

**Operational productivity and performance
in English NHS Ambulance Trusts:
Unwarranted variations**

Foreword by Lord Carter of Coles

The ambulance service plays a pivotal role in saving lives and has a major influence on the flow of patients to hospitals. Trusts answered 10 million 999 calls and responded to over seven million separate incidents last year. Nine out of 10 of these calls were not life-threatening but were lower acuity calls, often involving elderly patients, and nearly 60% of responses resulted in a patient being conveyed to A&E. Over two million patients brought to A&E were admitted to wards and at any one time 40% of all patients in hospital beds in England will have been taken to hospital in an ambulance.

The speed of response to stroke or cardiac arrest victims can be the difference between life and death. Ambulance services are also at the forefront of responding to major incidents. The tragic events at Manchester Arena last year saw the first call to the ambulance service at 22.32, one minute after the bomb exploded. An advanced paramedic, self-deployed, arrived on scene 10 minutes later. In this review I have been struck by the dedication of all those working in the ambulance service.

The Five Year Forward View outlines an ambition to place care closer to home, but further work is needed to make this a reality. In my review of community health services, I identified that elderly patients, whose average length of stay in hospital for a non-elective admission is 13 days, needed a focused approach. Nowhere is this more evident than when looking at ambulance services. Being taken to hospital in an ambulance is not always in the best interests of the patient and is sometimes expressly against their wishes or their agreed care plan. In this review I have identified significant unwarranted variation in the proportion of patients that ambulance services take to hospitals across England. Tackling avoidable conveyances to hospital, particularly for elderly patients, supports delivery of care closer to home, reduces unnecessary pressures on our A&Es and wards and could release capacity equivalent to £300 million in the acute sector. Ambulance trusts must play their role, but action is required to ensure that alternative health services are in place and responsive to patients need.

Delivering effective urgent and emergency care

I consider that there are three structural issues in the provision of health services which need to be strengthened to improve patient experience and reduce avoidable conveyance.

1. **Ability to access general practice and community services.** To reduce avoidable conveyance, ambulance staff need to be aware of and able to easily access health services in the community. Plans to roll out evening and weekend GP appointments to 50% of the public by March 2018 have been met and NHS England are on track to deliver 100% by October 2018. However, providers of community services and mental health trusts consistently told us they would be able to do more to prevent admissions if the healthcare system was more joined up.
2. **Urgent treatment centres.** About 100 designated urgent treatment centres have been established, although this is lagging behind expectations and there are regional variations in the provision of these services. NHS England is working with local areas

to confirm their delivery plans, but action needs to be taken by strategic and transformation partnerships, working with ambulance services, to accelerate progress before winter.

3. **Hospital handover delays.** Ambulance services are well-placed to understand the performance of the hospitals as they, along with patients, suffer from unacceptable delays at A&E. This has a significant impact on the services ability to get to other patients and cost the ambulance service nearly £50 million last winter.

Operational improvement

Since January 2017 we have engaged with all 10 ambulance trusts in England and talked to the teams and patients who use their services. We have analysed the productivity of ambulance trusts over time and seen that there has been significant divergence in their productivity. If all trusts implement the practice of the best, the scope for greater productivity is around £200 million by 2021. These productivity benefits should be reinvested in improving patient care to support the Government's commitment to return to delivery of key performance standards.

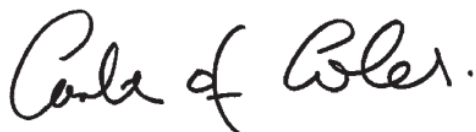
Our work has identified three important areas where operational improvement must be made.

1. **Staff.** Ambulance staff do hugely challenging jobs day in, day out. Giving detailed attention to ensuring they receive the right level of support is critical. Levels of sickness and engagement across ambulance staff are some of the most problematic in the NHS and should be addressed culturally. Staff need greater clinical and managerial support to ensure they feel confident in treating a patient over the phone or on scene and are supported by effective rotas which match supply to patient demand.
2. **The digital ambulance service.** Ambulance services have been at the forefront of technological innovation for many years but there needs to be renewed emphasis in this area. Auto dispatch technology was proved to shave valuable seconds from responses to patients who suffered from cardiac arrest 12 years ago but is yet to be fully implemented across all ambulance trusts in England. New technology is not adopted rapidly across the service and this, plus the weakness identified in the control centre infrastructure, must be addressed. Ambulance services need to plan for tomorrow's service today and develop robust plans to rapidly improve the resilience of the infrastructure.
3. **Effective fleet management.** It is simply unacceptable that trusts purchase different ambulances and stock them with different equipment and medicines. This demonstrably increases costs and there is an unarguable case to develop a common specification across England and move rapidly to centralised procurement for the ambulance fleet. Technology like black boxes and CCTV must become standard issue and make ready systems must be put in place across the country to drive productivity.

