Institution: University of Hull		
Unit of Assessment: 03 Allied Health Professions, Dentistry, Nursing and Pharmacy		
Title of case study: Reducing inequalities in palliative care for people with non-malignant disease		
Period when the underpinning research was undertaken: 2000 – to date		
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 Miriam Johnson	Prof Palliative Medicine (clinical-academic)	2000 – to date
Prof David Currow	Prof Palliative Care (clinical-academic)	2017 – to date
Dr Ann Hutchinson	Research Fellow (medical Scientist)	2015 - present
Dr Simon Hart	Reader Respir. Medicine (clinical academic)	2007 - present
Prof Andrew Clark	Prof Cardiology (clinical-academic)	1999 - present
Dr Steve Oxberry	Research Fellow (clinical-academic)	2006 - 2009
Dr Amy Gadoud	Research Fellow (clinical-academic)	2010 – 2013
Dr Jason Boland	S.Lecturer Palliative Medicine (clinical-academic)	2013 - 2016
Dr Mark Pearson	S.Lecturer Implementation Science & Knowledge Mobilisation	2017 – to date
Prof Fliss Murtagh	Prof Palliative Care (clinical-academic)	2018 – to date
Prof Una Macleod	Prof Primary Care Medicine, Dean of Medical School (clinical-academic)	2010 – to date
Period when the claimed impact occurred: 2014 – ongoing		
Is this case study continued from a case study submitted in 2014? No		

1. Summary of the impact

Palliative care research at Hull has had global impact by characterising and improving management of chronic breathlessness, through changes in National and International guidelines and a world-first regulatory licence for morphine in the pharmacological management of this debilitating syndrome which affects over 88 million people worldwide. This has been achieved by addressing the inequalities in palliative care of ageing patients with non-malignant heart and lung disease, as compared with cancer patients and by developing effective tools to identify and triage care and providing new therapeutic interventions.

2. Underpinning research

Before 2000, few palliative care (PC) services in the UK, or worldwide, accepted patients with non-malignant conditions. Thus, few patients with such diseases accessed specialist PC services or received evidence-based symptom control measures, despite there being a similar need, i.e. >90% of people with advanced heart and lung disease will have chronic breathlessness, levels similar to the prevalence in lung cancer patients. Most died in hospital, often by default, not preference. Miriam Johnson (UoH, Professor of Palliative Medicine and Director of the Wolfson Palliative Care Research Centre [WPCRC]) leads a multidisciplinary research team that has worked for almost two decades to rebalance this gross inequity in palliative care access.

The senior WPCRC research team now comprises: Johnson and Currow (population health; policy and trials), Murtagh (outcomes and skill-mix); and Pearson (implementation science). The research group has attracted more than £14 million since its inception in 2000. Their research has underpinned international clinical guidelines and led to patient benefit.

Key research findings:

Palliative care beyond cancer

In 2000 Johnson started the UK's first integrated heart failure, primary care (HF-PC) service in Scarborough (a Hull York Medical School clinical partner site) and from the work at this centre published service descriptions in 2006**, [1]** 2009 and 2012, and co-edited the world's first HF-PC clinical handbook. In 2014, Gadoud, Macleod and Johnson published a UK Clinical Practice

Research Database study of those dying in 2009 (n = 27,689) showing the inequality of PC access for people with HF compared with cancer (7% vs 48%); their recent study shows that by 2014, PC access had increased to 25% of people dying of Chronic Obstructive Pulmonary Disease (COPD) or HF **[2]**.

Symptom management of chronic breathlessness

In 2011 Johnson, Oxberry and Clark published the first adequately powered, 4-day placebo, randomised-controlled trial (RCT) in heart failure (HF) **[3]** and the only 3-month placebo RCT of oral morphine for chronic breathlessness due to HF. In addition, Currow and Johnson completed the only dose titration study which underpinned the Regulatory License approved dose regimen for oral morphine. Finally, Johnson and Currow led the international research to define the new clinical syndrome of chronic breathlessness. In 2017 Hutchinson and Johnson delineated the new conceptual framework of “Breathing Space” to convey the experience of people living with chronic breathlessness **[4]**. Using pooled clinical study data, Johnson and Currow defined the minimal clinically important difference (MCID) in breathlessness intensity measurement demonstrating that patients attach value to even a small improvement. **[5].**

Development of novel ways to access and deliver PC

People with interstitial lung disease have many PC needs but, despite policy directives, only 3% patients accessed PC in 2015. Johnson, Hart, Boland and Currow adapted and validated the *Needs Assessment Tool-Interstitial Lung Disease* (*NAT-ILD*) to identify and triage palliative needs. Finally, Johnson pioneered the use of subcutaneous administration of furosemide to reduce hospital admissions in people with decompensated advanced HF; publishing their service development findings in 2011 **[6].**

