

<p><b>Institution: University of Bradford</b></p> <hr/> <p><b>Unit of Assessment: A3 Allied Health Professions</b></p> <hr/> <p><b>a. Context</b></p> <p>Our research in the field of Allied Health Professions, Dentistry, Nursing and Pharmacy is underpinned by the ethos of <i>Making Knowledge Work</i> and is relevant to the health and wellbeing of the population of the UK and beyond. It contributes to wealth creation through new and established companies and to the development of policy and practice as well as the delivery of professional services.</p> <p>The beneficiaries of our research are wide ranging and include international pharmaceutical and personal care companies who use our research findings to inform product development (e.g. Alliance-Boots, Parfum Dior, Allergan). This not only supports the economic growth of companies but also contributes to health and well-being of individuals as many of the products are brought to market and directly benefit consumers.</p> <p>Our research has supported innovation and improvement in professional roles and the practice of health and social care service providers across government-funded, private and charitable frameworks such as hospices and care homes. It has influenced policy development at national and international levels. Ultimately it benefits those experiencing a range of health conditions such as cancer, dementia and skin or vision problems. Aspects of our research contribute to the wider public debate on sensitive issues including birth defects and relationship to first cousin marriages within Pakistani communities or smoking by fathers before conception causing DNA alterations in babies.</p> <hr/> <p><b>b. Approach to impact</b></p> <p>The research presented within UoA3 combines multiple professional and academic disciplines with impact extending from industrial production and commerce through changes in practice and service delivery to influence on public policy as well as health behaviours in society. As a result, our approach to impact during the REF period has been intentionally diverse to optimise the influence and reach of our research findings.</p> <p>The University of Bradford's Research and Knowledge Transfer Strategy 2009-2014, which has governed our activity in the REF period, demands that we aim not only "to be a research-active University supporting high quality research, its application and dissemination," but also "to make knowledge work through the effective knowledge transfer between the University and public, private, voluntary and community sectors." The University uses a formal project approval process that requires academics to consider impact including relationships with health services, commercial and industrial organisations, and the third sector.</p> <p>The University seeks to create environments in which our academics can undertake research of the highest quality and produce impact of reach and significance amongst the external stakeholders for that research. These environments are tailored to the respective subject areas of our Schools (Health and Life Sciences for this UoA) and Research and Knowledge Transfer (RKT) Centres by appropriate internal liaison, and map closely onto REF Units of Assessment (UoA). Two University RKT centres, the Centre for Skin Sciences (CSS) and the Centre for Pharmaceutical Engineering Sciences (CPES), are within the UoA3 submission, as are the Institute of Cancer Therapeutics (ICT) and the Bradford Dementia Group (BDG).</p> <p><b>Local Partnerships:</b> The ICT is a partner in the St James's University Hospital, Leeds NlCR/CRUK-funded Experimental Cancer Medicines Centre (ECMC), providing an enhanced level of pharmacokinetic support and developing novel pharmacodynamic endpoints to phase I/II chemotherapy studies in Leeds and Bradford hospitals. The ICT conducts studies to GCLP (Good Clinical Laboratory Practice) under the guidelines of Cancer Research UK and BARQA (British Association Of Research Quality Assurance). The GCLP facility is supported by a Quality Control Manager and research assistant funded by the ECMC enabling our support of clinical trials as discussed in the impact case <i>Apaziquone (EO9) as a new therapy for treating non-muscle invasive bladder cancer</i>.</p> <p>UoA3 academics play a full role in applying development funds, e.g. European Regional Development Fund (ERDF), to the creation of economic benefit through innovation. The University of Bradford coordinates the £8.2M Yorkshire Innovation Fund, part-funded by ERDF; participates in the £4.6M Nanofactory ERDF project; and is a full member of the METRC consortium which pools</p>
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expertise from universities across the North of England to help accelerate the development of new products and processes. For example, CPES, an interdisciplinary research centre founded in 2009 and working across the pharmaceutical sciences, polymer and process engineering disciplines, has used such funding strategically to grow its portfolio of industry partners during the REF period, working on dozens of the small-scale projects typical of this funding regime to develop relationships and trust. CPES has now secured more than £300K to work with local companies supported by the new Yorkshire Innovation Fund, to facilitate regional economic growth through innovation. The Born in Bradford ([www.borninbradford.nhs.uk](http://www.borninbradford.nhs.uk)) cohort study and programme of research is embedded in local schools and health services at policy and practice levels, working closely, for example, with City of Bradford MDC to ensure its “results are applied to our learning about our children to shape our thinking and policy” (Kate Tunstall, Strategic Director – Children’s Services). It demonstrates excellent examples of engagement with the local community through a diverse set of activity that range from social (Teddy bears picnic) to the shaping of the study’s priorities via the Parent Governors Group.