Throughout the review we identified areas of good practice and 'what good looks like'. The challenge to NHS Improvement, NHS England, ambulance trusts and the Association of Ambulance Chief Executives is how to ensure the approach of the best is rapidly industrialised across England. Implementation will require leadership, the right infrastructure and the necessary capability and capacity to drive change.

During the review senior people in the ambulance service have raised questions around the current model of 10 trusts. I have concluded that now is not the right time to revisit this issue but that instead trusts should focus on moving to a common infrastructure and operating model supported by new ways of working such as the alliance formed in the North. This will deliver the benefits of scale but NHS England and NHS Improvement should also consider where some aspects of the model will require mandation. Successful delivery of the recommendations I have made will provide a foundation for this question to be properly considered in the future.

I am grateful for the opportunity to extend my work and undertake this review. I would like to thank all those in ambulance services who have devoted significant time to supporting this review. I would also like to thank my team and those who advised and supported me over the last 12 months. I am confident that if the recommendations in this report are implemented, significant savings can be secured in the acute sector through reduced pressure on A&E and admissions. In doing so, and in addressing some of the underlying causes of productivity through targeted investment, ambulance trusts will be able to improve their productivity and get on the path towards consistently achieving constitutional performance standards across England.

A handwritten signature in black ink, reading 'Carter of Coles'.

Lord Carter of Coles

September 2018

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Executive Summary

This document sets out our conclusions from the review into the operational productivity of the 10 English ambulance trusts. The review commenced in June 2017 and has received significant support from the trusts and many others. We have focused on the urgent and emergency service, which makes up the bulk of trusts expenditure. NHS 111 and patient transport services are considered in the context of their impact on these services. We have also looked at the impact that decisions ambulance staff make and the significant variation between trusts in the number of patients conveyed to A&E. Reducing avoidable conveyance could save £300 million across the wider health system by treating these patients at home or directing them to more appropriate health services. This requires significant improvements in the availability and accessibility of the urgent and emergency care system.

The demand for ambulance services has risen significantly over the past five years and is likely to continue to do so. Improvements in operational productivity will be key to meeting this rising demand. We found that while the service's overall productivity has improved, the significant differences in the productivity of individual trusts indicates more can be achieved. We identify the steps trusts can take to move to a common, more efficient operating model. Effective implementation could be worth up to £200 million by 2021 and help improve performance. The review identified examples of good practice across the service to help achieve this. We make nine recommendations over eight chapters to improve the unwarranted variation in productivity across the ambulance service and ensure better, more appropriate care for patients.

Chapter 1: Ambulance services

Ten ambulance trusts respond to 10 million 999 calls every year across England to provide lifesaving urgent and emergency care. This costs around £1.8 billion, or £33 per person, and services are contracted by 10 lead commissioners. We found the cost of these services varied between trusts, some of which is caused by factors outside their control, such as geography. Some trusts also provide NHS 111 and patient transport services and over 40,000 people are employed across trusts. Demand has increased by 6% a year and there is no national forecasting. Maintaining effective relationships across the wider health system is difficult for ambulance trusts due to their relatively small scale. This means the impact of wider service reconfigurations on ambulance trusts is often not considered. Performance has come under sustained pressure and new standards were introduced in 2017 to provide a better, more appropriate service to the public. Some trusts are performing well but others are not meeting the new standards.

Chapter 2: Productivity of the ambulance service

The ambulance service has become more productive over time but we found a significant and increasing disparity between trusts in the key drivers of productivity: the categorisation of calls; the model of care provided to patients; the length of time taken to resolve an incident; and, the overall staff time this takes. Factors outside the ambulance trusts control will impact productivity such as the ability to access suitable alternative

healthcare services and delays at A&E when handing over patients. Ambulance trusts must be supported to identify productivity improvements by being routinely provided with operational benchmarking data.

