

Institution: Keele University
Unit of Assessment: A3 Allied Health Professions, Dentistry, Nursing and Pharmacy
<p>a. Context</p> <p>A key objective of health research at Keele is to improve the health and welfare of individuals with long-term conditions by producing world-leading research that impacts across the field, ranging from the laboratory investigation of cellular mechanisms to developing and testing innovative clinical interventions. The <i>Institute for Science and Technology in Medicine</i>, ISTM, and the <i>Institute for Primary Care and Health Sciences</i>, IPCHS have integrated strategies that aim to maximize our impact across cross-cutting themes, e.g. basic mechanisms of neural injury, genetics of multiple sclerosis and rehabilitation following stroke, while maintaining a strong focus on key areas such as the management of musculoskeletal pain and arthritis. The long term conditions we investigate represent a major global burden of disease and there is international recognition of the urgent need to identify clinically and cost effective treatments. Taking the example of musculoskeletal pain, we aim to achieve a fundamental shift away from a focus on disease categories, into targeted and more holistic pain management in the primary care setting. To ensure our research influences health policy and improves service provision, we work closely with local, national and international stakeholders, aiming to help clinicians and patients to be more effective in managing those symptoms through attention to prognosis, stratified care and supported self-management. Our influence in advancing health policy and practice in the field of musculoskeletal pain has been recognized through the Queen's Anniversary Prize for <i>Pioneering the early prevention and treatment of chronic pain</i>.</p>
<p>b. Approach to impact</p> <p>We have dedicated mechanisms to identify and promote our key research outputs through local, national and international dissemination as well as ensuring where appropriate their incorporation into clinical practice and NHS commissioning plans. Examples of our approaches include organization of national meetings to appropriately targeted audiences, cultivation of our national and international collaborations, partnerships with industry, and specific investment to support roll-out into practice of the practical tools and treatment approaches that our research has demonstrated to be effective. This latter approach is exemplified by the IPCHS primary care musculoskeletal research group where Dziedzic, one of our senior academics and NICE Fellow, leads our Research Implementation Strategy, supported by a dedicated Manager (Duffy), an NIHR Knowledge Mobilization Fellow (Stevenson) and two GP Research Fellows (Somerville, Cooper). This group works closely with the IPCHS Executive Team and our international collaborators in the US, Europe and Australia, to formulate clear research implementation plans and to identify research outputs that lend themselves to rapid translation and implementation by health providers. Impact through collaboration with industry is supported by Keele's Research & Enterprise Services and facilitated by the physical proximity of the Research Institutes to the Keele Science Park and Innovation Centre, fostering long-standing relationships with several companies – for example in pharmaceuticals, medical materials and scanning technology – including the sponsorship of PhD students and contract research. To further expand these links Keele established its Nova Centre in 2012, which is an on-campus business growth programme and incubation unit for start-up businesses, with dedicated on-site business support and initial peppercorn rents. To maximize international impact, we support researchers to participate in prestigious events (e.g. Harvard and NIH Grand Rounds, Farrell), to take leadership roles in multi-national research programmes (e.g. IMPROVED, Baker; PDOPPS, Davies), and knowledge transfer (e.g. the adoption of STarTBack in the US in collaboration with the Patient Centred Outcomes Research Institute, www.pcori.org).</p>
<p>c. Strategy and plans</p> <p>A key aim within Keele's Strategic Plan is to 'deliver international excellence and impact in focused areas of research'. In line with this, the Research Strategy (2011–15) sets out plans for research to have a significant social, cultural, environmental and economic impact, and to work with external partners and collaborators to benefit society.</p> <p>Communicating our Research: Since 2011 Keele's Marketing and Communications has engaged dedicated external professionals to promote research impact through marketing, web-pages and publications, e.g. dedicated reports on Ageing Research at Keele. We have supported</p>

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national and international uptake of our research through our website, presentations at conferences for healthcare providers and professional groups, and participation in guideline groups. An example of targeting specialized audiences is the bi-annual EuroPD meeting www.europd.com held in venues across Europe to reach specialists practising peritoneal dialysis, for which Davies has been scientific programme chair for the last 10 years.

