



Topic Exploration Report ¹

Topic explorations are designed to provide a high-level briefing on new topics submitted for consideration by Health Technology Wales. The main objectives of this report are to:

- Determine the quantity of evidence available for a technology of interest.
- Identify any gaps in the evidence.
- Inform decisions on topics that warrant fuller assessment by Health Technology Wales (HTW).

Topic exploration report number	TER481
Topic	Advanced paramedic practitioners
Summary of findings	<p>Advanced paramedic practitioners (APPs) have additional training and skills compared to standard paramedics, enabling them to deliver extra treatments and make clinical decisions independently. Health Technology Wales researchers searched for evidence on the effectiveness of advanced paramedic practitioners.</p> <p>We identified one evidence-based guideline, five systematic reviews and two individual studies.</p> <p>The evidence indicates that paramedics with additional training and skills have lower rates of conveyance of patients to emergency departments when compared to standard paramedics. The evidence on safety is more limited but does not indicate paramedics with additional training and skills are less safe than standard paramedics. One cost-effectiveness analysis indicated that paramedics with additional training and skills were cost effective.</p> <p>The role of emergency care practitioner and has evolved over time since the early 2000s to now include advanced paramedic practitioners. This means that in many of the included studies the required additional paramedic training will differ and may not be representative of current advanced paramedic practitioners.</p>

¹ [Cyfieithu dogfennau HTW wedi'u cyhoeddi o'r Saesneg i'r Gymraeg](#)
Translation of published technical HTW documents from English into Welsh

Introduction and aims

The Welsh ambulance service received an average of 1142 emergency calls each day in June 2023, of which 11.7% were red calls (where someone is in imminent danger of death, such as a cardiac arrest). The target is for 65% of red calls to have an emergency response within 8 minutes, however as of June 2023 this target was not being met in Wales.

At times of high demand, a significant proportion of the ambulance fleet can be tied up waiting to unload patients at hospital emergency departments (ED). Some of these patients conveyed by emergency ambulance paramedics to ED for assessment and treatment could be safely managed in the community.

Advanced paramedic practitioners (APPs) have additional training and skills enabling them to deliver extra treatments and make clinical decisions independently. By managing some patients in the community instead of conveying them to EDs, APPs potentially reduce pressure on EDs.

Health Technology Wales researchers searched for evidence on the effectiveness of APPs.

Evidence overview

We identified one evidence-based guideline, five systematic reviews and two individual studies not included in the systematic reviews.

Guidance

The NICE 2018 guideline on emergency and acute medical care in over 16s (NICE, 2018) recommended that specialist and advanced paramedic practitioners who have extended training in assessing and treating people with medical emergencies should be provided. This recommendation was based on evidence from one cluster randomised controlled trial (RCT) and one non-randomised study. Evidence was available on mortality at 28-days, hospital admissions, ED attendance and patient satisfaction.

Systematic reviews

Hospital admissions or conveyance to emergency department

A systematic review by Evans et al. (2014) looked for evidence to support extending skills in any of the British Paramedic Association's 9 core paramedic competencies. They concluded there was evidence (from a cluster RCT and observational studies) to support paramedics managing patients autonomously to reduce conveyance to the ED. Evidence for extending other paramedic skills was less robust.

Systematic reviews by Tohira et al. (2014) and Hill et al. (2013) with considerable overlap of included studies with Evans et al. (2014) reached similar conclusions: that paramedic practitioners, extended care paramedics or emergency care practitioners are less likely to convey patients to ED than conventional ambulance crews.

Snooks et al. (2017) conducted both a cluster randomised trial and systematic review of clinical effectiveness and cost-effectiveness of new protocols for emergency ambulance paramedics to assess older people following a fall with referral to community-based care when appropriate. The systematic review identified evidence (considerable overlap of included studies with the above systematic reviews) indicating reductions in subsequent hospital admissions when calls were attended by paramedics with additional skills.

Evidence overview

Health outcomes (survival, quality of life and functional status)

A systematic review by Flynn et al. (2017) found no evidence addressing the impact of an enhanced paramedic role (staying on to assist after hospital handover of stroke, myocardial infarction or trauma patients) on patient health outcomes.

Safety

The systematic review and meta-analysis by Tohira et al. (2014) concluded there was insufficient evidence to say whether decisions to convey to ED by paramedic practitioners and extended care paramedics were inappropriate.

The Snooks et al. (2017) systematic review reported evidence of reductions in subsequent emergency calls when calls were attended by paramedics with additional skills.

Economic evidence

The economic evidence review for the NICE guideline (NICE 2018) identified one cost effectiveness study (based on a single RCT conducted in the UK) comparing paramedics with enhanced competencies to usual emergency care (Dixon et al. 2009). Overall, total costs per patient were lower in the intervention group, and the authors reported a 95% probability that paramedics with enhanced competencies are cost effective at a QALY threshold of £20,000.

Individual studies

Conveyance to emergency department

An observational study (Pilbery et al. 2022) evaluated the impact of a 10-week placement in a GP practice for specialist paramedics. This GP placement increased the rate of appropriate non-conveyance to ED by the specialist paramedics, when comparing matched cases from before and after the placement.

An unpublished analysis by the Welsh Ambulance Services NHS Trust (WAST 2023) compared conveyance rates for emergency calls attended by advanced paramedic practitioners to those attended by standard paramedics stratified by dispatch code from June 2022 to May 2023. APPs were less likely than standard paramedics to convey patients to ED. This analysis was not adjusted for confounders and it may be that advanced paramedic practitioners tend to be dispatched to calls with a higher likelihood of non-conveyance. However a consistent pattern of reduced conveyance with APPs was seen across all presenting priorities and not just for the less acute presentations.