Chapter 3: Improving ambulance service productivity

Delivering the best outcome for patients and helping them stay at home can be achieved by reducing avoidable conveyance and will also enable productivity improvements. NHS England is leading a programme to strengthen the urgent and emergency care system to support this aim. Ambulance trusts can enable improvements by: standardising clinical assessment offers in control centres; enabling access to patient information; empowering staff to make clinically appropriate decisions; and utilising a consistent workforce skill mix. We found there is no standard frontline utilisation measure for the ambulance service. Ensuring resources are used and monitored effectively is integral to improving productivity, and trusts can improve this by: using demand modelling software; optimising clinical support; improved rota and fleet management; adopting enabling technologies and implementing a make ready system.

Chapter 4: Workforce, leadership and human resource processes

Ambulance staff have a vital part to play in improving productivity and providing better care for patients. Significant investment has been made into improving pay and training for paramedics to provide better care for patients. However, staff are not always supported to do this as engagement is low across the service. We found sickness absence was the highest of all NHS sectors at an average of 20 days per person per year and work has begun to address this. Across the service there are recruitment and retention issues, the highest levels of bullying and harassment in the NHS and unacceptable violence towards staff. Workforce, recruitment and wellbeing plans must tackle these issues and provide staff the support they need.

Chapter 5: The ambulance fleet

Over £200 million every year is spent on the service's fleet of around 5,000 vehicles. There is no standard ambulance across the country with 32 types of double crewed ambulance in operation and no standard list of what is carried on board. There are substantial differences in the average age of the fleet between trusts and different fuel delivery methods are used. Fleet management can be strengthened through improvements in the information systems and a greater focus by trust boards. Black box technology and CCTV in ambulances has enabled significant savings in fuel and accident reductions but less than half of them have this fitted. To drive efficiencies in this area, a standard specification for an ambulance should be developed, supported by effective fleet management systems and utilising black box technology. Trusts should work together to leverage combined purchasing power through centralised procurement.

Chapter 6: Control centres and the digital ambulance service

Across the country there are 22 control centres with each trust having at least two in case of a site failure. There is no standard operating procedure across trusts and there

are significant differences in their performance. Resilience is an issue across the service that must be addressed to ensure current and future demand increases can be met. Staff recruitment and retention in control centres are challenges and wellbeing initiatives must be shared. There is limited interoperability as trusts use different triage, computer, and telephony systems. Ambulance trusts must improve performance and implement more common systems. They should also exploit new technologies and develop proposals to deliver a modern resilient infrastructure in the longer-term.

Chapter 7: Optimising non-clinical resources

Effective frontline care is enabled by efficient estates, procurement and corporate services. Trusts estates are structured differently, partly to meet local demand, but there are opportunities to rationalise and modernise this using the make ready system. Ambulance services spend the highest on average in the NHS on corporate services as a proportion of turnover, which may be partly due to their smaller size. However, we found considerable variation between ambulance trusts. Trusts are paying significantly different prices for the same goods and benchmarking data must be used to identify potential opportunities. Aggregation and collaboration between trusts and the wider health system should be exploited in these areas to enable savings.

Chapter 8: Securing effective implementation

To ensure successful implementation of the recommendations, NHS Improvement and NHS England will provide the required support to trusts through the joint Ambulance Improvement Programme. They must help trusts to identify opportunities for improvement by presenting their data in a comparable way through the Model Ambulance Service portal. Using this benchmarking data, trusts should work together to improve performance and remove unwarranted variation in the current configuration. A common operating model for the ambulance service can then be developed to ensure a more consistent and better service for patients. To support delivery of the conclusions of the review, we recommend building key requirements into the NHS business rules for ambulance services, including the NHS Standard Contract, national tariff and commissioning for quality and innovation (CQUIN), and support the development of alliances across ambulance trusts.

During the review we analysed a significant amount of data and some of this is represented in the report. In the report we used, where possible, publicly available data. Where information was sourced directly from trusts we undertook a comprehensive quality assurance, with trusts offered the opportunity to review and correct the data. A representative from the National Ambulance Information Group also reviewed the overall data set. This does not guarantee the data is perfectly accurate, however the process we undertook with trusts means that we are confident that it is a fair reflection of the overall position of ambulance services.

Chapter 1: Ambulance services

The ambulance service provides unplanned assistance 24 hours a day, 365 days a year in response to 10 million 999 calls every year. Staff are trained and equipped to deal with a wide variety of situations ranging from major incidents and life-threatening conditions, to providing support for frail and elderly patients. They are supported by control centre staff who receive and triage calls, dispatch the right vehicle and provide clinical advice to patients over the phone. There are 10 NHS ambulance trusts in England delivering services within defined boundaries as shown in Figure 1.1¹.

