

Institution: University of Sheffield		
Unit of Assessment: A-03 Allied Health Professions, Dentistry, Nursing and Pharmacy		
Title of case study: Major policy change to improve ambulance response and efficiency in the NHS		
Period when the underpinning research was undertaken: 2011–2019		
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:
Janette Turner	Reader in Emergency and Urgent Care Research	1998–2020
Period when the claimed impact occurred: 2015–2020		
Is this case study continued from a case study submitted in 2014? N		
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>In 2015 ambulance services in England responded to 6.5 million 999 calls compared to 3.5 million in 1995. With no equivalent increase in resources, they were unable to meet response times expected for the most critically ill. The Sheffield programme of work evaluated changes to processes of assessing, categorising and dispatching ambulances to 999 calls and helped set new performance standards. The evidence-based changes have been adopted in the NHS resulting in more consistent fast response to the most urgent calls and ensuring as far as possible people who call get the right response first time. Now all regional ambulance services meet the response time standard for the most serious calls compared to only 1/10 before.</p>		
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>For over 20 years, research in the School of Health and Related Research (SchARR) has provided the evidence base for major policy and operational reform, which has shaped how emergency ambulance services are delivered to patients in the UK. Our early work in 1995 assessing emergency call prioritisation systems underpinned the introduction of 999 call triage in UK ambulance services and response time targets for different levels of urgency.</p> <p>In 2011, Sheffield researchers were awarded an NIHR Programme Grant for Applied Research - the Pre-hospital Outcomes for Evidence Based Evaluation Programme (PhOEBE). This research used statistical modelling of a data set linking ambulance, hospital, and mortality data to produce novel case-mix adjustment measures of ambulance service quality [R1]. Existing performance measures centred on response times so, whilst this was still considered important, it became part of a suite of potential quality measures that also reflected clinical care delivery and patient outcomes.</p> <p>Using consensus methods, SchARR researchers identified a shortlist of ambulance outcome and performance measures that were important to clinicians and service providers, service users, commissioners, and clinical academics, reflecting current pre-hospital ambulance care and services [R2, R3]. Service user perspectives through patient and public involvement (PPI) was integral to the PhOEBE programme and continued to be used to investigate the aspects of emergency ambulance service care valued by users [R4]. Results showed service users valued similar aspects of their pre-hospital care. Users were often extremely anxious about their health, and the outcome they valued was reassurance provided by ambulance service staff that they</p>		

were receiving appropriate advice, treatment and care. This sense of being reassured was enhanced by the professional behaviour of staff, which instilled confidence in their care; communication; a short wait for help; and continuity during transfers. A timely response was valued in terms of allaying anxiety quickly [R4].

While this work was in progress it was becoming clear that ambulance services in the UK were under severe pressure. By 2015, ambulance services in England were responding to 6.5 million calls a year and a combination of increasing demand, changing population and no new financial resources meant almost all were failing to meet the expected response time targets. At that time half of 999 calls were assigned to the highest response category even though only about 10% were true emergencies and the targets themselves were creating poor dispatch practices. Almost all ambulance services in England were failing to meet expected response times and as a result, NHS England embarked on a large-scale review in autumn 2015 - The Ambulance Response Programme (ARP). Three significant changes were tested – i) more time to assess the urgency of 999 calls and identify an appropriate response, ii) a revision of call categories, and iii) new response time standards for each category. A similar exercise began at the same time in Wales. SCHARR's expertise in related policy research led to the team being commissioned to undertake independent evaluations of the changes initiated by the ARP in England [R5] and the revised clinical response model in Wales [R6], providing the evidence needed for decisions about whether these should be permanently adopted.

The English evaluation of Phase 1 of the ARP (analysing over 14 million 999 calls) provided strong evidence that the introduction of longer call assessment times produced clear benefits for operational efficiency with an estimated 14,000 additional resources available for response per week across England. This translated into better response time performance for the most seriously ill patients with a 6% improvement in high priority calls receiving a response within 8 minutes and more stable and consistent fast response performance for calls in the revised highest call category. This became increasingly important as demand continued to rise [R5]. Evidence showed the new call category model had produced benefits without compromising patient safety (patients were more likely to get the right response first time), and did not result in longer waiting times for the 999 call population, thus having the potential to improve survival from out of hospital cardiac arrest by early identification of these critical calls. A staff survey found the changes were welcomed by ambulance staff [R5]. Findings from the PhOEBE programme supported changes to response time performance standards and how these should be reported.