Intellectual Property (IP) Keele's IP policy, administered by **Research & Enterprise Services** <http://www.keele.ac.uk/media/keeleuniversity/graduateschool/Keele%20Commercialisation%20Policy.pdf>, is designed to optimize research impact as well as creating the opportunity to reinvest income from commercialization. For example, the **Medicinal Chemistry Group** used royalty income (c. £500K to date) from *tetrafosmin*, a cardiac imaging agent, to purchase state-of-the-art analytical equipment. **IPCHS** has shared IP policies with collaborators and NHS partners, supporting early identification and free use to support rapid dissemination of IP into clinical practice. Impact is maximized by developing our IP into products that can be easily adapted into routine clinical practice. Examples include clinical assessment tools, patient-reported outcome measures, and clinician training packages on new interventions. Use of the STarTBack screening tool by UK GPs is supported by embedding it within computerized consultation systems, a web-based calculator and smart phone App, and professionally produced DVDs to support clinician training on stratified care treatments for low back pain.

Working with partners and stakeholders: In addition to its commercial partnerships, Keele has strong national engagement with key NHS stakeholders. The focal point for local NHS engagement is through its **Health Research Strategy** meeting, held quarterly and chaired by Keele's Executive Dean of Health. Strong **Academic/NHS Healthcare Provider Links** are exemplified by the **Primary Care Musculoskeletal Research Consortium** (1998 to date). The Consortium's lead NHS partner, North Staffordshire CCG, holds the primary care research contracts with the National Institute for Health Research (NIHR: £14,051,000 2008–2013). Joint accountability to the University and to the NHS for this research and its dissemination is managed through senior academic and NHS leadership on the Consortium Board. The Board reviews annual research priorities (to ensure these are important, feasible and useful to patients, clinicians, healthcare providers, and policy makers) and research implementation plans, measuring impact by the extent to which our research has influenced guidelines and service redesign locally, nationally and internationally. Finally, the Board oversees clinician participation in the delivery of our research, seeing this activity as a strong platform for early adoption of research. All Physiotherapy centres, all clinical directorates at our University Hospital, and 83% of the GP practices in our area are research active.

Clinical and patient engagement is an essential component in our research. Each of our research programmes has a Clinical Advisory group, where local clinicians and international collaborators help to shape research ideas and study designs, ensuring that we address issues that are important and relevant to the NHS, that clinical insights are appropriately incorporated, and that the research design can feasibly be carried out within routine clinical practice. Over 500 clinicians in our region have engaged in our research projects, receiving training in research methods and delivering the usual care and experimental arms of our trials. This level of research participation helps individual clinicians to gain new knowledge and insights and to incorporate research-driven approaches into their own practice. Lessons learned whilst delivering our research projects are incorporated into local service improvements. Since 2003, our group has supported Evidence-Based Practice groups for AHPs, which aim to integrate best evidence into clinical practice by supporting these clinicians to carry out systematic searches and critical appraisal of evidence to address clinically important questions. Outputs include clinical bottom lines and simple clinical algorithms to define and support delivery of best practice (<http://www.keele.ac.uk/ebp/mrfgroup/>). Where gaps in evidence have been identified, our EBP groups have helped develop new trial proposals. An example of this is our current NIHR trial of treatment for shoulder impingement (SUPPORT). Our international research reputation, and our commitment to ensuring our research findings influence delivery of health services and improve patient outcome, led to our involvement in developing the West Midlands **Academic Health Sciences Network** (AHSN). The Keele research group (Dziedzic, Croft, Russell, Hughes) are leading the Long Term Conditions and Integrated Care themes within the AHSN, which will adopt national roll-out of stratified care for low back pain (STarTBack) and management of OA (MOSAICS) as its exemplar case studies. Future

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plans expand this model to underpin the research strategy for the newly formed **Health Services Research Unit (HSRU)**, which is embedded within **ISTM** but will work closely with the main secondary care provider, University Hospital of North Staffordshire (Fryer, Davies), CCG leads, and Primary Care Research Networks to extend our research programme to address multimorbidity and health care at the primary/secondary care interface. **HSRU** members provide strong research leadership to the NIHR Stroke Network (Roffe), the Renal Research Consortium (Davies) and the Royal College of Pathologists (Fryer). Finally, established **long-term relationships with regional patient groups and charities**, for example the Haywood Foundation for Arthritis Research support translational researchers based in **ISTM**.