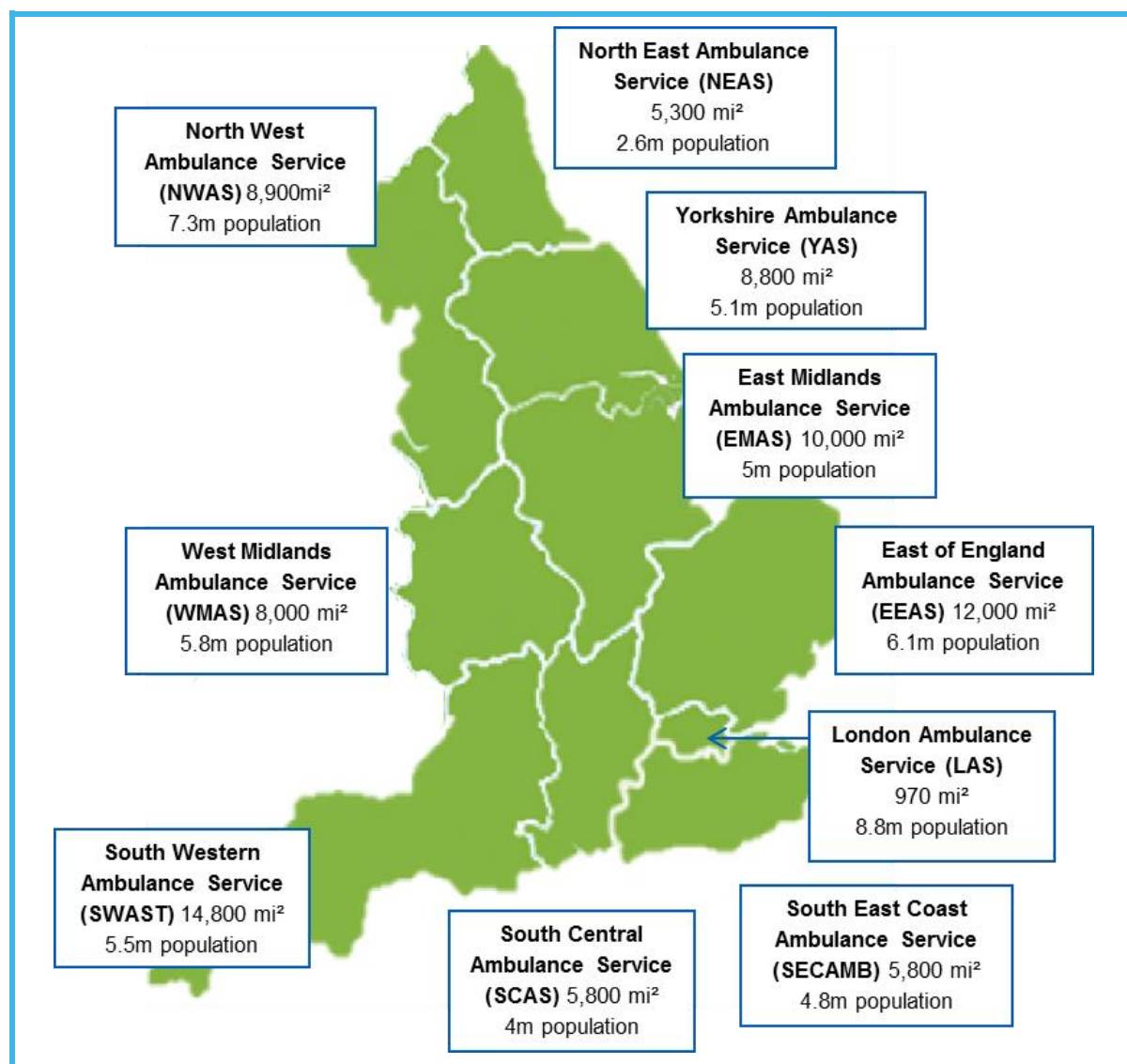


Figure 1.1: Geography of the English ambulance service²

Ambulance crews deliver timely and lifesaving emergency care daily to people who suffer from life changing conditions such as cardiac arrest, trauma and stroke. Ambulance trusts are measured against key quality indicators and these demonstrate

¹ Ambulance services on the Isle of Wight are delivered by the Isle of Wight NHS Trust

² Figures sourced using data from Office of National Statistics, www.data.gov.uk and NHS England.

that patients now get better quality care, for example: 97% of patients with a suspected stroke now receive the right package of care compared to 92% in 2011³.

