Impact case study (REF3)

Institution: Keele University

Unit of Assessment: UoA2 Public Health, Health Services and Primary Care

Title of case study: Raising the international quality of osteoarthritis management in primary care

Period when the underpinning research was undertaken: 2010-2018

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Prof Elaine Hay	Professor of Community Rheumatology	1994-present
Prof George Peat	Professor of Clinical Epidemiology	1999-present
Prof Clare Jinks	Professor of Health Research	
Prof Krysia Dziedzic	Professor of Musculoskeletal Therapies Versus Arthritis	1997- present
Prof Nadine Foster	NIHR Professor of Musculoskeletal Health in Primary Care	1998- present 2000-2020
Prof Kelvin Jordan	Professor of Biostatistics	1993-present
Prof Christian Mallen	Head, Keele School of Medicine & NIHR Research Professor in General Practice	2003-present
Dr Melanie Holden	Senior Research Fellow in Applied Health Research	2005-present
Dr Ross Wilkie	Senior Lecturer in Public Health	2000-present
Dr Emma Healey	Senior Research Fellow in Applied Health Research	2009-present
Dr Elaine Nicholls	Research Fellow in Biostatistics	2005-present
Dr Zoe Paskins	Senior Lecturer in Rheumatology	2009-present
Dr Milica Blagojevic-Bucknall	Senior Lecturer in Statistics	2006-present
Dr John Edwards	Senior Lecturer in General Practice	2008-present
Dr Elizabeth Cottrell	Senior Lecturer in General Practice	2011-present
Mike Brooks	Research User Group	n/a

Period when the claimed impact occurred: 2014-2020

Is this case study continued from a case study submitted in 2014? N

1. Summary of the impact (indicative maximum 100 words)

Our osteoarthritis research developed new understanding of the number of people with osteoarthritis and its personal and societal impact, informing health policy nationally (Public Health England Health Profile of England reports) and internationally (National Public Health Agenda: 2020 CDC). Our research examining osteoarthritis risk factors and effective treatments informed international clinical guidelines (UK NICE, US Defence Department, Australian Commission Safety and Quality). Implementation of our research transformed primary healthcare services in Europe (JIGSAW-E), with an estimated 40 million patients benefiting through improved access to more consistent, evidence-based care, and equipping healthcare professionals to implement our research and high-quality osteoarthritis care.

2. Underpinning research (indicative maximum 500 words)

Osteoarthritis is a leading cause of disability globally, yet care remains suboptimal. Our interdisciplinary osteoarthritis research group (led by Peat (Epidemiology), Jinks (Social Science) and Dziedzic (Implementation)) has 15 members combining clinical expertise (general practice,

nursing, rheumatology and physiotherapy), biostatistics and epidemiology, qualitative/mixed methods, clinical trials, exercise science and service redesign. Strong patient and public involvement and engagement underpins our research (3.1) which highlights the international importance of osteoarthritis to population health and healthcare services. Our definition, evaluation, and implementation of high-quality osteoarthritis care has transformed osteoarthritis care provision in Europe.

Highlighting the impact of osteoarthritis in populations
Multiple studies have provided new and improved estimates of how many people have osteoarthritis, why people get it, the negative impact on individuals, society, and social participation (3.2), how symptoms change over time, and improved international osteoarthritis healthcare provision (3.1-3.6). We identified an increase in diagnosis of osteoarthritis in populations born after 1950 (3.3) but also that many community-based older adults with joint pain (likely to be osteoarthritis), do not have this formal diagnosis recorded (3.3). This is important as it is linked to patients receiving suboptimal care. Our identification of different patterns of osteoarthritis pain experienced by different people over time (3.5) dispelled myths among patients and healthcare professionals that osteoarthritis is inevitably progressive. We have identified modifiable risk factors (i.e., obesity) that impact on the development of osteoarthritis (3.4). We identified the strongest predictors of future pain and functional limitation (baseline pain, function, low physical activity, poor general health, obesity and socioeconomic indicators) (3.1). Consequently, we demonstrated the potential population level benefits of effective non-pharmacological approaches to treatment and prevention for osteoarthritis and have supported patient information provision about what can be done to change patient outcomes.