**International Partnerships:** Since 2006 the UK-China Healthtech Open Innovation team, based at Bradford, have run a rapidly-expanding collaborative research and technology development programme across China. A particular feature of this is a programme with key centres in China supported by £10M of proof of concept funding for joint UK-China projects. The UK-China Healthtech Open Innovation team’s programme is focused on open innovation, translational research, commercialisation and joint new company creation in multiple centres across China (e.g. Beijing, Tianjin, Shanghai, Changzhou, Guangzhou). The team are actively involved in UK government programmes with China (e.g. UK-China Joint Economic Trade Commission, R2D BioBridge etc). In 2011 an agreement was signed with Medipex (an NHS innovation hub) for the rights to exploit regional NHS intellectual property in China. In 2012, the team launched a programme with Cancer Research UK, to accelerate collaborative translational research, and to enable existing intellectual property funded by the charity to receive the further support required for successful commercialisation in Chinese and international markets. It has successfully run six open innovation workshops and has established 18 projects funded by either the Chinese government or companies, with a further 25 projects at the application stage, up to 12 of which are expected to receive funding. In 2008, staff from this UoA set up a spin out company in China, with a strategic collaboration with the Chinese National Academy of Nanotechnology and Engineering. More recently, the team has been commissioned by AstraZeneca to identify drug delivery strengths in China and establish new EU-China technology collaborations in this area.

**Working with Industry:** Staff within UoA3 have benefited from central business development support in initiating, developing and securing funding for collaborative projects between academics and industrial partners. The University of Bradford’s ten most important company relationships by value and half of the contracts established in 2008-2013 involved academics from this UoA. This was worth £4M distributed over 95 contracts and included Knowledge Transfer Partnerships and Innovation Vouchers. For example, CSS (the largest academic base in Britain for fundamental and applied skin and hair follicle sciences) has developed a successful two element approach to industry partnerships; leveraging the power of contacts with key industry people and applying greater business empathy when developing the funded relationship. This approach is supported by a dedicated business development manager (an ex-industry skin researcher and current president of the European Hair Research Society) and has led to significant confidence in CSS and good repeat business. In the current period (2008-2013) they have delivered 30 projects worth £1M per year with partners such as Philips, Reckitt Benckiser, Unilever, Alliance-Boots, Parfum Dior, Allergan and L’Oreal. These range from expert witness support in international patent disputes to the co-development of technologies incorporated into products that have been launched on the market and have reached thousands of consumers. Details are provided in the impact case *Scientific discoveries in skin pigmentation contribute to the development of bestselling skincare products of high commercial value*.

**Working with practitioners and service users:** While commercialisation and product innovation are an important aspect of impact, academic researchers within Bradford’s UoA3 submission are also committed to making a difference to the patient experience through research focussed towards the health professions and health service delivery. Strategic involvement with the Bradford Institute for Health Research (BIHR, [www.bradfordresearch.nhs.uk](http://www.bradfordresearch.nhs.uk)), as well as direct knowledge exchange partnerships with local healthcare providers, the third sector and the University of Leeds

has generated an active community of practice. Staff are encouraged and supported to attend to the requirements of their professional organisations and feed into professional and governmental advisory bodies in order to influence practice, policy and practitioner development. Examples of this are given in our impact cases (see section d). Engaging the public and users in health research as part of planning, development, implementation and dissemination is a priority for Bradford colleagues within this UoA. Together with BIHR, we have an active patient and public engagement programme in which patients and service users are included in the development of research grant applications and on research advisory and steering groups.