The number of calls to the ambulance service has steadily risen over a number of years and the profile of patients it cares for and supports has changed. Calls for life threatening emergencies now only make up 10% of demand, with the remainder mostly for patients with urgent primary, social or mental health care needs⁴. This change in demand has placed significant pressure on ambulance services. The service has evolved from one that focused on conveying patients to hospital to ensuring patients receive the right and appropriate care for their needs.

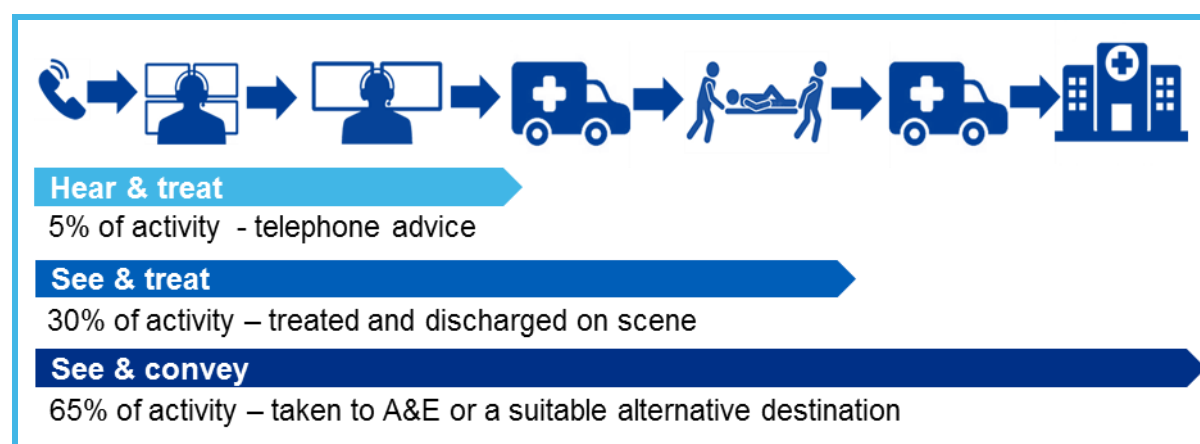


Figure 1.2: Ambulance response models of care now provided to patients, NHSE England Ambulance Quality Indicator (AQI) data set 2017/18

Variation in the cost of delivering services

Ambulance trusts spent £1.8 billion last year providing urgent and emergency care. Each face-to-face incident costs on average £267, which equates to about £33 for each person in England. However, there is variation between trusts.



Figure 1.3: The variation in cost between ambulance trusts, Reference Costs 2016/17 and AQI data set 2016/17

³ <https://www.england.nhs.uk/statistics/statistical-work-areas/ambulance-quality-indicators/>

⁴ Department of Health (2005), Taking Healthcare to the Patient: *Transforming NHS Ambulance Services*

These cost variations are caused by a range of factors, including: demographics, performance, the geography of an area, and the underlying productivity of the trust.

Last year the total expenditure for ambulance services was £2.3 billion, with the remaining £500 million spent delivering NHS 111 and patient transport services (PTS). These services are subject to competitive tendering and this review has focused on the productivity and efficiency of 999 urgent and emergency services. NHS 111 and PTS were only considered in the context of their impact on the provision of urgent and emergency services.

Ambulance workforce

The majority of expenditure is on pay. The 10 ambulance trusts employ over 40,000 people in over 70 different roles from several professional groups, including paramedics, physiotherapists, nurses and administrative staff.