The Wales evaluation showed that response time reliability for the most urgent category increased substantially, fewer resources were used per incident and direct costs decreased slightly and were redistributed to earlier steps in the Ambulance Patient Care Pathway [R6].

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

- R1. Turner J, Siriwardena A, Coster J, Jacques R, Irving A, Crum A, et al. (2019).** Developing new ways of measuring the quality and impact of ambulance service care: the PhOEBE mixed-methods research programme. *Programme Grants Appl Res* 19;7(3) <https://www.ncbi.nlm.nih.gov/books/NBK540540/>.
- R2. Coster, J. E., Irving, A. D., Turner, J. K., Phung, V.-H., & Siriwardena, A. N. (2017).** Prioritizing novel and existing ambulance performance measures through expert and lay consensus: A three-stage multimethod consensus study. *Health Expectations*, 21(1), 249–260. <https://doi.org/10.1111/hex.12610>

- R3.** Irving, A., Turner, J., Marsh, M., Broadway-Parkinson, A., Fall, D., Coster, J., & Siriwardena, A. N. (2017). A coproduced patient and public event: An approach to developing and prioritizing ambulance performance measures. *Health Expectations*, 21(1), 230–238. <https://doi.org/10.1111/hex.12606>
- R4.** Togher, F. J., O’Cathain, A., Phung, V.-H., Turner, J., & Siriwardena, A. N. (2014). Reassurance as a key outcome valued by emergency ambulance service users: a qualitative interview study. *Health Expectations*, 18(6), 2951–2961. <https://doi.org/10.1111/hex.12279>
- R5.** Turner, J., Jacques, R., Crum, A., Coster, J., Stone, A. & Nicholl, J. (2017). *Ambulance Response Programme: Evaluation of Phase 1 and Phase 2. Final Report to NHS England.* School of Health & Related Research, University of Sheffield. https://www.england.nhs.uk/wp-content/uploads/2017/07/ARPreport_Final.pdf
- R6.** Public & Corporate Economic Consultants (PACEC), Turner J. (2017). NHS Wales Ambulance Service Emergency Ambulances Service Committee. Clinical model pilot evaluation. Final Report. PACEC LTD UK. <http://www.wales.nhs.uk/sitesplus/documents/1134/Final%20evaluation%20report.pdf>

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

Sheffield research has resulted in the wholesale revision of the way 999 calls are managed, responded to and reported in England and Wales, and is underpinning the implementation of a new clinical response model for Emergency Medical Services (EMS) in Niagara, Canada.

Policy impact in England and Wales

In England, the National Medical Director for NHS England, Department of Health policy teams and other key stakeholders reviewed the comprehensive report [R5], produced by Sheffield researchers, on evaluating the safety and effectiveness of the three changes made by the ARP. Based on the evidence presented, the National Medical Director recommended all three changes be implemented across all eleven ambulance services in England [S1] and in July 2017 this was approved and announced in parliament by the then Secretary of State for Health the Rt. Hon. Jeremy Hunt [S2]. These changes were subsequently incorporated into the NHS Constitution [S3]. The scope and speed of this change is significant and a rare example of NHS policy being tested, evaluated, and a decision then made based on research evidence. This substantial national change has been developed and implemented in the space of two years. A wide range of stakeholders welcomed the changes and highlighted this work as a good example of evidence-based policy change [S4, S5]. In Wales, SchARR’s report [R6] was shared with the Welsh Ambulance Service and key policymakers, and published in January 2017. Ministerial approval for implementation of the new clinical response model was given in February 2017, based on the findings of the independent evaluation [S8]. The new model was implemented across Wales from March 2017.

Impact on health service practice and patient experience

The impact of these changes on service delivery within the NHS for this sector is extensive and described in the NHS England programme review as the biggest substantial change in ambulance operating practice in England for 40 years [S2].