Defining and evaluating current osteoarthritis primary care
We empirically derived osteoarthritis quality indicators to define high-quality primary care (3.1). Within primary care, our research on diagnosis of osteoarthritis and support for self-management identified a primary care evidence-practice gap (3.1). This gap is sub-optimal use of core non-pharmacological and pharmacological approaches recommended by the National Institute for Health and Care Excellence (NICE) (3.1). We have provided definitive evidence for the value of exercise as core management for osteoarthritis (3.1, 3.6), yet shown general practitioners, practice nurses and physiotherapists practice inconsistently when optimising exercise for osteoarthritis (3.1).

Optimising osteoarthritis care
Building on our knowledge of patterns of osteoarthritis symptoms, the social consequences and potential unmet care needs of people with osteoarthritis, we have developed and tested key innovations to transform primary care provision for osteoarthritis. We used internationally recognised NICE recommendations (3.1) as a foundation for our innovations, which were developed to support high quality primary care provision, self-management, and roll-out at study end. The 4 innovations are: a model osteoarthritis consultation (co-designed with patients and practitioners) (3.1); an osteoarthritis patient guidebook co-produced with patients and carers (3.1); an electronic health record template to support delivery and recording of high-quality primary osteoarthritis care (3.1); and a multidisciplinary healthcare professional training programme (3.1).

3. References to the research (indicative maximum of six references)

3.1. Hay E, Dziedzic K, Foster N, Peat G, van der Windt D, Bartlam B, Blagojevic-Bucknall M, Edwards J, Healey E, Holden M, Hughes R, Jinks C, Jordan K, Jowett S, Lewis M, Mallen C, Morden A, Nicholls E, Ong BN, Porcheret M, Wulff J, Kigozi J, Oppong R, Paskins Z, Croft P. Optimal primary care management of clinical osteoarthritis and joint pain in older people: a mixed-methods programme of systematic reviews, observational and qualitative studies, and randomised controlled trials. DOI: 10.3310/pgfar06040. Programme Grants Appl Res 2018;6(4).

3.2. Theis KA, Murphy L, Hootman JM, Wilkie R. Affiliations expand Social participation restriction among US adults with arthritis: a population-based study using the International Classification of

Functioning, Disability and Health Arthritis Care Res (Hoboken). 2013 Jul;65(7):1059-69. DOI: 10.1002/acr.21977. PMID: 23401463 PMCID: PMC4466902
https://onlinelibrary.wiley.com/doi/full/10.1002/acr.21977

3.3. Yu D, Jordan KP, Bedson J, Englund M, Blyth F, Turkiewicz A, Prieto-Alhambra D, Peat G. Population trends in the incidence and initial management of osteoarthritis: age-period-cohort analysis of the Clinical Practice Research Datalink, 1992-2013. Rheumatology 2017; 56(11):1902-1917. DOI: 10.1093/rheumatology/kex270.

3.4 Blagojevic M, Jinks C, Jeffery A, Jordan KP. Risk factors for onset of osteoarthritis of the knee in older adults: a systematic review and meta-analysis. Osteoarthritis and Cartilage 2010;(18): 24-33. DOI: 10.1016/j.joca.2009.08.010

3.5 Nicholls E, Thomas E, van der Windt DA, Croft PR, Peat G. Pain trajectory groups in persons with, or at high risk of, knee osteoarthritis: findings from the Knee Clinical Assessment Study and the Osteoarthritis Initiative. Osteoarthritis Cartilage. 2014;22(12):2041-50. DOI: 10.1016/j.joca.2014.09.026. Epub 2014 Oct 8.PMID: 25305072

3.6 Uthman OA, van der Windt D, Jordan J, Dziedzic KS, Healey EL, Peat GM, Foster NE. Exercise for lower limb osteoarthritis: systematic review incorporating trial sequential analysis and network meta-analysis. BMJ 2013;347:f5555. DOI: https://doi.org/10.1136/bmj.f5555

4. Details of the impact (indicative maximum 750 words)

Influencing national and international health policy
We extended understanding of osteoarthritis and influenced international health policy by moving beyond reliance on measures of knee and hip osteoarthritis, as this condition can affect all, and often multiple, joints. Our research on the number of people with osteoarthritis and why people get it (epidemiological estimates) (3.3) have been integrated into The Global Health Data Exchange and Global Burden of Disease models of the burden of osteoarthritis (5.1). The estimates have been used within Public Health England (PHE) burden of disease (5.2), and Versus Arthritis policy reports (5.3). Our active partnerships with Versus Arthritis and PHE, raised awareness of osteoarthritis in the public and political domain, prompting prioritisation of musculoskeletal health by PHE in 2018 (5.3). Our research collaborations recognised osteoarthritis-related social participation disruption (3.2) and shaped the recent National Public Health Agenda for Osteoarthritis in the US: 2020 update for the Center for Disease Control (5.4).