**Public engagement:** Through actively engaging with television, radio and other media outlets, our work has also informed wider public debate and shifted public attitude. For example, Edwards from the Bradford Dementia Group (BDG) took part in the BBC2 TV programme “Can Gerry Robinson Fix Dementia” in 2009, viewed by over 2 million people and converted to a DVD to support staff training in care organisations. Similarly colleagues used their work to inform the 2012 BBC1 Panorama TV programme “Undercover: Elderly Care” watched by 3.7 million. As part of this the Bradford team engaged in social media audience interaction before, during and after the event. The commitment shown by colleagues from BDG in ensuring their work informs public and policy opinion as well as improving organisation approaches to dementia through consultancy and training was recognised internally with colleagues being awarded the University Award for Business Innovation (2010) and the VC award for Knowledge Transfer (2011).

### c. Strategy and plans

Our broad and diverse impact approaches as described in the previous section and exemplified by our five impact cases will continue to inform future research strategies and plans.

A review of our internal research proposal approval and monitoring will be undertaken to ensure that current processes are capturing all potential impact and that continued and long term monitoring of impact is established in line with UKRC and NIHR expectations. This will enhance our understanding of the complexity of impact as a concept and ensure staff at all stages of their research careers appreciate the importance of this aspect of research and that it continues to be formally recognised through promotion and other recognition exercises.

The CSS, CPES, BDG and ICT have dedicated business development managers. In CSS, CPES and BDG these posts were initially supported by HEIF funds and have subsequently become part of the core staff. These on-going staff investments will allow the continued support of our relationships with external commercial and industrial partners, ensuring we build sustainable relationships such as the recently signed Framework Contract agreement between CSS and Alliance-Boots and the EU-funded Network for Initial Training between Philips and CSS.

The University will continue to manage HEIF and other funds to promote short-term boosts to long-term relationships with external partners. Recently researchers in this UoA have benefitted from £140K investment over 2 years to take an existing prototype of an international database for Dementia Care Mapping data, to a market-ready product for cross-organisational care monitoring and international benchmarking.

We will continue to develop our Intellectual Property and commercialisation activity. Previous successes include the sale of University of Bradford spin-out pharmaceutical company Bradford Particle Design (BPD) to an American firm for \$200M. More recently, 46 filings in 10 patent families and four awards in three families have been made during the period 1/1/08 - 31/7/13. Of particular note is the MMP prodrug (ICT2588) patent family (14 filings, yet to be granted) which has been assigned to the University's spin-out company Incanthera Ltd ([www.incanthera.com](http://www.incanthera.com)), founded in 2011 by researchers at the Institute of Cancer Therapeutics to act as the commercial development vehicle for novel medicines for the treatment of cancer discovered in house. The interactions between Bradford staff and Incanthera Ltd. are maintained by a highly experienced scientist/business development manager who is seconded (0.2FTE) to the company. Incanthera Ltd secured an initial £0.375M funding in Jan 2012 from SPARK Impact, manager of the North West Biomedical Fund, to initiate clinical development of ICT2588. Investment in Incanthera has now risen to £3M with further UK venture capitalist and business angel support alongside a US based technology Investment Company and in March 2013 a Wellcome Trust Translational Award to support the scale-up manufacture, preclinical toxicology evaluation and clinical trial protocol for a Phase I clinical trial of ICT2588 scheduled for 2014.