Areas of uncertainty

Emergency care practitioners and paramedic practitioners were introduced in the UK in the early 2000s with the aim of reducing pressures on ED by treating minor injuries at the scene. Over time the role has evolved and now includes APPs, who have post-graduate qualifications enabling them to carry out more advanced decision making in the community – for example assessing older patients with comorbidities taking multiple medications. This means that depending on the publication date of the included study the required additional paramedic training will differ, and paramedics in the older studies would not have been trained to the level of current APPs.

Some randomised trials of specific training for emergency ambulance paramedics were identified in the literature search. For example: the PASTA trial for stroke (Price et al. 2020) and

Areas of uncertainty

the SAFER-2 falls prevention trial (Snooks et al. 2017), but these trials evaluated training on a specific protocol rather than a general APP qualification and were not included for this reason.

The NICE guideline (NICE 2018) and the systematic reviews relied on evidence from the same cluster RCT. This trial was conducted in over 60-year-olds and most of the emergency calls were due to falls. It is unclear whether its findings can be extrapolated to other types of emergency calls.

Relevant and up-to-date real-world evidence is provided by WAST (WAST 2023) showing a clear pattern of reduced conveyance to ED with APPs. To reach firmer conclusions, however, further analysis would need to be done to adjust for relevant confounders such as patient characteristics, social deprivation, geographic location and paramedic years of experience.

Literature search results

Health technology assessments and guidance	
<p>NICE. (2018). Emergency and acute medical care in over 16s: service delivery and organisation. 978-1-4731-2741-8. National Institute for Health and Care Excellence. Available at: https://www.nice.org.uk/guidance/ng94 [Accessed 19th July].</p> <p>Snooks HA, Anthony R, Chatters R, et al. (2017). Support and Assessment for Fall Emergency Referrals (SAFER) 2: a cluster randomised trial and systematic review of clinical effectiveness and cost-effectiveness of new protocols for emergency ambulance paramedics to assess older people following a fall with referral to community-based care when appropriate. Health Technology Assessment. 21(13): 1-218. doi: 10.3310/hta21130</p>	
Evidence reviews and economic evaluations	
<p>Dixon S, Mason S, Knowles E, Colwell B, Wardrope J, Snooks H, Gorringer R, Perrin J, Nicholl J. 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. 2009 Jun;26(6):446-51. https://doi.org/10.1136/emj.2008.061424</p> <p>Evans R, McGovern R, Birch J, et al. (2014). Which extended paramedic skills are making an impact in emergency care and can be related to the UK paramedic system? A systematic review of the literature. Emergency Medicine Journal. 31(7): 594-603. doi: 10.1136/emj.2012-202129</p> <p>Flynn D, Francis R, Robalino S, et al. (2017). A review of enhanced paramedic roles during and after hospital handover of stroke, myocardial infarction and trauma patients. BMC Emergency Medicine. 17(1): 5. doi: 10.1186/s12873-017-0118-5</p> <p>Hill H, McMeekin P, Price C. (2014). A systematic review of the activity and impact of emergency care practitioners in the NHS. Emergency Medicine Journal. 31(10): 853-60. doi: 10.1136/emj.2013-202660</p> <p>Tohira H, Williams TA, Jacobs I, et al. (2014). The impact of new prehospital practitioners on ambulance transportation to the emergency department: a systematic review and meta-analysis. Emergency Medicine Journal. 31(e1): e88-94. doi: 10.1136/emj.2013-202976</p>	
Individual studies	
<p>Pilbery R, Young T, Hodge A. (2022). The effect of a specialist paramedic primary care rotation on appropriate non-conveyance decisions (SPRAINED) study: a controlled interrupted time series analysis. British Paramed Journal. 7(1): 9-18. doi: 10.29045/14784726.2022.06.7.1.9</p> <p>Price CI, Shaw L, Islam S, et al. (2020). Effect of an Enhanced Paramedic Acute Stroke Treatment Assessment on Thrombolysis Delivery During Emergency Stroke Care: A Cluster Randomized Clinical Trial. JAMA Neurology. 77(7): 840-8. doi: 10.1001/jamaneurol.2020.0611</p>	
Evidence supplied by topic proposer	
<p>WAST (2023). Welsh Ambulance Services NHS Trust unpublished data (June 2022 to May 2023) on conveyance rates in calls attended by advanced paramedic practitioners verses standard paramedics according to dispatch codes.</p>	

Date of search	July 2023
Concepts used	Advanced paramedic practitioners; emergency care practitioners; paramedics with enhanced competencies

Proposed research question and evidence selection criteria (if selected)

Proposed Research question	What is the clinical and cost effectiveness of advanced paramedic practitioners compared to standard paramedics?
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	Inclusion criteria	Exclusion criteria
Population	People calling 999 assigned dispatch codes potentially managed in the community. For example: chest pain / chest discomfort.	People calling 999 assigned dispatch codes automatically conveyed to emergency department. For example: stroke / transient ischaemic attack.
Intervention	<ul style="list-style-type: none"> Advanced Paramedic Practitioners Paramedic with enhanced skills 	
Comparison/ Comparators	Usual emergency care, such as attendance by standard paramedics or other first responders	
Outcome measures	Systematic reviews, randomised trials, observational studies (controlling for confounders). Economic studies	

Proposed specialities	Injuries, accidents and wounds; Health service organisation and delivery
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