Improving international and national clinical guidelines and supporting professional practice
We have underpinned core management guidelines internationally for example in the US and Australia (5.5) and UK, NICE (5.6, 5.7) and guided NHS commissioners (5.7, 5.10). These impacts have been achieved by highlighting modifiable risk factors for the development and progression of osteoarthritis (3.4), providing definitive evidence for the use of exercise (3.6), providing innovations for use in practice (i.e., Osteoarthritis (OA) guidebook) (3.1), and supporting cost and clinically effective care (3.1). Our OA quality indicators (3.1) informed the 2014 NICE osteoarthritis guidelines (5.7) and are reflected in the associated NICE quality indicators. Our resulting OA e-template (3.1) was endorsed by NICE and made available to clinicians to download (5.8). Our four innovations have thus benefitted patients, healthcare organisations and commissioners by supporting provision of more consistent, cost-effective, evidence-based care, aligned with NICE recommendations.

Improving quality and accessibility of osteoarthritis primary care to patients
High quality osteoarthritis written information is a key part of osteoarthritis management. Our co-produced guidebook (led by our patient members) (3.1) combined scientific understanding with lived experiences of osteoarthritis and rectified the variable quality of existing information. This approach was valued, and the guidebook adopted, by the Arthritis and Musculoskeletal Alliance Knowledge Hub (5.9) and recommended as excellent by Red Whale (a national primary care

education provider) for use during remote working due to the COVID-19 pandemic (5.11). Over 1,550 hard copies have been disseminated. An electronic version of the guidebook has been incorporated within the Keele Pain Recorder Application (5.9). This App has been adopted by the EMIS App Library and NHS digital library to support patients to record symptoms and consult with painful conditions. Consequently, the reach of the guidebook has been extended to >1,000 downloads across 9 countries (UK, China, USA, Australia, France, Malaysia, UAE, India, Italy).

Uniquely, we have improved access to high quality care by equipping community pharmacies to undertake osteoarthritis care provision. We adapted our model consultation (3.1) and delivered training to equip 44 members across 9 Shropshire Clinical Commissioning Group pharmacies. In Staffordshire, Clinical uptake of the NICE guidelines has been recognised by a NICE Shared Learning Award for physiotherapy (5.10). Additionally, we partnered with industry (Lloyds Pharmacy) and co-wrote information on pharmacological and non-pharmacological management of osteoarthritis provided to patients as part of their seasonal national pain campaign. Company metrics revealed a positive impact on patient engagement, including approximately 12,000 page views on the Lloyds arthritis pain webpage, and projected revenue for pain products was exceeded in the first year of the campaign (5.12).

Equipping healthcare professionals to better manage osteoarthritis
Our research has developed healthcare professional training across Europe to improve knowledge and confidence to deliver high quality osteoarthritis care and has been implemented through face-to-face UK training (n=355), one-off events (i.e., Red Whale in association with Versus Arthritis Webinar (n=500 by December 2019)) (5.11), e-learning packages (i.e., British Medical Journal (BMJ) Learning Osteoarthritis module (completed 13,400 times by February 2020, personal communication)), pharmacists online training (n=153) (5.9), physiotherapist online training (n=104) (5.9) and European League against Rheumatology (EULAR) Training Modules on osteoarthritis for Rheumatologists and healthcare professionals.

Transforming international healthcare service provision
We have transformed international osteoarthritis primary care service provision by implementing our 4 osteoarthritis innovations (3.1) within the Joint Implementation of Guidelines for Osteoarthritis Across Western Europe (JIGSAW-E) project, funded by the West Midlands Academic Health Science Network and the EU (European Institute of Innovation and Technology (EIT)-Health) (5.9). JIGSAW-E supported primary care providers in five European countries to address the unmet needs of adults with osteoarthritis through the systematic implementation of international guidelines for the best care and management of osteoarthritis.