3. References to the research

(1) Johnson MJ, Houghton T. Palliative care for patients with heart failure: description of a service. Palliat Med 2006; 20(3):211-214. (Scopus citations 31; Google citations 65; field weight citations (FWC) 2.67)

(2) Gadoud A, Kane E, Oliver SE Johnson MJ, Macleod U, Allgar V. (2020) Palliative care for non-cancer conditions in primary care: a time trend analysis in the UK (2009–2014) BMJ Supportive & Palliative Care Published Online First: doi: 10.1136/bmjspcare-2019-001833

(3) Oxberry SG, Torgerson DJ, Bland JM, Clark AL, Cleland JG, Johnson MJ. Short-term opioids for breathlessness in stable chronic heart failure: a randomized controlled trial. Eur J Heart Fail 2011; 13(9):1006-1012. (Scopus citations 39; Google citations 85; FWC 2.09)

(4) Johnson MJ, Yorke J, Hansen-Flaschen J, Lansing R, Ekstrom M, Similowski T et al. Towards an expert consensus to delineate a clinical syndrome of chronic breathlessness. Eur Respir J 2017; 49(5). (Scopus citations 23; Google citations 150; FWC 9.24; Altmetrics score 80).

(5) Johnson MJ, Bland JM, Oxberry SG, Abernethy AP, Currow DC. Clinically Important Differences in the Intensity of Chronic Refractory Breathlessness. J Pain Symptom Manage 2013; 46(6):957-963. (Scopus citations 56; Google citations 99; FWC 7.09)

(6) Zacharias H, Raw J, Nunn A, Parsons S, Johnson M. Is there a role for subcutaneous furosemide in the community and hospice management of end-stage heart failure? Palliat Med 2011; 25(6):658-663. (Scopus citations 26; Google citations 49; FWC 1.26)

Research awards etc.

1) Excellence in Research. Researcher of the Year 2017. University of Hull. **Johnson MJ.**

2) Golden Hearts Award, Hull University Teaching Hospitals NHS Trust; University-Trust research partnership between respiratory and palliative care. 2019. **Johnson MJ, Hart S, Crooks M, Hutchinson A, Swan F, Currow D.**

3) Tom Reeve Award for Outstanding Contribution to Cancer Care from the Clinical Oncological Society of Australia 2015 For a significant contribution to cancer care through research and clinical leadership. **Currow D.**

4) American Academy of Hospice and Palliative Care (AAHPM) 2015 Award for Excellence in Scientific Research in Palliative Care. **Currow D.**

5) Field leader in Hospice and Palliative Care. The Australian. 2019. https://specialreports.theaustralian.com.au/1540291/health-and-medical-sciences/ **Currow D.**

Selected competitive grant support
Work to reduce inequalities in palliative care for people with non-malignant disease has formed the foundation of the following awards from national and international peer review funders, totalling **more than £15 million** as of 3rd of May 2019. Members of Hull team are in bold.