Influencing local, national and international policy and healthcare practice: Building on our track record of developing research-led innovative local services for musculoskeletal pain and back pain (which were cited as best practice examples in the DoH's Musculoskeletal Framework for the UK; 2006), we have worked with local clinicians to develop a new **community-based chronic pain management** service (the IMPACT service). The IMPACT service was cited by Dame Carole Black (National Director for Health and Work) in presentations on her 2010 report "Working for a Healthier Tomorrow" as the only model she has seen nationally that provided an integrated approach to address mental health and musculoskeletal problems among patients in order to reduce long-term sickness absence in this group. In 2013, the IMPACT service won the *Health Service Journal's* National Care Integration award for pain management. Internationally, we have supported roll-out of STarTBack (stratified care for spinal pain), which has been adopted in at least 85 clinical organizations across the UK and Europe, North America, and Australia. To ensure our plans for impact come to fruition, we provide staff with protected time and support from our systematic reviewers, and to be panel members or invited experts in **national and international guideline and advisory groups**. We have strong representation on national speciality groups that define the research agenda (e.g. **the NIHR Stroke Research Network and Kidney Research Consortium, Arthritis Research UK Clinical Specialty Groups**). Our researchers are members of national, and international guideline groups and our research is cited in: NICE OA (2008 and 2013), Depression (2009), and Back Pain guidelines (2008), and EULAR Task Force on Diagnosis of Knee and Hand OA, PMR and Gout¹ (2008; 2009; 2010). Members of our groups have worked with NICE to develop and test indicators to be included in a Quality and Outcomes Framework for rheumatoid arthritis and OA. Results from our trials have also been incorporated into national clinical guidance (Map of Medicine), Clinical Evidence, Cochrane and BMJ reviews to inform best clinical practice for the management of back, neck, tennis elbow, shoulder and knee pain (Binder, 2006; Green et al., 2001; Mallen et al., 2006; Scott & Kowalczyk, 2007; Fransen et al., 2008; Roddy et al., 2013; Uthman et al., 2013).

As an Arthritis Research UK Centre-of-Excellence, **IPCHS** supports the charity to highlight the **implications for health policy** of the prevalence and impact of arthritis on individuals, on health services and on society. We have produced short reports (*Musculoskeletal Matters*) <http://www.keele.ac.uk/pchs/disseminatingourresearch/newslettersandresources/bulletins/> also available via Arthritis Research UK's (ARUK) communication systems, which provide easily accessible, relevant information for health care professionals, teachers, trainers and policy-makers about managing musculoskeletal problems (Jordan, 2009, 2010; Jinks, 2010; Foster, 2011; van der Windt, 2012; Bedson, 2013; Stevenson 2013). Topics have included GP workload, reasons for consultation, patient experience, effective management of knee pain, supporting return to work, trends in GP prescribing, and getting evidence into practice. We have supported the Arthritis Research UK's policy unit to use our research data to highlight the burden of osteoarthritis in general practice and to prepare reports and recommendations on this issue, targeted specifically at Members of Parliament, and we provided the evidence for ARUK's report on the Burden of Osteoarthritis for National Arthritis Week². Our data highlighted osteoarthritis as a major public health priority, because of the numbers of people seeking health care, the health and social care costs caused by increasing disability, frailty and work-loss associated with OA, and the failure of current health services to adopt effective prevention and management strategies despite increasing evidence of effective interventions that can change patient outcome (including safe

¹ National Collaborating Centre for Chronic Conditions 2008; Savigny et al., 2009); OMERACT/OARSI guidelines for hip and knee OA (Zhang et al., 2007), European League Against Rheumatism for knee and hand OA, and gout (EULAR) (Zhang et al., 2007, 2009, 2010); ARMA Standards of Care for OA (ARMA, 2004) and Back Pain (ARMA, 2004).

