Institution:
ASTON UNIVERSITY

Unit of Assessment:
3:- ALLIED HEALTH PROFESSIONS, DENTISTRY, NURSING AND PHARMACY

a. Context

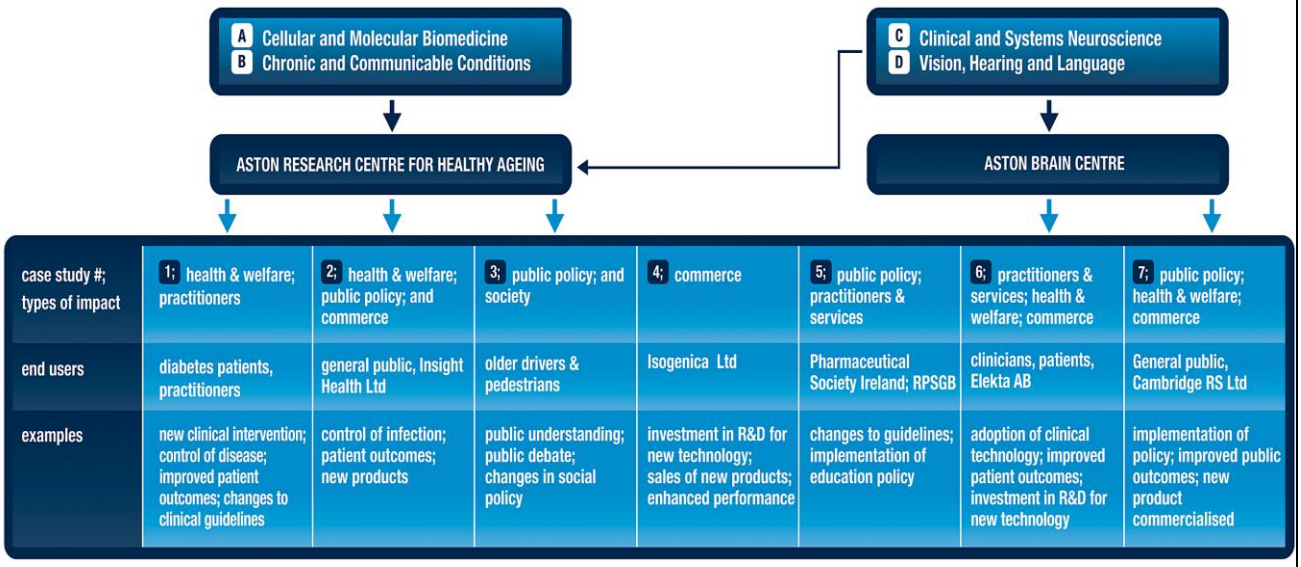
Research in the School of Life and Health Sciences (LHS) delivers impacts on 1) health & welfare 2) public policy & services 3) commerce 4) practitioners & services and 5) society for the benefit of the general public, patients, clinicians, public policy makers and commercial organisations.

The main examples of impact and non-academic user groups for each case study are presented in Figure 1. These impacts have arisen from our four research themes (A-D; Figure 1) extending from biomedical to applied clinical sciences, which feed into two research centres, Aston Research Centre for Healthy Ageing (ARCHA) and the Aston Brain Centre (ABC).

ARCHA's mission is to understand, predict, prevent and intervene to facilitate healthy ageing by concentrating its research on aspects of the eye, the mind, metabolism and medicines. Two internationally renowned areas of impact from ARCHA's metabolism research portfolio are the development of treatments metformin and dapagliflozin for type 2 diabetes; and temozolomide for brain cancers (pre-1993 research conducted by Tisdale). In 2008, Aston celebrated the 30th anniversary of the start of the project which led to the discovery of Temodal (temozolomide), a drug with sales now exceeding $7.5 billion dollars since its launch in 1999. The commercial and health impacts of Temodal research continue with new opportunities in combination therapies.

The ABC promotes interdisciplinary translational research, incorporating studies on disorders related to neurodevelopment, social and cognitive neuroscience and neurological disease. ABC also provides a unique training centre for magneto- (M) and electro- (E) encephalography (EG). The ABC houses the Wellcome Trust laboratory for MEG studies (established 1999) and the first high-resolution paediatric-compliant MEG in the northern hemisphere.