Capacity Building awards (£0.9M)
a) 2019 – 2024. Research England International Investment Initiative. Building Critical Mass, Increasing Scale and Impact for Palliative Care Research through International Collaboration. **Johnson MJ** on behalf of the Wolfson Palliative Care Research Centre. £403,510. One of only 8 awarded across all HEIs in England, across all disciplines.
b) 2016. Wolfson Foundation. **Johnson MJ** on behalf of the palliative care research group. Application for Palliative Care Research in the Institute for Clinical and Applied Health Research. £500,000. This grant founded the Wolfson Palliative Care Research Centre.
Symptoms (£6.9M)
a) 2014 – 2015. NIHR RfPB. A randomised trial of high versus low intensity training in breathing techniques for breathlessness in patients with malignant lung disease: early intervention. **Johnson MJ (CI), Nabb S**. £247,152
b) 2014 – 2018. NHMRC. Improving the treatment of breathlessness – a phase III randomised, controlled trial of sustained release morphine for the symptomatic treatment of chronic refractory breathlessness. A national Palliative Care Clinical Studies Collaborative study. **Currow DC (CI), Johnson MJ.** AUS$860,808 (£464,743)
c) 2018 – 2020. EU Horizon 2020. Better treatments for breathlessness in palliative and end of life care (BETTER-B). (Chief investigator, Kings College London) **Currow DC, Johnson MJ**. € 3769999,75 (£3,3M)
d) 2018 – 2022. NIHR HTA. A parallel group, double-blind, randomised, placebo-controlled trial comparing the effectiveness and cost-consequence and cost effectiveness of low dose oral modified release morphine (MRM) versus placebo on the intensity of worst breathlessness in people with chronic breathlessness. **Johnson MJ (CI), Currow DC, Hart SP, Pearson M, Seymour J**.- £1,2M.
Access to PC (£5.2M)
a) 2016. British Heart Foundation. Caring Together Cohort study. **Johnson MJ (CI).** £160,000
b) 2016 – 2023 Yorkshire Cancer Research. Reducing Inequalities in Cancer Outcomes in Yorkshire: Realising our potential for innovation in Patient Management, Survivorship and Palliative Care Research (University of Hull Endowment). **Macleod U & Johnson MJ (Co-CIs), Lind M, Murtagh F, Currow DC**. £4.9M.
Tools (£2.0M)
a) 2011 -2014. Dunhill Medical Trust clinical fellowship. Successful application. “Needs Assessment in Parkinson’s Disease” to support clinical fellowship. **Johnson MJ (Primary Supervisor), Richfield E.** £189,863
b) 2019 – 2022 Yorkshire Cancer Research. Effectiveness and cost-effectiveness of a needs assessment tool in primary care for people with active cancer with regard to unmet patient and caregiver need, compared with usual care. **Johnson MJ, Clark J, McCormack T, Currow DC**. £1,398,435.

4. Details of the impact

Research at Hull into chronic breathlessness has influenced clinicians, policy makers, funding bodies and has significantly improved the care experienced by patients and their families. Access to PC and novel symptom control has increased both nationally and globally.

Palliative care beyond cancer
The National Centre for Palliative Care (NCPC) minimum dataset (2015) shows that access to hospice services by people with HF increased to 15% of inpatient admissions, 24% of day care, 29% of outpatients, and 27% of hospital advisory services, from previously non-existent levels (**Evidence 1)**. In the North East & Yorkshire area, Prof Johnson’s clinical region, providing the UK’s first combined HF-PC service, Public Health England figures (2018) showed that patients dying with circulatory disease had the highest home death rate (an indirect measure of quality end of life care); 56.6% vs national average of 44.8%; **(Evidence 2**).

Johnson provided clinical academic advice for the NHS/Marie Curie/British Heart Foundation funded "Caring Together" HF/PC Programme in Glasgow. Since 2010, 78 "change-agent" practitioners representing multi-disciplinary teams across Scotland have attended the resulting Scottish government funded course. (**Evidence 3**). Also, Johnson was an invited committee member of the National Confidential Enquiry for the Prevention of Deaths (Heart Failure), the report highlights the importance of access to PC in HF in their recommendations. The Scottish Government are using the PC recommendations of this enquiry to inform their new heart disease strategy **(Evidence 4**).

In view of Hull's leading reputation, the team were commissioned to produce a Hospice UK/British Heart Foundation position document, detailing clinical priorities in hospice service provision for people with HF. To address the identified need the St James' Foundation then issued a grant call for hospice-led HF service development project proposals and 17 projects across the UK were funded (total value £500,000) in 2018 (**Evidence 5**).

NICE (October 2016, E0070) has endorsed the Hull tool to support national guidelines on Interstitial Pulmonary Fibrosis. Even though there are only about 30 ILD units in the UK, since October 2016 the tool has been downloaded from the HYMS website over 400 times. Furthermore, Johnson has received requests from Melbourne (Australia), Pennsylvania (USA), and Montreal (Canada) for the tool for adoption in their clinical service (**Evidence 6**).

Symptom management

Work by Hull researchers on opioids, oxygen and the battery-operated hand-held fan for breath-lessness are now included in 8 (opioids) and 6 (oxygen) clinical guidelines for chronic breath-lessness around the world (**Evidence 7**). Hull's measure of the MCID in chronic breathlessness is the current global research standard. Hull researchers worked with Mayne Pharma and the Therapeutic Goods Administration of Australia for the license of Kapanol™ (a preparation of morphine) to be extended to include people with chronic breathlessness. This is a world-first as the only licensed medication for chronic breathlessness; importantly the government have included it on the public subsidy list to ensure access is maximised. These actions delineate the standard of care and the template for other regulatory bodies to follow, supporting safe access to important symptom control to the millions round the world with chronic breathlessness (**Evidence 8**).