Ambulance services are now using resources more efficiently and have reduced the use of multiple responses to the same incident in order to “stop the clock” simply to meet a target. It also ensures they are more likely to send the right resource first time – for example a transporting, two crew vehicle to patients needing to go to hospital rather than a single paramedic in a fast response car and then a second vehicle for transport. Better resource use and a reduction from 50% to 10% of 999 calls for the most serious (category 1) cases has translated into improved response performance for this group. By July 2020, 9 out of 10 category 1 calls in England were receiving a response within 13 minutes (standard 15 minutes) [S6].

Patients: the service is more responsive for patients and their clinical needs. It has reduced long waiting times for second vehicles as 93% of patients who need to go to hospital get the right vehicle first time compared to about 80% before. In the longer term there is potential that this will also mean improved patient outcomes. The revised response standards and publicly available response performance for each service are now more transparent as they are reported as mean and 90 centile (i.e. 9/10 calls) times for each call category rather than the previous standard of percent responded to within 8 minutes [S7]. This change was implemented using evidence from the PhOEBE programme [R1].

Staff: the new response model has also resulted in improvements for staff, particularly those working in ambulance emergency operations centres managing 999 calls. Staff surveys included in the evaluation reports were overwhelmingly positive of the changes being tested, reporting that staff were able to do their job more effectively and could better manage the available resources. The most immediate effect on working practices was with Emergency Operations Centre/Hub staff with responses indicating substantial improvements in the ability to dispatch the right resource to the right patient [R5].

Impact on international emergency medical services

Internationally all EMS are coping with increasing demand and diminishing resources and there is a strong appetite for finding better ways of delivering services. As a direct result of the PhOEBE programme [R1] and the evaluation support provided to England and Wales [R5, R6], the research lead has been working with an EMS service in Niagara, Canada. Niagara EMS have embarked on an ambitious plan to implement a new clinical response model based on the Wales and England models. The evidence base generated by the two evaluations has supported rapid progress and the new plan was implemented in September 2019 [S9, S10]. The Ontario Ministry of Health and other Canadian provinces are closely watching progress in Niagara with a view to future more widespread adoption.

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

- S1.** Factual statement from the National Medical Director, NHS England, 13 July 2017 (<https://www.england.nhs.uk/publication/ambulance-response-programme-letter-to-secretary-of-state/>).
- S2.** Implementation of recommendations of the Ambulance Response Programme Statement by Secretary of State for Health to Parliament, 13 July 2017 (<https://bit.ly/3qfHIR3>) and NHS England Ambulance Response Programme Review (2018) NHS England Gateway Publication Reference: 08296 <https://www.england.nhs.uk/wp-content/uploads/2018/10/ambulance-response-programme-review.pdf>

- S3.** Change in NHS Constitution (<https://www.gov.uk/government/publications/supplements-to-the-nhs-constitution-for-england/the-handbook-to-the-nhs-constitution-for-england>).
- S4.** Stakeholder example: NHS Providers on the day briefing Ambulance Response programme, July 2017 (<https://nhsproviders.org/media/3296/nhs-providers-on-the-day-briefing-ambulance-response-programme-13-july-2017.pdf>).
- S5.** Analysis article from the Guardian, 14 July 2017 (https://www.theguardian.com/healthcare-network/2017/jul/14/ambulance-response-system-overhaul-deliver-improvements?CMP=share_btn_tw).
- S6.** NHS England. *Ambulance Quality and Systems Indicators*. July 2020. (<https://www.england.nhs.uk/statistics/statistical-work-areas/ambulance-quality-indicators/ambulance-quality-indicators-data-2020-21/>).
- S7.** NHS England. Post ARP Ambulance Service System Indicators, Statistical Specification. 12 September 2019. (Labelled '20190912 AQI System Indicator Specification'). (<https://www.england.nhs.uk/statistics/wp-content/uploads/sites/2/2019/09/20190912-AmbSYS-specification.pdf>).
- S8.** Statement from the Cabinet Secretary for Health, Wellbeing and Sport, Welsh Assembly, 27 February 2017 (<https://gov.wales/written-statement-independent-evaluation-emergency-ambulance-services-clinical-response-model>).
- S9.** Public information film for Niagara EMS system transformation (https://www.youtube.com/watch?v=HNX4hRCJnLI&feature=emb_title).
- S10.** Factual statement from Niagara Emergency Medical Services, Director/Chief, 3rd May 2019.