups such as animal breeding organisations; (iii) <i>Enhancement of public and professional understanding of science and therapeutics</i>. This relates to our expertise across a wide range of research activities, from neuroscience through to medicines usage and safety and professional education. Our activities have included provision of science-based professional leadership activities, bringing science into schools, and media appearances including a popular BBC television series. Here the beneficiaries are not only the public and patient groups but also the pharmaceutical profession, where our research has made a major contribution.</p>
<p>b. Approach to impact</p> <p>Here we describe the infrastructural support for impact development and outline how we have both developed and identified the effect of impact activities.</p> <p>Infrastructural approaches used to develop impact</p> <p><i>Impact as an academic expectation:</i> all staff are encouraged through appraisal and promotion to participate in engagement and impact-related activities, which are specified as criteria for promotion at all academic levels. <i>Recruitment of impact-facing staff:</i> we have developed an academic body that covers not only basic and applied research, but also includes staff with expertise positioned directly at the interface with external stakeholders. Examples include Della Pasqua, a clinical pharmacologist with expertise in pharmacokinetics of children's medicines whose appointment is 50% with GlaxoSmithKline. We also have a dedicated policy development expert in D Taylor, a former Director of Public and Economic Affairs for the Association of the British Pharmaceutical Industry. <i>Good governance:</i> The School has a range of policies, now matched up to UCL best practice, to ensure a transparent framework in which staff can develop relationships with stakeholders. These include guidelines on consultancy (allowing up to 40 working days/annum); equitable fee sharing (standard formula available); indemnity insurance provided by UCL Consultants Ltd (UCLC), who also assist in rate negotiations; suitable IP protection via UCL Business PLC (UCLB, UCL's technology transfer office); and revenue sharing for spin-out companies (agreed with UCLB). We also make use of the extensive support offered for contract development with external bodies via the institutional and university research offices, and through courses available in research governance and policies for conflict of interest declaration. <i>Institutional support for achieving impact:</i> Prior to the 2012 merger with UCL, the School had a dedicated business development manager whose function was to provide advice and support for start-up companies, consultancy and secure venture capital funding. The effectiveness of this approach is evidenced by the extensive translational activity outlined below. We also had policies for outreach to Schools and international relations, including a dedicated international officer. Following merger, institutional support for stakeholder engagement has increased significantly,</p>

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thanks to new access to a range of organisations providing advice, training and financial support for staff. These include: i) UCL Advances - the UCL Centre for Entrepreneurship and Business Interactions; ii) UCL Business PLC - UCL's technology transfer company; iii) UCL Consultants Ltd, which facilitates and manages consultancy contracts; and iv) UCL Partners, one of five accredited academic health science systems in the UK translating cutting-edge research and innovation into measurable health gain for patients and populations. In addition, we are actively involved in the UCL Grand Challenges (Global Health, Sustainable Cities, Intercultural Interaction and Human Wellbeing), which all relate to high impact, globally-relevant activities that are supported by central funding. UCL also have a Public Engagement Unit, as well as supporting engagement via UCL Beacon Bursaries. All School staff are being encouraged to register on the UCL Media Relations 'Find an Expert' database.

Development of impact-generating relationships

Development of interfaces with policymakers: We are exceptionally well-placed to make a significant contribution to policy via three mechanisms for interfacing with policy organisations and government departments. The first of these is our cultivation of reputational influence via outstanding publications, which has led to invitations to produce commissioned work. In 2010, for example, **D Taylor** was commissioned by the Department of Health (DoH) to evaluate the scale, causes and costs of medicines waste. This prompted a Kings Fund policy seminar co-chaired by the Under Secretary of State Lord Howe in 2011, and led to proposals in Dec 2012 for the implementation throughout the NHS of the national strategy on reducing medicines waste (see <http://tinyurl.com/q2wbwm7>). Secondly, we influence policy via quality publications in the peer-reviewed literature. For example, **Horne's** published work on patient perspectives of illness and treatment was referenced in authoritative guidelines for improving medicines adherence and shared decision-making in clinical practice (NICE Guidelines for Medicines Adherence 2009), and in an EU policy statement on asthma (Brussels Declaration for Asthma, 2008). Finally, we inform policy via influential expert committees, where our staff are invited to contribute as a result of their research reputations and expertise. For example, **Gibbons** is Chair of the Advisory Council on the Misuse of Drugs (ACMD) Novel Psychoactive Substances Workgroup, and co-author of numerous government advice reports that have resulted in changes in legislation relating to several drugs of abuse, such as methoxetamine. This committee's recent (Oct 2011) work on "Consideration of the Novel Psychoactive Substances ('Legal Highs')" has led to direct correspondence with the Home Secretary, who has outlined intended changes in legislation as a direct result of the recommendations (March 2012).