Hull's definition of the concept of chronic breathlessness as a clinical syndrome, was used in an international survey (UK, Australia and New Zealand) which demonstrated that the overwhelming majority of respiratory (89%) and palliative (98.5%) clinicians now recognise chronic breathlessness as a distinct target for treatment. Of note, 75% responding palliative physicians and 41% respiratory physicians recommend oral morphine for breathlessness (**Evidence 9**). The Hull definition was also used in a French survey; just over half of patients with COPD had unmanaged chronic breathlessness, bringing a hitherto "invisible" but distressing problem to light (**Evidence 10)**.

Development of novel ways to access and deliver PC

Hull research is cited in clinical guidelines and policy statements recommending integration of palliative care with HF management. Johnson was a core member of the European Association of Palliative Care's taskforce which prepared an international position statement, including Australia and North America, regarding integration of palliative care in cardiology (**Evidence 11**).

The Hull team have hosted visits from more than 20 leading healthcare professionals from around the world over the past decade; one of these, subsequently became the lead cardiologist for Glasgow's Caring Together Project and has changed practice in Scotland, *"I reconfigured our service to provide an advanced heart failure clinic, working with a nurse specialist, and established a palliative care-heart failure multidisciplinary team meeting between cardiology and palliative care services, including local hospices; both these services were strongly influenced by Johnson's work"*. (**Evidence 12**). Another visiting fellow, after 2016 established a palliative care section of the Italian Respiratory Society which has held its first scientific conference in 2019 with 45 delegates; he led an Italian position statement about PC in respiratory disease December 2020 (**Evidence 13**).

5. Sources to corroborate the impact

Evidence 1. NCPC minimum dataset. https://www.hospiceuk.org/docs/default-source/What-We-Offer/publications-documents-and-files/minimum-data-set-summary-report-2014-15

Evidence 2. Public Health England Palliative and End of Life Care Profiles https://fingertips.phe.org.uk/profile/end-of-life/data#page/0/gid/1938132902/pat/46/par/E39000048/ati/152/are/E38000001

Evidence 3. Caring Together Programme final evaluation report. https://www.mariecurie.org.uk/professionals/working-in-partnership/caring-together/evaluation-and-findings

Evidence 4. National Confidential Enquiry into Patient Outcome and Death https://www.ncepod.org.uk/2018ahf.html

Evidence 5. Hospice UK and St James' Foundation grant call
Hospice UK. Heart failure and hospice care: how to make a difference. London: Hospice UK, 2017

i. https://www.hospiceuk.org/docs/default-source/What-We-Offer/Care-Support-Programmes/heart-failure-and-hospice-care_web.pdf
ii. https://www.hospiceuk.org/docs/default-source/What-We-Offer/Grants/old-grant-programmes---not-open/st-james's-place---previous-years-themes/outline-of-application-questions-final-2017

Evidence 6. NICE endorsement of the NAT:ILD tool. https://www.nice.org.uk/guidance/cg163/resources/needs-assessment-toolprogressive-disease-interstitial-lung-disease-natpd-ild-2665699597

Evidence 7. Guidelines

i. Parshall et al American Thoracic Society guidelines management of dyspnea https://www.atsjournals.org/doi/abs/10.1164/rccm.201111-2042ST
ii. European Society for Cardiology guidelines. http://www.cardio.se/sites/default/files/ESC%20Guidelines%20for%20the%20diagnosis%20and%20treatment%20of%20acute%20and%20chronic%20heart%20failure%202016.pdf

Evidence 8. Summary of Medicinal product Characteristics – Kapanol https://www.ebs.tga.gov.au/ebs/picmi/picmirepository.nsf/pdf?OpenAgent&id=CP-2013-PI-01928-1&d=201911051016933

Evidence 9. Physicians appreciation of chronic breathlessness and use of opioids
Smallwood, *et al.* (2017) Junior doctors' attitudes to opioids for refractory breathlessness in patients with advanced chronic obstructive pulmonary disease. *Intern Med J.* 47(9):1050-1056.

Evidence 10. French survey
Carette, H. *et al.* (2019) Prevalence and management of chronic breathlessness in COPD in a tertiary care center. *BMC Pulm Med* 19, 95.

Evidence 11. International position statement
Sobanski, PZ et al. (2020) Palliative Care for people living with heart failure – European Association for Palliative Care Task Force expert position statement, *Cardiovascular Research*, https://doi.org/10.1093/cvr/cvz200

Evidence 12. Honorary Clinical Associate Professor, Glasgow University.
Improved palliative care in Scotland for people with advanced heart failure – Testimonial

Evidence 13. Senior consultant in Respiratory medicine at ULSS 4 Veneto Orientale, Italy. Improved palliative care for people with lung disease in Italy - Testimonial