Institution: University of Sheffield		
Unit of Assessment: A-03 Allied Health Professions, Dentistry, Nursing and Pharmacy		
Title of case study: Safely reducing hospital transfers for older patients using advanced paramedic practitioners in urgent and emergency care		
Period when the underpinning research was undertaken: 2002–2013		
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:**
Suzanne Mason	Professor of Emergency Medicine	2002–present
Colin O'Keeffe	Research Fellow	1999–present
Bridget Colwell	Study Manager	2001–present
Michael Campbell	Professor of Medical Statistics	1997–emeritus since 2005
Allen Hutchinson	Professor of Public Health	1997–emeritus since 2010
Jenny Freeman	Senior Lecturer in Medical Statistics	1997–2013
Patricia Coleman	Research Fellow	1987–2017
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)

In the UK and internationally, demand for ambulance services, subsequent emergency department attendances, and hospital admissions is unsustainable for health economies. Between 2003 and 2013, Sheffield researchers evaluated the ability of new professional roles, Advanced Paramedic Practitioners (APPs) or Emergency Care Practitioners (ECPs), to reduce pressure on this system without compromising patient outcomes. The research is the only evidence underpinning National Institute for Health and Care Excellence (NICE) guidelines recommending the use of APPs and ECPs in urgent and emergency care settings and has been widely cited in key policy documents. The numbers of advanced paramedics employed by English ambulance services in 2014-2020 has increased from 600 to over 2,500. In that period, conveyance to the emergency department has reduced by over half a million patients, resulting in a conservative cost saving in NHS hospital care alone of over £50 million.

2. Underpinning research (indicative maximum 500 words)

The School of Health and Related Research (ScHARR) programme of research evaluated the impact on quality of care and costs of allied health professionals (primarily paramedics) working in extended or new roles as either Advanced Paramedic Practitioners (APPs) or Emergency Care Practitioners (ECPs) in urgent and emergency care settings between 2003 and 2013. ECP/APP are usually from a paramedic or nursing background and receive enhanced clinical training to operate as autonomous practitioners in a range of urgent and emergency care settings (such as ambulance, urgent care centres). The ECP/APP role is to improve the patient experience and journey by either discharging patients at scene or referring onward to the most appropriate service. The role aims to reduce unnecessary transfers to the emergency department (ED) or emergency admissions to hospital.

First, researchers evaluated the role of APPs developed and trained in Sheffield with extended skills in assessing and managing acute illness or injury in the elderly [R1, R2]. Between 2002

and 2005 a randomised trial (funded by the Health Foundation) was undertaken to determine the impact of 'paramedic practitioners' (PP) on the care of older people with minor illness or injuries who called 999 for help.

- In the trial of 3,018 patients, PPs significantly reduced patient transfers to the Emergency Department (ED) by 24.9% and hospital admissions by 6.1% [R1] when compared with usual care. The service presented a cost saving of £150 per patient [R2] and operated safely, with very high levels of satisfaction for patients [R3].

A second study evaluated the impact of ECPs on patient care pathways. This was a controlled observational study undertaken in three NHS areas employing ECPs, funded by the Changing Workforce Programme of the Department of Health.

- Comparative data on patients seen by both ECPs and usual providers in the three sites showed 54% of patients having contact with ECPs did not require onward referral to other services. The mean cost per ECP patient contact was £24 when compared with £55 for an ED contact. When compared with usual providers in these health settings, ECPs undertook significantly fewer investigations, provided more treatments, discharged more patients, and had higher levels of patient satisfaction [R4].

Following this, a multi-centre controlled trial funded by the National Institute for Health Research HS&DR Programme (2005-2008) was undertaken comparing patient care provided by ECPs working in a range of clinical settings with standard care in those services such as ambulance, GP out of hours services, walk-in centres, and urgent care centres.

- The trial included 5,525 patient outcomes. ECPs significantly reduced onward referral to acute hospital services compared with their standard provider counterparts. This was especially the case when they provided a mobile service to the patient (e.g. ambulance services), were targeted at the elderly population and when ECPs operated at a higher level of skill than their counterparts (e.g. ECP vs paramedic) did [R5].
- A related safety study found comparable quality or safety of care provided by ECPs when compared with their standard care provider counterparts [R6].

The research outlined above demonstrated that allied health professionals (primarily paramedics) working in extended or new roles as either APPs or ECPs were effective, cost effective, safe, and acceptable to patients.

