OPTIMISING AMBULANCE RESPONSE TIMES & COSTS

A study carried out by University of Lincoln researchers, drawing on data from the East Midlands Ambulance Service, has created a new modelling approach that can be used to address the challenges of emergency fleet management within the NHS.

University of Lincoln research has:

➡ Created a new analytic model to support decision making within the NHS, supporting more effective and evidence-based fleet management approaches that draws on data for each NHS Trust.

➡ Evaluated – in terms of response times and costs – the optimum configuration of different types of emergency response vehicle and how they are crewed.

➡ Demonstrated that, where high conveyance to hospital rates exist, increasing the ratio of single-crewed rapid response vehicles to dual crew ambulances is counterproductive.

The UK ambulance service responds to around 10 million calls each year, amounting to a total expenditure of £2.3 billion. This number has risen annually by 6% for the past 5 years, with increased forecasts of 38% over the next decade. The NHS regularly comes under pressure to improve services at the same time as reducing costs, and a 2018 review of the ambulance service, carried out by Lord Carter of Coles, looked at different ways this could be achieved. The report highlights three main areas for operational improvement: staff; technology; and fleet management.
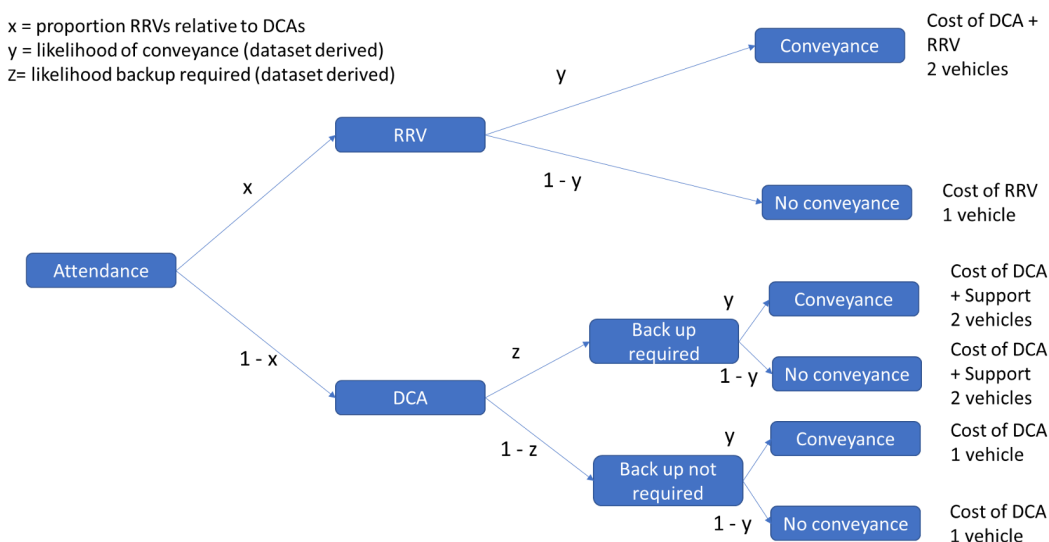
Researchers at the University of Lincoln worked with the East Midlands Ambulance Service – one of 10 services in England – to build an evidence base on how different types of emergency vehicles were used. By analysing data on all emergency vehicle assignments over a period of a year – exploring which type of team responded and what actions they took – the researchers have created a new analytic framework that models the optimum use of those emergency vehicles.

THE DATA MODEL

Working with the East Midlands Ambulance Service, the Lincoln research team analysed data from the 711,922 incident calls attended by emergency vehicles throughout 2019. Each incident was categorised as either a 'see and treat' case, where patients were treated at the scene, or a 'see, treat and convey' case, where at least one patient needed to be taken to hospital. By applying sector-wide assumptions to the data – including staff pay rates, job cycle times, and the use of single crew rapid response vehicles and/ or dual crew ambulances – they were able to construct an analytic model that generated the cost and optimum vehicle requirements for different types of incident.

The results of the modelling showed that, for the East Midlands in 2019, nearly three quarters (72.3%) of calls required at least one patient to be taken to hospital. Where single crew rapid response vehicles had been initial responders, this meant that a dual crew ambulance would also have to be deployed. Their analysis also revealed that where first-on-scene dual crew ambulances were crewed by technicians, there was a higher likelihood that back-up would be needed than if the ambulance was crewed with at least one paramedic (8.2% compared with 3.9%). However, where patients were less likely to need in-hospital treatment, rapid response vehicles did become cost effective, with a tipping point of around 41%. These results support the finding that, at current rates of hospital conveyance, there is no benefit to increasing the proportion of single crew rapid response vehicles to dual crew ambulances, unless additional benefits can be realised, including through upskilling technicians to paramedics.

x = proportion RRVs relative to DCAs
y = likelihood of conveyance (dataset derived)
z = likelihood backup required (dataset derived)

IMPACT ON POLICY

This research has the potential to impact policy by:

- Supporting a data-driven understanding of how best to deploy emergency crews and vehicles.
- Informing fleet management and skills development strategies across ambulance services in England, and further afield.
- Providing an evidence-based model that enables ambulance services to improve and streamline their emergency responses, both within individual services and across England.
- Creating the foundations for further investigation into ways of reducing conveyance to hospital rates while maintaining quality of care.

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