



Topic Exploration Report

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:	TER371
Topic:	Clinical decision support software (CDSS) during emergency telephone triage.
Summary of findings:	<p>CDSS are systems that are designed to support operators in the handling and managing of patient calls during emergency telephone triage.</p> <p>Researchers at HTW have identified one systematic review and one cost avoidance analysis, based in the USA. Overall, findings suggest that the consistencies of decisions made by CDSS when compared with standard care is largely inconclusive and further research is needed. The systematic review concluded that several factors such as the experience of the call handler and whether they have a clinical background, patient characteristics, and the type of clinical decision support software would likely have an impact on the effectiveness of CDSS during telephone triage.</p> <p>One additional paper was identified by the topic proposer about the proposed use of Emergency Communication Nurse System (ECNS) with Lowcode for secondary triage in the Welsh Ambulance Service Trust (WAST).</p> <p>We did not identify any ongoing studies relating to clinical decision support software during emergency telephone triage.</p>

Introduction and aims

The initial dialogue during a 999 call can be referred to as primary telephone triage for any emergency. People identified as low urgency can sometimes be signposted to alternative care pathways, referred to as secondary triage.

Information from the topic proposer confirms WAST use core CDSS (Lowcode) during emergency telephone triage. The software aims to improve the way in which 999 callers are assessed by nurses and paramedics in Wales. LowCode has computer-aided dispatch integration, logic prompts and structured questioning for call handlers. Lowcode assists clinicians in providing the right response which can include confirming the requirement of an ambulance or suggesting alternative referral options to callers with non-life-threatening symptoms, thus prioritising resources.

Information from the topic proposer highlights WAST previously used a paper-based secondary triage system that relied on 53 stand-alone pieces of paper to triage, assess, and refer. Due to the limitations of this system, it was replaced earlier this year with a computer based CDSS supported by Lowcode software. This software aims to improve and modernise the method of triage, digital consultation, data sharing, and usability of computer CDSS. The technology also aims to improve how clinicians are audited, tutored, and how feedback is developed and delivered to staff.

Health Technology Wales researchers searched for evidence on the clinical effectiveness and cost-effectiveness of computer based CDSS. We excluded tools that would prompt the call handler to rule in or rule out specific conditions without prompting specific questions for the call handler to ask.

Evidence overview

Evidence standards

Clinical decision support software's are digital health technologies and was determined to be a Tier C technology according to the [Evidence Standards Framework for Digital Health Technologies](#). Tier C evidence standards apply to digital health technologies that function as interventions. This includes technologies that are tools that perform clinical calculations that are likely to affect clinical care decisions. Standard 13 highlights the need to describe the expected health, cost and resource impacts compared with current care or system processes. Sources of information to demonstrate this should be from the most robust evidence available, for example from clinical studies on the technology and on current care options (if available), real-world evidence, observational studies, or expert opinion. To meet standard 14, evidence should support the digital health technology's effectiveness to support its claimed benefits. To demonstrate this, prospective studies (preferably those conducted in a setting similar to that of the UK health system) are often considered to be more valuable than retrospective studies because they can be designed to capture the most relevant outcomes and have a lower risk of bias in terms of who is included in the studies.

Evidence reviews

Health Technology Wales researchers identified one systematic review of secondary triage systems.

Eastwood et al. (2015) aimed to evaluate the safety and success of secondary triage systems in emergency ambulance services, where patients had already been classified as low priority by a primary triage process, however, the decision-making support tools varied including three studies

where computer-based algorithm was used, and some studies where it was unknown whether the tools were computer based.

Eastwood et al. (2015) evaluated the safety and success of secondary triage systems in emergency ambulance services, where patients had already been classified as low priority by a primary triage process. Eastwood et al. (2015) identified seven papers in the review including a mixture of prospective observational studies, retrospective studies and one report. Four studies were UK based, and three were based in the USA. The type of call handlers in the studies also varied across the papers identified in this review, including nurses and paramedic call handlers.

Eastwood et al. (2015) found the number of adverse events to be low which was expected as the cases were already categorised as low priority during primary triage. The paper also reported high satisfaction rates with secondary telephone triage on follow-up. However, Eastwood et al. (2015) highlighted that the evidence base surrounding CDSS is largely inconclusive and further research is needed. The paper highlighted the inconsistencies in decision making and the factors that would influence this. Factors included length and type of experience of the operator, variations in the software system and patient-related characteristics.

Individual studies

The topic proposer highlighted a paper on the proposed use of Emergency Communication Nurse System (ECNS) with Lowcode for secondary triage in WAST. The paper states that the use of CDSS is well-established in the UK (Brady et al. 2021). This paper presents a proposal for WAST, to the International Academies of Emergency Dispatch (IAED), for the implementation of the ECNS, using Lowcode software, for use by its 999 call centres by nurses and UK paramedics. The paper also suggests that paramedics who are skilled to undertake telephone triage would be able to use their existing skills and experience to use ECNS tools.

Economic evaluations

HTW researchers identified one cost avoidance analysis of two 911 dispatch centres that implemented the ECNS in the USA (Gardett et al. 2015). The objective of the study was to determine the amount of cost savings achieved using an alternative point of care as compared to going to the emergency department, and the cost savings of using an alternative mode of transport as compared to a typical ambulance response.

The data included in the paper was based on two agencies (MedStar, based in Texas and LMEMS, based in Kentucky) where the ECNS program was employed. In their analysis, they reported that collectively, approximately 1.2 million US dollars in payments were avoided because of directing patients away from the emergency department to alternative provider points of care.

Areas of uncertainty

Overall, the evidence suggests that the consistencies of decisions made by CDSS when compared with standard care is largely inconclusive and further research is needed.

The evidence identified in this review includes variations in the type of triage system (i.e., primary, and/or secondary triage), including studies where it was unknown as to whether computerised clinical decision software or algorithms were used.

Cost-effectiveness data is limited to a cost-avoidance analysis based in the USA. It is unclear how generalisable this would be to the health system in Wales and/or UK.

Literature search results

Health technology assessments and guidance
No evidence identified.
Evidence reviews and economic evaluations
Eastwood K, Morgans A, Smith K, et al. (2015). Secondary triage in prehospital emergency ambulance services: a systematic review. <i>Emerg Med J.</i> 32(6): 486-92. doi: 10.1136/emmermed-2013-203120
Gardett I, Scott G, Jeff J, et al. (2015). 911 Emergency Communication Nurse Triage reduces EMS patient costs and directs patients to high-satisfaction alternative point of care. <i>Annals of Emergency Dispatch and Response.</i> 3(1): 8-13.
Individual studies
No evidence was identified.
Studies identified by Topic Proposer
Brady M, Tucket S, Perry M, et al. (2021). Proposed use of the emergency communication nurse system in Welsh ambulance service 999 secondary triage with paramedic and nurse users. <i>Annals of Emergency Dispatch and Response.</i> 9(2): 10-9. Available at: https://www.aedrjournal.org/proposed-use-of-the-emergency-communication-nurse-system-in-welsh-ambulance-service-999-secondary-triage-with-paramedic-and-nurse-users
Ongoing research
No evidence was identified.

Date of search:	August/September 2022
Concepts used:	Emergency Communication Nurse System; Emergency telephone triage; LowCode; Clinical decision support software; Emergency triage; Computer-Aided Dispatch (CAD) Integration; Remote clinical decision-making; ambulance service telephone triage.