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

R1. **Mason, S., Knowles, E., Colwell, B., Dixon, S.**, Wardrope, J., Gorringe, R., Snooks, H., Perrin, J., & **Nicholl, J.** (2007). Effectiveness of paramedic practitioners in attending 999 calls from elderly people in the community: cluster randomised controlled trial. *BMJ, 335*(7626), 919. https://doi.org/10.1136/bmj.39343.649097.55

R2. **Dixon, S., Mason, S., Knowles, E., Colwell, B.**, Wardrope, J., Snooks, H., Gorringe, R., Perrin, J., & **Nicholl, J.** (2009). Is it cost effective to introduce paramedic practitioners for older people to the ambulance service? Results of a cluster randomised controlled trial. *Emergency Medicine Journal, 26*(6), 446–451. https://doi.org/10.1136/emj.2008.061424

R3. **Mason, S., Knowles, E., Freeman, J.,** & Snooks, H. (2008). Safety of Paramedics with Extended Skills. *Academic Emergency Medicine, 15*(7), 607–612. https://doi.org/10.1111/j.1553-2712.2008.00156.x

R4. **Mason, S., O'Keeffe, C., Coleman, P., Edlin, R., & Nicholl, J.** (2007). Effectiveness of emergency care practitioners working within existing emergency service models of care. *Emergency Medicine Journal, 24*(4), 239–243. https://doi.org/10.1136/emj.2006.035782

R5. **Mason, S., O'Keeffe, C., Knowles, E., Bradburn, M., Campbell, M., Coleman, P., Stride, C., O'Hara, R., Rick, J., & Patterson, M.** (2011). A pragmatic quasi-experimental multi-site community intervention trial evaluating the impact of Emergency Care Practitioners in different UK health settings on patient pathways (NEECaP Trial). *Emergency Medicine Journal, 29*(1), 47–53. https://doi.org/10.1136/emj.2010.103572

R6. **O'Hara, R., O'Keeffe, C., Mason, S., Coster, J. E., & Hutchinson, A.** (2012). Quality and safety of care provided by emergency care practitioners. *Emergency Medicine Journal, 29*(4), 327–332. https://doi.org/10.1136/emj.2010.104190

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

The landscape of the emergency care workforce has changed in the UK over the past 15-20 years due to the knowledge and evidence produced by ScHARR. Our research has resulted in substantial changes to national and international guidance, policy, and practice. This has produced cost savings to the NHS as a whole and benefits to patients themselves from the reduction in unnecessary journeys to hospital and care provided at home.

Changes to policy and guidance

In 2018 the NICE issued new guidance on service delivery and organisation for emergency and acute medical care in over 16s [S1], with the aim of reducing inappropriate visits to emergency departments (ED) and reducing hospital admissions. A recommendation within the guidance was to, "*Provide specialist and advanced paramedic practitioners who have extended training in assessing and treating people with medical emergencies*." This guidance was based exclusively on evidence referenced directly from the clinical and cost effectiveness research undertaken in ScHARR [R1-R4].

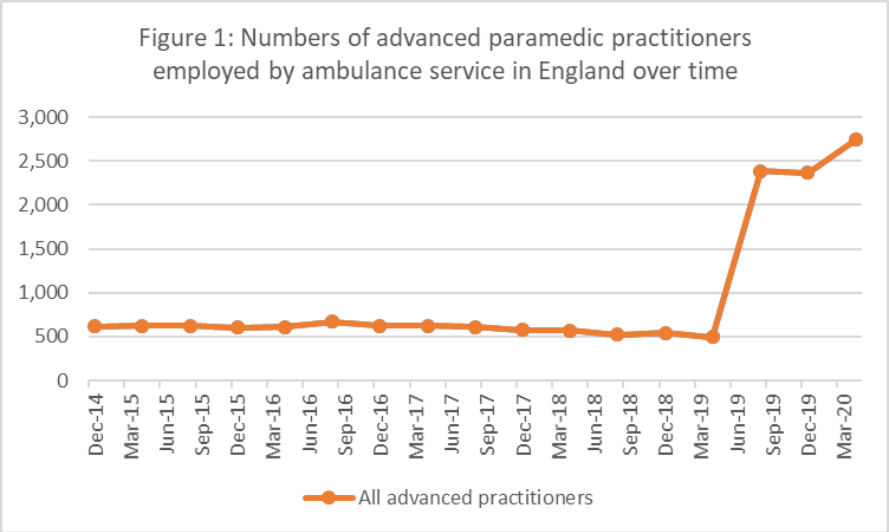
A number of key national policy documents have also referenced the ScHARR ECP/APP research [S2-S4]. The NHS England Urgent and Emergency Care (UEC) Review Team Report (S2) recommended the PP role for undertaking acute home visits, referencing [R1]. A Nuffield Report into UEC interventions [S3] found the PP role to be the intervention supported by the strongest evidence, referencing R2. Similarly, a Health Foundation Report [S4] recommended that developing new roles (including ECPs) represented a potential 'best bet' intervention to have a meaningful impact on ED attendances and hospital admissions, citing [R4]. Further to this, a House of Commons Health Committee report on winter Accident & Emergency (A&E) pressure [S5] recommended using extended paramedic roles to avoid unnecessary transport to the emergency department to reduce A&E attendances cited [R1 and R4].