Development of interfaces with healthcare organisations and user groups: Our close proximity to and relationship with a range of partner hospitals (such as UCLH) and healthcare organisations provides multiple opportunities for direct interaction with other healthcare professionals and the patient population. This is further facilitated by our provision of contacts, identification of funding opportunities and the prestige of the School, as well as our participation in UCL Partners. We have also facilitated interaction with specialist user groups through the extensive connections, not only within UCL, but also with partner institutes such as the Royal Veterinary College and the School of Hygiene and Tropical Medicine with whom we have had long-standing, productive relationships.

Development of interfaces with industry: The School has a long and distinguished track record of working with the pharmaceutical industry and our reputation, specialist equipment base and contacts make us strongly placed to work with companies and assist new staff in developing their own relationships. Since 2008, we have secured £1.98m in support of studentships (including our participation in an EPSRC Centre for Doctoral Training (CDT) with Nottingham University: a continuation of this EPSRC CDT worth circa £11m has just been announced) as part of a total of over £3m in total funding from industrial sources. However, we also play an advisory and citizenship role. For example, **Tuleu** leads the European Paediatric Formulation Initiative (EuPFI), a consortium working on paediatric drug formulations with members drawn from academia, hospital pharmacies and the pharmaceutical industry, with the European Medicine Agency (EMA) present as an observer. This has led to the EMA adopting the terminology recommended by the EuPFI in the hierarchy of classification review (*Int J Pharm*, 2012, 435:124-130).

International activities: We contribute to a wide range of international collaborations (encouraged by sabbaticals and travel funds) and play a role in developing practice overseas. For example, **P Taylor** is representing the UK on the Management Board and Steering Committee of the Joint

Programming Initiative on Antimicrobial Resistance, an EU initiative to support the sustainable use of antibiotics (<http://www.jpamr.eu>).

Consultation, translational and entrepreneurial activity

The development of commercial activity at the School has been strongly assisted by the provision of a business manager pre-merger and now the suite of support structures such as UCLB, UCLC and UCL Advances, UCL's centre for entrepreneurship. In addition, the Translational Research Office (TRO) offers advice and seedcorn funding based on a £700k MRC 'Confidence in Concept' fund and the UCL Therapeutic Innovation Fund. The School also hosts the Drug Discovery Initiative, a UCL-wide programme charged with developing a pipeline of new small molecule drugs. The School Research Clusters have also been instrumental in introducing staff to translational research organisations such as MRC Technology and Argenta, who support both initial stage drug development projects and larger bids (e.g. to the Wellcome Trust Seeding Drug Discovery initiative). The net effect of this support has been an extremely wide range of activities, including: i) spin-out companies such as Nanomerics, Polytherics, Pharmaterials, and Therakind - which launched a product (Buccolam^R) onto the European market in 2010; ii) consultancy leading to product development (e.g. COLALTM, PHLORALTM, ProreleaseTM and DuocoatTM); and iii) engagement with stakeholders in a facilitative role (e.g. CASMI and the EPSRC Centre for Innovative Manufacturing in Emergent Macromolecular Therapies, see below). Consultancy work in the School, supported by these mechanisms, has resulted in over 130 contracts with a value of £3.2m since 2008.

Encouragement of professional and public engagement

As a longstanding professional healthcare institution, the School is deeply committed to dissemination of information to the public and contribution to the profession. The inclusion of these activities as part of the culture within the School is encouraged via appraisal and promotion. In addition, UCL has numerous mechanisms for feedback, funding and assistance, e.g. the UCL Public Engagement Unit, which supports a range of activities. For example, **Williams** contributes to the Bright Club, which uses comedy to engage researchers with the public. Our long-standing close relationship with the Royal Pharmaceutical Society (RPS) is also conducive to engagement. Education models based on research conducted by **Bates** and partners will provide the basis for advanced practice training for the new RPS Faculty. In turn, this will enhance career development and support for over 42,000 UK practitioners. School staff also draw on their research expertise to engage the public via traditional media including television, radio, and the popular press, as narrators, interviewees or as technical consultants. For example, **Barber** had a key presenting role in a four-part historical documentary TV series 'Victorian Pharmacy', first shown on BBC2 in 2010. This series examined and explained both the role of the pharmacy as a vital public health resource and the scientific principles underpinning the use of the therapeutic approaches available during the Victorian period. We also use art to convey research outputs to public audiences: **Cavanagh** and **McCarthy** won eleven prizes for Images of Excellence in the Wellcome Image Awards between 2008 and 2012. The unit has also engaged with patient groups: **K Harvey** and **Whitton** have made regular contributions to discussions at Parkinson's disease conferences focused on the interaction between patients, carers and scientists (e.g. Parkinson's UK Research Conference 2012). We strongly encourage the use of staff research experience and expertise to raise awareness of both science and scientists in schools to support the next generation of science leaders. **Ali** has been highly active in this regard; as a highly credible scientist (winner of the 2008 Muslim News Award for 'Excellence in Science and Engineering') she is ideally placed to act as a role model for young (especially female) scientists. This has facilitated outreach activities including a Royal Society partnership scheme with Redbridge Primary School for key stage 2 children, where she used her skills as a neuroscientist to engage them in activities to test 'How the brain works'. She also shares her experience with key stage 2 children through activities such as essay competitions about women in science.