Leaders from non-academic user groups (charities, health service providers, patients, the public and industry) serve on our research centre advisory boards to promote effective reciprocal communication between end-users and our researchers. In essence, we have developed a culture of knowledge transfer such that achieving impact is a priority and an integral part of our strategy.



case study #; types of impact	1; health & welfare; practitioners	2; health & welfare; public policy; and commerce	3; public policy; and society	4; commerce	5; public policy; practitioners & services	6; practitioners & services; health & welfare; commerce	7; public policy; health & welfare; commerce
end users	diabetes patients, practitioners	general public, Insight Health Ltd	older drivers & pedestrians	Isogenica Ltd	Pharmaceutical Society Ireland; RPSGB	clinicians, patients, Elekta AB	General public, Cambridge RS Ltd
examples	new clinical intervention; control of disease; improved patient outcomes; changes to clinical guidelines	control of infection; patient outcomes; new products	public understanding; public debate; changes in social policy	investment in R&D for new technology; sales of new products; enhanced performance	changes to guidelines; implementation of education policy	adoption of clinical technology; improved patient outcomes; investment in R&D for new technology	implementation of policy; improved public outcomes; new product commercialised

Figure 1. Relationship of research themes and centres to impact and end users.

b. Approach to impact

1) Interaction with beneficiaries and end users

Many members of LHS are engaged in translational research through collaborative research partnerships and professional networks and in strategy and policy development through specific advisory appointments.

Government and regulatory bodies Examples of international and UK Government committee and advisory panel membership include: **Bailey**, who served as an independent expert reviewer for the FDA by advising on the design of trials and efficacy evaluation leading to metformin's approval (**case study 1**) and now leads the global partnership for effective diabetes management

'Control to Goal' treatment guidelines for health practitioners. Bailey is also co-chair of the European Coalition for Diabetes. **Holland** was part of an expert review panel for the Road Safety Observatory, Department of Transport and contributed to the evidence base for the Parliamentary Advisory Council for transport safety (**case study 3**); and **Woodhall** is a member of the UK Government Animals in Science Committee.

Commercial organisations Over the last five years, LHS has continued to increase the range and depth of its engagements with business and industrial organisations. These include the co-ordination of partnerships and supporting applications for RCUK CASE awards. LHS has received 29 RCUK CASE awards since January 2008 including 17 BBSRC awards (e.g. **Hine** with Isogenica, **see case study 4**); 9 EPSRC awards (including **Worthington** and Insight Health, see **case study 2**), 1 ESRC (**Holland**, **case study 3**) and 2 MRC awards (e.g. **Lowry** with Morvus). Other industry-funded partnerships include a Bioscience knowledge transfer network SPARK award, European Regional Development Funding, seven Knowledge Transfer Partnership awards (e.g. a deepening relationship with Insight Health) and three Technology Strategy Board awards (e.g. **Lambert** with Mologic Technology). We are also actively involved with international Higher Education Institutions and industrial consortia (>45 members) associated with Marie Curie IAPP (**Griffin**-TRANSCOM); Research for Benefit of SMEs (**Griffiths** - ERDF Biomarkers); and FP7 collaborative projects (**Gibson**-EUROCONDOR, **Griffin**-TRANSPATH, **Perrie**-TRANSVAC).

Advocacy groups representing public interest Members of LHS are involved in advocacy groups to influence opinion and public policy. **Griffiths** is a member of the research advisory committee for Research into Ageing (AgeUK); **Holland's** work has contributed to the evidence base for Help the Aged document "Keeping on the move" (**case study 3**); and **Langley** is a member of the Royal Pharmaceutical Council's Education Expert Advisory Council (**case study 5**).

Practitioners, clinicians and patients In order to maximise impact within the healthcare setting for patients, practitioners and clinicians, LHS has entered into strategic partnerships with Birmingham Children's Hospital (BCH) and the Heart of England Foundation Trust (HEFT) through joint appointments (e.g. **Seri, Gibson** and **Bellary**). Evidence of follow through from these activities include: 1) LHS acts as the lead organisation for a cross-Birmingham group studying type 2 diabetes and its management in the young (**case study 1**); 2) Aston and HEFT are now joint members of the European Vision Institute Clinical Research Network to facilitate multicentre clinical trials. The team was a key contributor to a landmark trial for wet age-related macular degeneration; 3) use of MEG to accurately localise changes in neuronal oscillations in epilepsy patients which inform pre-surgical screening for refractive epilepsy (**case study 2**); 4) establishment of a human brain tissue laboratory for the study of tissue removed during surgery to gain mechanistic insight into epilepsy and support future drug development. In May 2012, Aston/BCH was awarded centre status for epilepsy surgery (one of two in the UK); 5) increased understanding of the specific clinical and EEG phenotypes for photosensitive epilepsy supporting its diagnosis and improving patient care (**case study 6**).