Changes to practice

Growth in APP/ECP roles

The development of APP/ECP roles nationally started as a pilot in the South Yorkshire Ambulance Service, Sheffield. ScHARR was instrumental in assisting with the delivery of training and education to the first PPs in Sheffield. It then conducted the first study evaluating the impact of the role as an RCT [R1]. The role was then gradually rolled out across the country, and ScHARR provided more research that evaluated the role during this period [R4, R5]. Since then, there has been a considerable growth in numbers of paramedics employed by English ambulance services in advanced roles between 2014 and 2020, shown in figure 1. Since

publication of the NICE guidance in 2018, underpinned by [R1-R4], there has been a particularly steep rise in the numbers of APPs.



Source: NHS Hospital & Community Health Service (HCHS) monthly workforce statistics, NHS Digital

Reduced conveyance to hospital

Alongside this growth in employment of APPs in England between 2014-2020, the numbers and proportions of ambulance patients not conveyed to ED (either seen and treated at scene or referred/transported to a non-hospital provider) has increased. In 2014, 2,279,815 (32.5%) of ambulance 999 calls were not conveyed to ED and by 2019-20 this had increased to 3,165,547 calls (39%). The impact of APPs on improved non-conveyance is supported by evidence from a recent National Institute for Health Research (NIHR) report [S6] examining variation in ambulance non-conveyance in England, which found overall non-conveyance rates varied between 23% and 51%, with the variation in part explained by the percentage of calls attended by advanced paramedics.

Potential cost savings by reduced conveyance to hospital

If conveyance rates to ED had remained at 2013-2014 levels (32.5%), an additional 551,558 ED attendances would have occurred in 2019-20. Based on 2018-2019 costs (latest available), an ED attendance for less acute cases (i.e. 'No Investigation with No Significant Treatment and Not Admitted') was £93 per attendance, equating to a conservative cost saving to the NHS of £51.3 million (for the ED attendance alone). Further cost savings would also include those saved by reduced ambulance transport to hospital and reduced hospital admissions for some cases. Based on updating our cost analysis [R2] to 2019 prices, we estimated a cost saving of £193 per patient, taking into account savings to the ambulance service and all hospital costs. Applying this cost to the reduced ED conveyances figure equates to a saving of over £100 million.

Changes to practice internationally

The work of the Sheffield clinical/academic team has influenced the establishment of similar schemes internationally. The cost effectiveness evidence from R2 has been cited by an Australian report on expanding the role of paramedics in minor injury and illness, funded by Health Workforce Australia (HWA) [S7].

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

S1. NICE Guidance NG94. *Emergency and Acute Medical Care in over 16s: Service Delivery and Organisation*. Chapter 3: Paramedics with enhanced competencies. March 2018. https://www.nice.org.uk/guidance/ng94.

S2. NHS England UEC Review Team and ECIST. *Transforming urgent and emergency care services in England Safer, faster, better: good practice in delivering urgent and emergency care A guide for local health and social care communities*. NHS England 2015 (https://www.england.nhs.uk/wp-content/uploads/2015/06/trans-uec.pdf). Recommended the PP role for undertaking acute home visits (p.33), referencing the PPOPS study (R1) p.54.

S3. Imison, C., Curry, N., Holder, H., Castle-Clarke, S., Nimmons, D., Appleby, J.,Thorlby, R., Lombardo, S. (2017). *Shifting the balance of care: great expectations*. Research report. Nuffield Trust (https://bit.ly/38R8Zhi). PP role to be supported by the strongest evidence referencing R2 (Box 5, p48).

S4. Molloy, A., Martin,S., Gardner, T., Leatherman (2016). *A clear road ahead. Creating a coherent quality strategy for the English NHS*. The Health Foundation (https://www.health.org.uk/publications/a-clear-road-ahead). New roles (including ECPs) represented a potential 'best bet' intervention to have a meaningful impact on ED attendances and hospital admissions (see citing of R4 (p.38) and ECP recommendation under 'Creating and developing new roles in the workforce to improve quality' (p.67).

S5. House of Commons Health Committee. *Winter pressure in accident and emergency departments Third Report of Session 2016–17 Report* (https://publications.parliament.uk/pa/cm201617/cmselect/cmhealth/277/277.pdf). Cited evidence from two ScHARR publications (R1, R4), see 'The Ambulance Service: Potential of paramedics', p.31.

S6. O'Cathain, A., Knowles, E, Bishop-Edwards, L. et al. (2018). Understanding variation in ambulance service non-conveyance rates: a mixed methods study. *Health Services and Delivery Research, 6*(19). 1-192. http://eprints.whiterose.ac.uk/132286/. Figures on non-conveyance variation (p.15 Fig 4). For significant effect of APP on non-conveyance (p.48) examining staff skill mix and non-conveyance.

S7. Thompson, C., et. al. (2014). HWA Expanded Scopes of Practice Program Evaluation: Extending the Role of Paramedics Sub-Project Final Report. Centre for Health Service Development, Australian Health Services Research Institute, University of Wollongong. (https://bit.ly/2QiJjnl). Supporting evidence of cost effectiveness from R2. P61, para 5.