c. Strategy and plans

The School sees the following as priority areas for impact over the coming 5-10 years:

- Sustained development of an enhanced translational portfolio;*
- Continued establishment of key international relationships;*
- Enhanced engagement with public and professional initiatives*
- Enhanced engagement with key high impact institutional initiatives.*

We also fully recognize the need to support and nurture emerging impacts, as well as to instigate

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new projects. Our recently-introduced management structure, wherein researchers are organised into subject-specific clusters, is already facilitating opportunity identification and enhanced assistance of new staff through the provision of specialist advice and insights, whilst partnerships with colleagues throughout UCL are leading to a range of new collaborative research initiatives which will underpin impact. *Development of an enhanced translational portfolio*: we will achieve this using the support mechanisms outlined above (e.g. UCLB, UCLC), but also by supporting new initiatives with staff appointments and encouraging research leading to translational impact. This will include providing matching support for bids for new facilities (including initiatives such as the School of Life and Medical Sciences Capital Equipment Fund for provision of major equipment). We further plan to enhance our translational portfolio through the development of a drug delivery holding company to work in parallel with the Drug Discovery Initiative, by developing relationships with translational organisations such as MRC Technology and Argenta, and by recruiting staff to enhance existing strengths in strategic areas such as children's medicines, where we already have commercial activity. CDTs and the UCL Impact Awards studentship scheme will be used to support collaborative PhD projects with companies, charities, government institutions and social enterprises to address UCL Grand Challenges. *Establishment of key international relationships* is a key priority for UCL, and we anticipate strong institutional support for our emerging initiatives. These include cooperation with the Royal Pharmaceutical Society (RPS) and International Pharmaceutical Federation (FIP) for the establishment of the Global Workforce Observatory, which will provide a permanent platform for workforce data and advocacy for over 3 million practitioners worldwide. We are also currently developing institutional relationships to develop a School presence in China and Saudi Arabia. *Engagement with public and professional initiatives*: there is considerable support within UCL for initiatives such as open-access publishing (for which funding is being made available) and staff will continue to be encouraged to engage with public initiatives. Our professional engagement with the new RPS Faculty will remain a key priority as this new initiative changes the reward system for practicing pharmacists throughout the UK. *Engagement with key high impact institutional initiatives*, including the establishment of the £700m Francis Crick Institute, the continued development of the Drug Discovery Initiative and the UCL Grand Challenges. We also anticipate high impact from CASMI (Centre for the Advancement of Sustainable Medical Innovation), a major new initiative between Oxford University and UCL for which **Horne** is the UCL representative. The aim of this programme is to address the issues that have led to failures in the translation of basic bioscience into new treatments.

d. Relationship to case studies

The case studies we have selected reflect our strategic emphasis on policy development, introduction of new medicines/therapeutic strategies and public/professional engagement; they also exemplify several important aspects of our impact approaches outlined above.

In terms of *policy development*, the case study of work by **Barber** (UCL03-BAR) demonstrates several of the principles outlined in our approach, especially in terms of the close relationship with both policymakers and fellow healthcare professionals, including the London hospital trusts. Similarly, the study of impacts arising from work by **Bates** (UCL03-BAT) demonstrates our support for staff engagement with international organisations such as the FIP as well as with national educational and healthcare bodies. In both cases, the successful outcomes have reflected the success of our strategy of employing staff who are able to interface with stakeholder bodies. Our *facilitation and introduction of new medicines and therapeutic strategies* features in four of the case studies (UCL03-BAS, UCL03-BUC, UCL03-BRO and UCL03-HAR). In all four, the impact is a direct result of outstanding research but also reflects our use of institutional support. In the cases of **Brocchini** (UCL03-BRO) and **Buckton** (UCL03-BUC), development of the spin-out companies described was supported by the School, whilst the impacts of work by **Basit** (UCL03-BAS) and **Brocchini** (UCL03-BRO) arose in part from their use of the support available for consultancy and licensing of products. Our interface with industry was also vital. For **R Harvey** (UCL03-HAR), the key route to impact was UCL-assisted consultancy and commercialisation of diagnostic tests for diverse user communities. *Public and professional engagement* is exemplified in UCL03BAR, UCL03-BAT and UCL03-HAR, all three of which describe our effective communication with the public and professional bodies, actively supported by contact development with user groups. The work outlined in these studies has led to tangible impacts on the wellbeing of the public and the adoption of practices by the associated professionals and carers.