2) Unit and institutional support for staff

Specific support for individuals and groups to achieve impact from their work is provided through financing, time allocation, training and LHS's strategic partnerships/appointments.

Our strategic follow-on fund provides a platform for proof of concept funding for individuals to secure critical data required prior to partner engagement (e.g. **Parri**, this led to a BBSRC CASE with Eli Lilly UK). Further to this, sabbaticals are offered for up to six months to support engagement with industry and commercialisation of research (e.g. **Hine,** 2011). LHS has recognised the importance of staff representation on government and advocacy advisory boards to achieve impact from their research, and provides time for attendance in work-load models. To improve staff awareness of impact-drivers, training is provided for industry-focused grant writing and to support greater understanding of intellectual property and its value for commercial partners. Strength of support is exemplified by a 75% success rate in third stream funding.

Institutional support for staff is provided through the School-based representatives of the Research Support Office (RSO), the Business Partnership Unit (BPU), and the Aston Health Research and Innovation Cluster (AHRIC). RSO provides the interface between researchers, finance and legal teams. It aims to improve the dissemination of information and implements training courses and workshops to facilitate and develop strong, competitive research proposals. RSO employs an EU specialist to identify strategies for international partnership funding and to exploit knowledge

transfer through EU funding instruments. The BPU provides expertise in linking Aston's research staff to those in commercial, public and third sector organisations. Its specific goals are: to increase the range and depth of industrial contacts relevant to research, to support approaches to relevant funding streams, and to prioritise delivery of impact from research output. Our Business Development Manager presents LHS expertise and research to over 30 companies a year at Bio-partnering events (e.g. Genesis, Biotrinity) and hosts business lunches to build links with users. The BPU also manages the University's intellectual property portfolio and supports academics in seeking funding for licensing and development of spin-out companies. Since 2011, Isis Enterprise has facilitated our exploitation activities by providing a market specialist for each specific area. This partnership has proved successful in gaining access to a wider range of networks, contacts and expertise than could be achieved by Aston alone. Recent successes from this approach include the licensing of a novel disinfectant EuClean to Insight Health (**case study 2**) and Proximax to Isogenica (**case study 4**). AHRIC co-ordinates health-related research and innovation, facilitates strategic relationships and develops research opportunities with key NHS Trusts. It provides a critical governance framework e.g. oversees compliance with ethical review processes and the Human Tissue Act thereby facilitating research with impact in clinical environments.

3) Other mechanisms to support and enable impact

Our academic publications are freely available through Aston University Research Archive and we seek to maximise scientific impact with users by distribution of promotional reports, bulletins, and dispatches. LHS is committed to enhancing its media presence (e.g. **Hilton's** BBC presence to increase public understanding of infection) and has embraced social media including Twitter. Furthermore, LHS made an extensive contribution to the British Science Festival which was held at Aston in 2010 and will return to Birmingham in 2014. Our contribution included public demonstrations and seminars highlighting Healthy Ageing, neuroimaging, optometry and pharmaceutics. In addition, we promote active involvement in public/member fora e.g. Alzheimer's UK (**Hill**) and Parkinson's UK (**Stanford**), numerous Café Scientifique talks, school visits and open seminars to stimulate public debate. The BPU compiles case study specials showcasing industrially relevant research, and produces 'Links to Business' which is sent to over 1300 companies monthly. Other research impact bulletins include 'Aston Advances' and LHS-specific research brochures sent to practitioners, government organisations and charities.

c. Strategy and plans

Our impact strategy is reviewed annually at the Research, Enterprise and Community Engagement committee to ensure it meets the needs of our user groups. We plan to capitalise on our multidisciplinary research to facilitate new knowledge creation related to health and its application to products, to policy and to practice. Our strategy is to:

- grow the number of collaborative post-graduate research students using a matched (50% Aston/50% industry) funding scheme in order to attract new industrial collaborators and partnerships that align to commercial strategies. Six such projects have been funded within the past year including **Flower** with the pharmaceutical company UCB;
- develop our recently launched research centre in Vision & Hearing; we will engage end-users in the advisory board who will guide our approach in a manner consistent with our translational research aspirations and we will extend commercial engagement e.g. with Optegra Ltd based in our University Day Hospital, to develop and evaluate novel diagnostics and therapeutics;
- cement our close working relationship with the Heart of England Foundation (HEFT) and Birmingham Children's Hospital (BCH) by targeting joint funding e.g. NIHR and industrial awards. We have also launched a Professional Doctorate in Pharmacy to enhance critical mass in practice-based research;
- extend existing industrial associations with major Pharma e.g. Glaxo, Eli Lilly, and Unilever through School advisory group membership and regular research showcase events to enhance end-user relevance of our excellent research. Further interaction with blue chip companies and SMEs will be facilitated through the Local Enterprise Partnership network;
- target the EC Horizons 2020 programme with partners through SME-led initiatives that deliver commercial benefits. The School has already had significant success with collaborative schemes for developing and exploiting research for end-user benefit such as Marie Curie ITN and IAPP (TRANSPATH; TRANCOM);
- enhance institutional/unit support for achieving impact by the development of bespoke software