The Born in Bradford programme is being extended through a series of events to stimulate new collaborations that maximise use of collected data and the embedding of strategically linked

projects. We will continue to strengthen links with the NHS through strategic joint appointments and secondments between the University of Bradford and BIHR/Bradford Teaching Hospitals Foundation Trust (BTHFT). We are encouraging further clinical-academic partnership through the introduction of research focussed clinical academic posts within health practitioner environments to embrace partnership working and provide a clear avenue for clinical implementation and evaluation of research. Based on the success of a jointly-funded (Bradford /BIHR/BTHFT) doctoral Fellowship in Medicines Management and Patient Safety, we have established two further posts with Sheffield NHS Trust. We will continue to develop and deepen our programme of patient and public involvement in research by spreading existing good practice more widely. Research and practice expertise in dementia, patient safety and medicines management resulted in the University being selected by Bupa as partner for the Research, Innovation and Teaching Care Home.

Our commitment to making knowledge work by ensuring that our research informs policy is ongoing as exemplified by our impact cases and more recent appointments of staff to a National Institute for Health and Care Excellence (NICE) Guideline Development Group producing good practice guidance for medicines management in care homes.

We will continue to co-ordinate media engagement with our work as in recent examples in relation to the impact of first cousin marriages on neonatal defects in Pakistani community, the effect of men smoking on their unborn children and the potential harm of tattoos. These news items were published in all UK papers and covered by TV news and radio and the findings presented on more than 90 websites with global reach demonstrating the international public interest in our work and the potential it has to encourage public debate and shift attitudes.

The Bradford Crocus Cancer Appeal ([www.crocus.brad.ac.uk](http://www.crocus.brad.ac.uk)) is a recent local charitable initiative between the University of Bradford, Yorkshire Cancer Research, the Telegraph & Argus Newspaper and the Sovereign Healthcare Charitable Trust that aims to raise £1M (more than 300K raised in the first five months) for the purchase of a state-of-the-art mass spectrometry facility through public support while exploring the role of social media to further understanding and engagement of the public with the scientific basis of the research programme and its application.

#### **d. Relationship to case studies**

Our selected case studies illustrate the breadth of impact that is delivered by staff submitted within this unit of assessment, with work on potential cancer cures (*A3-1 Apaziquone (EO9) as a new therapy for treating non-muscle invasive bladder cancer*) showcased alongside changes to prescribing policy in children's hospices (*A3-2 Improving medicine management across the UK's children's hospice service*) to policy and professional education changes in the prescribing of spectacles in older people to help prevent falls in the elderly (*A3-3 Changes to ophthalmic clinical practice to help reduce trips and falls*) to cultural change in the treatment of people with dementia (*A3-4 Improving care for people with dementia*) and wealth creation for established multinationals (*A3-5 Scientific discoveries in skin pigmentation contribute to the development of bestselling skincare products of high commercial value*).

A number of staff from across the UoA have developed bespoke training and evaluation packages for care provider organisations and professional groups, the delivery of which demonstrates movement from developing knowledge to implementing knowledge in practice and evaluating change. Dementia Care Mapping is an obvious example of this with international franchise of the tool and evaluation strategies (*A3-4*). Similarly the medicines management toolkit for children hospices (*A3-2*) is now in its second edition and is being further developed for use in Belgium.

Research published by our staff in academic journals has informed national and international guidance (e.g. work of Downs cited in NICE and National Audit Office Guidance around Dementia, see *A3-4*) as well as underpinning professional guidance and policies in areas such as vision and falls (produced by the College of Optometrists and the British Geriatrics Society based on Elliott's work, *A3-3*) and children's hospices (*A3-2*). Elliot's collaboration in 2010 and 2012 with the consumer association *Which?* has improved public understanding of the risks of wearing bifocal and varifocal spectacles and stimulated public debate as detailed in *A3-3*.

The selected case studies illustrate our varied approaches to enabling impact, with impacts being delivered through working locally and internationally with patients and carers' groups, commercial and industrial organisations, professional bodies and clinical trials.