² Osteoarthritis in General practice: data and perspectives. Report for parliamentary reception 2 July 2013

strategies to increase physical activity and support weight loss).

Influencing health researchers and healthcare practitioners through training: ISTM hosts a successful **Doctoral Training Centre** with long-term Research Council support, which sets an innovative model for bioscience PhD training through broader options and experience with industrial partners, and has an excellent track record of PhD CASE students supported by BBSRC, EPSRC, MRC, each leading to further collaborations with the industrial CASE partners. Staff in **ISTM** and **IPCHS** have obtained **European partnership funding** for over two decades, primarily through Frameworks 4 to 7, which by their nature drive impact through collaborations with users of research results and potential commercial exploiters of inventions. Links have flourished to include successful Marie Curie Initial Training Networks and IRSES partnerships co-ordinated from Keele. Fellows who came to Keele on these schemes continue to build the University's wider network when they move on to work in industry or other research institutions worldwide

Our impact strategy ensures that key messages from our research are incorporated within the educational curriculum for health care professionals and training and educational packages provided by the Royal Colleges, professional bodies and medical charities. Members of our research groups are regularly invited to take up leadership positions within their respective professional bodies, and these appointments are positively supported by our Research Institutes to encourage dissemination and adoption of our research. Examples of guidelines and consensus statements authored by our researchers include Disorders of the Menstrual Cycle (O'Brien as vice-president and lead for guideline development, Royal College of Obstetrics and Gynaecology and chair International Society for Premenstrual Disorders); Peritoneal Dialysis (Davies, Renal Association and as chair of the Royal College of Physicians Specialist Advisory Committee for Renal Medicine Training overseeing the 2010 curriculum development). We have shaped the Royal College of General Practitioners' musculoskeletal curriculum for postgraduate training for GPs. Croft was the RCGP's musculoskeletal curriculum guardian (2007–2013), Chew Graham is the mental health curriculum guardian, Porcheret was the RCGP's clinical champion of osteoarthritis (2008–2011) and Chew Graham was clinical champion of mental health (2008–2012). We have also supported development of Arthritis Research UK's web-based information on management of common musculoskeletal conditions. Somerville is the editor of Arthritis Research UK's publication "Hands On" (which is circulated to all UK primary care teams and is a web-based resource commonly used by patients). Research AHPs from our Unit have shaped the contents of "Hands On" editions on OA, hand pain, neck pain, back pain and widespread pain.

Patient influence: Our **Research User Group (RUG)** – of over 50 members, dedicated RUG Coordinator, and Support Assistant – help to maintain our focus on the patient perspective by contributing to formulating research questions, advising on methods (questionnaire design, recruitment and consent procedures), interpreting findings, and assisting dissemination strategies. Our leadership in public and patient involvement (PPI) is recognized through our contributions to INVOLVE (development of their budgeting tool for researchers, patients and clinicians), writing of PPI guidelines for applicants to the Physiotherapy Research Foundation of the Chartered Society for Physiotherapy, for the NIHR Research Design Service West Midlands, and for the NIHR National School of Primary Care (Jinks), and funding from EULAR has established a Research Users' learning exchange programme (ARMA, Amsterdam). The RUG has commissioned research on patient priorities, incorporating a question "what should be the priorities for musculoskeletal research" in one of our large MRC-funded population surveys,³ and has formally evaluated the impact of patient involvement on research.⁴

d. Relationship to case studies: Our success in disseminating our research findings, in supporting implementation and in achieving impact is underpinned by a systematic approach to developing research that can make a real difference to patients, healthcare providers and policy makers, a strategic approach to securing international collaborations and national partnerships, investment in a dedicated group of staff who can support rapid roll-out and translation of our research findings, and easy access to our IP. Direct output from our research and our strategy for impact are clearly reflected in the case studies submitted with this impact template.

³ Strauss V *et al.* results from a general population survey. *Rheumatology (Oxford)*. 2012;51(11):2075–2082.

⁴ Carter P *et al* (2013): Mobilising the experiential knowledge of clinicians, patients and carers for applied health-care research. *Contemporary Social Science: Journal of the Academy of Social Sciences*, DOI:10.1080/21582041.2013.767468