developed by Computer Sciences to flag milestones in impact pathways. Six-monthly updates from researchers on project outputs to BPU and AHRIC teams will be screened for potential application, translation and exploitation e.g. the relationship between **Hine** and Isogenica was founded on a recommendation from BPU. This systematic approach will work in parallel with an open-door policy of support teams to develop timely approaches to impact with researchers throughout the project life-cycle;

- recognise those individuals whose research is achieving major impact, by 1) changes in University promotion criteria where impact of research has been embedded in the 'wider mission' criterion for promotion, and 2) establishing impact leaders and mentors;
- invest in technology development e.g. £15K to **Griffin** to develop transglutaminase inhibitors.

d. Relationship to case studies

Our research culture, institutional support mechanisms and approach have produced relevant research with impact for many years. The following seven case studies highlight how our approach has delivered significant impact across the breadth of allied health professions and pharmacy.

Bailey Case Study 1 - **Metformin: changing the treatment algorithm for type 2 diabetes**. **Bailey** was provided with financial support for proof of concept work and IP development. Support was also given as time to travel globally in an advisory capacity and to serve on international bodies developing treatment guidelines for type 2 diabetes.

Lambert Case Study 2 - **The control of healthcare-associated infections.** This study evolved with institutional/unit support and details commercial activity which has resulted in clear end user (patient) benefits. LHS-BPU worked closely with **Lambert, Worthington** and Insight Health Ltd to write and negotiate agreements for three successful EPSRC CASE awards and one KTP. The final KTP report submitted to Technology Strategy Board/KTP panel achieved a rating of 'outstanding'.

Holland Case Study 3 - **Older drivers and pedestrians: impacts on policies, stereotypes, practitioners, and public awareness** This case study involved unit support for outreach activities and interaction with advisory groups. Through BPU support, **Holland** built relationships with the RAC Foundation and with Goodmedia. The BPU facilitated approaches to Goodmedia for a successful ESRC CASE student application leading to improved understanding of vulnerabilities of older drivers which underpins a shift in public policy and perception.

Hine Case Study 4 - **Development and commercialisation of 'ProxiMAX' randomisation.** This case study exemplifies institutional support for commercial development and exploitation of IP**. Hine** was awarded a Midlands Medici Fellowship (entrepreneurship and commercialisation training) in 2003 and was seconded to the BPU on an Innovation Fellowship in 2005/6 in order to continue her own commercialisation work and to promote similar work amongst colleagues. BBSRC follow-on fund and funds from Mercia Spinner culminated in commercialisation readiness. BPU facilitated the high profile licence deal with Isogenica Ltd to exploit technology. **Hine** received a three month research sabbatical in 2011, specifically for transfer of ProxiMax into Isogenica. **Hine** won BBSRC 'Commercial Innovator of the Year 2013'.

Langley Case Study 5 - **Reforming international pharmacy education policy.** The Pharmacy Education and Accreditation Reviews (PEARs) project established by **Langley** and **Wilson** arose from interaction with professional networks and government advisory committees. **Langley** and **Wilson** have been afforded time in load models to engage actively with professional bodies relevant to Pharmacy. **Langley** secured promotion to Chair under the research impact/wider mission criteria. RSO provided support in negotiating contracts across two different EU countries.

Furlong Case Study 6 - **Development of magnetoencephalography (MEG) for clinical service provision.** Institutional support through a £4.4M Aston Strategic Research Initiative Fund enabled construction of the ABC building. RSO facilitated a successful £1M equipment bid to The Wellcome Trust for paediatric-compliant MEG system. The BPU secured a commercial contract with Elekta for the development of novel MEG protocols and provision of international Elekta 'training centre'.

Seri Case Study 7 – **Photosensitive epilepsy: policy making and safeguarding.** This case study is an example where strategic clinical appointments made by LHS have facilitated interaction between Aston researchers and policy committees e.g. OFCOM. This has led to policy changes which affect health and welfare on a national and international scale and culminated in commercial activity with Cambridge Research Systems Ltd. The BPU and RSO ensured effective communications and the generation of publicity platforms.