Internationally we have trained 195 multi-disciplinary healthcare professionals in 5 countries (UK, Netherlands, Denmark, Portugal, Norway). Led by our patient and public involvement (PPI) members who worked with colleagues internationally, we culturally adapted and translated our OA guidebook into four other languages (5.9). In the Netherlands the new guidebook was endorsed by the patient organisation Poly-Artrose Lotgenoten Vereniging (5.9). International relevance and value of our research implementation was recognised by the Osteoarthritis Research International (OARSI) Joint Effort Initiative, when it featured among seven remote osteoarthritis management programmes recommended in the COVID response (5.9). The EIT also adopted our implementation research to provide help to "*some 40 million EU citizens who would benefit from osteoarthritis Healthcare Transformation (5.9).* Patients also valued improved osteoarthritis care: *"…pain relief and increased mobility are possible. Take the first positive step to achieving your goals with the help of your GP or Practice Nurse – you won't regret it!" (JIGSAW-E Patient) (5.9).*

5. Sources to corroborate the impact (indicative maximum of 10 references)

5.1 Global Health Data Exchange http://ghdx.healthdata.org/record/population-trends-incidence-and-initial-management-osteoarthritis-age-period-cohort-analysis

5.2. Health profile for England: 2019. The third annual profile combining data and knowledge with information from other sources to give a broad picture of the health of people in England in

2019. https://www.gov.uk/government/publications/health-profile-for-england-2019. GBD estimates are modelled on multiple original sources - the paper by Yu et al (3.3) is listed in GBD data exchange [5.1] and it is these data that are used to provide prevalence/incidence estimates that contribute to national and international estimates used by Public Health England in national planning and strategy. The tables do not include the actual references.

5.3. a) Versus Arthritis (previously Arthritis Research UK) Policy Reports with associated Keele Osteoarthritis Research contributions and used in b) UK parliamentary debate. https://questions-statements.parliament.uk/written-questions/detail/2018-06-14/153894 and https://www.versusarthritis.org/media/2179/public-health-guide.pdf

5.4 A national public health agenda for osteoarthritis: 2020 update for the Center for Disease Control https://www.cdc.gov/arthritis/docs/oaagenda2020.pdf https://www.cdc.gov/arthritis/basics/osteoarthritis.htm

5.5 International **Guidelines**. (a) The US Department of Veterans Affairs and the Department of Defence Clinical Practice Guideline For The Non-Surgical Management Of Hip & Knee Osteoarthritis (2020). https://www.healthquality.va.gov/guidelines/CD/OA/VADoDOACPG.pdf and (b) the Australian Osteoarthritis of the Knee Clinical Care Standard May 2017. https://www.safetyandquality.gov.au/sites/default/files/migrated/Osteoarthritis-of-the-Knee-Clinical-Care-Standard-Booklet.pdf

5.6 Appendix A: summary of evidence from 2017 surveillance of Osteoarthritis (2017) NICE guideline CG177 (https://www.nice.org.uk/guidance/cg177/evidence/appendix-a-summary-of-new-evidence-from-surveillance-pdf-4550088782)

5.7 NICE Osteoarthritis clinical guideline (2014) and linked NICE Quality Standard. Our researchers (Porcheret and Dziedzic) were members of the 2014 guideline development group and guideline specialist committee). https://www.nice.org.uk/guidance/qs87/history

5.8 NICE endorsed osteoarthritis e-template. https://www.nice.org.uk/guidance/cg177/resources/endorsed-resources-the-osteoarthritis-etemplate-552602701

5.9 JIGSAW-E osteoarthritis resources for implementation and training https://jigsaw-e.com/

5.10 Case example on NICE Shared learning database https://www.nice.org.uk/sharedlearning/delivering-practice-led-integrated-care-for-long-term-conditions-a-new-approach-to-managing-osteoarthritis

5.11 Red Whale endorsement of our self-management tools during COVID-19 https://www.gp-update.co.uk/SM4/Mutable/Uploads/pdf_file/MSK-Remote-Consulting-Guide-v2.pdf

5.12 Lloyds Pharmacy, presentation and feedback on seasonal campaign following co-created material. 29th January 2020