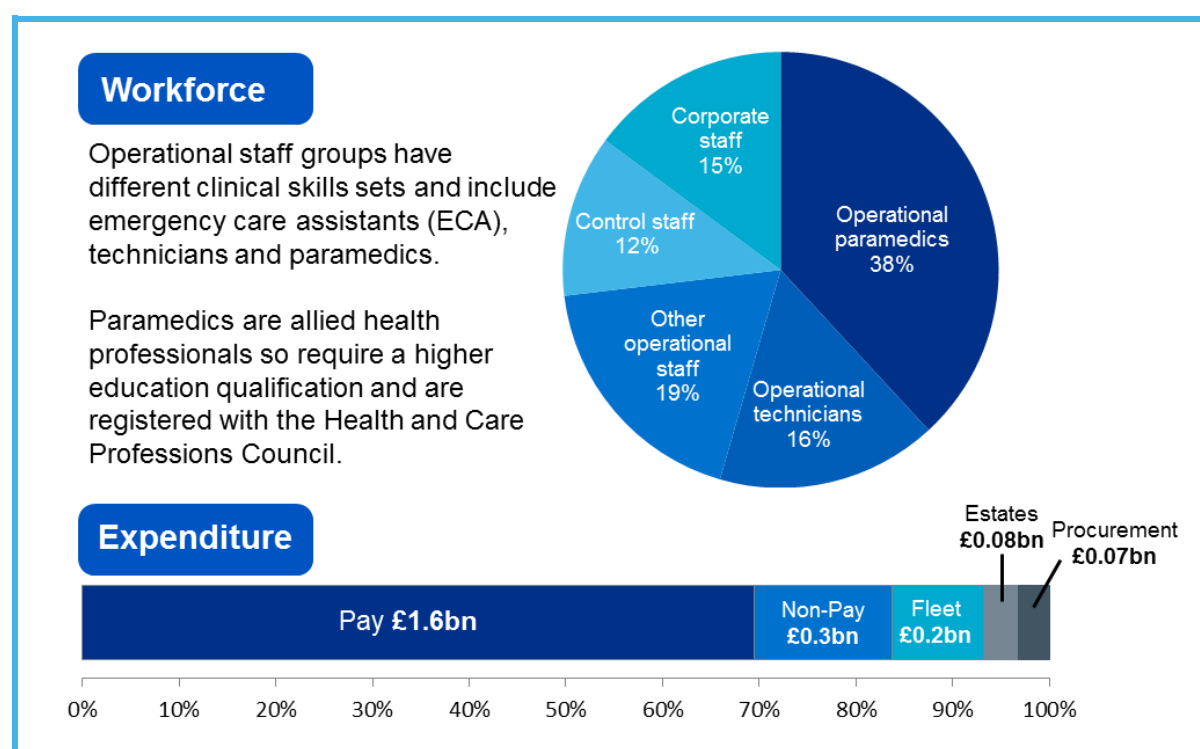


Figure 1.4: Ambulance service expenditure and workforce composition, NHS Improvement summary data request, November 2017, and NHS Financial returns, 2016/17

Around 85% of staff are directly involved in the delivery of operational services. Non-pay areas include fleet, estates, procurement and privately contracted services.

How services are commissioned

Ten lead Clinical Commissioning Groups (CCGs) commission ambulance services. They procure these on behalf of the 195 CCGs. Services are commissioned in different ways, with seven trusts on block contracts, two on activity-based contracts, and one with a

mixed contract. The National Audit Office report (2017) recommended that CCGs should take a consistent approach to commissioning ambulance services⁵.

Commissioning plays a significant role in the shape of the health service and ambulance trusts need to be seen in the context of wider provision. Ambulance trusts and CCGs must work together to co-design the system and develop effective pathways for urgent and emergency care. This includes integrated 999 and NHS 111 call handling and triage to ensure that the impact of decisions in local areas considers the effect on ambulance services. Through this collaborative approach trusts will be able to manage demand more appropriately and reduce avoidable conveyance to A&E.

This year's report into the Operational Productivity of Mental Health and Community Health Services highlighted the frictional cost of commissioning services and we identified similar challenges for ambulance trusts in this review⁶. The 42 Sustainability and Transformation Partnerships (STPs) across England enable NHS organisations and local councils to work together to improve regional health and care. Each ambulance trust covers between two to eight STPs, increasing the challenge of building and maintaining relationships with stakeholders, particularly given their relatively small size. One trust calculated that invitations to STP and CCG meetings stipulating executive director attendance would take up over 65 hours in one month alone. STPs and others need to work out effective mechanisms for managing their relationships with the ambulance service.

Demand

Over the last five years there has been a sustained increase of 6% a year in the number of 999 urgent and emergency calls⁷. Operational Research in Health, an organisation that specialises in emergency service planning, forecasts that future demand is likely to increase by at least a further 38% in the next 10 years⁸. We found that demand varies significantly between trusts.

⁵ National Audit Office (2017), NHS Ambulance Services, <https://www.nao.org.uk/wp-content/uploads/2017/01/NHS-Ambulance-Services-Summary.pdf>

⁶ Operational Productivity of Mental Health and Community Health Services, 2017 <https://improvement.nhs.uk/about-us/corporate-publications/publications/lord-carters-review-unwarranted-variations-mental-health-and-community-health-services/>

⁷ Source: NHS England Ambulance Quality Indicator Data Set

⁸ Operational Research In Health 'A decade of change: the capacity challenge' presentation to the Ambulance Leadership Forum, 20 March 2018. This increase is when population changes and trends in rates of access to A&E are considered.

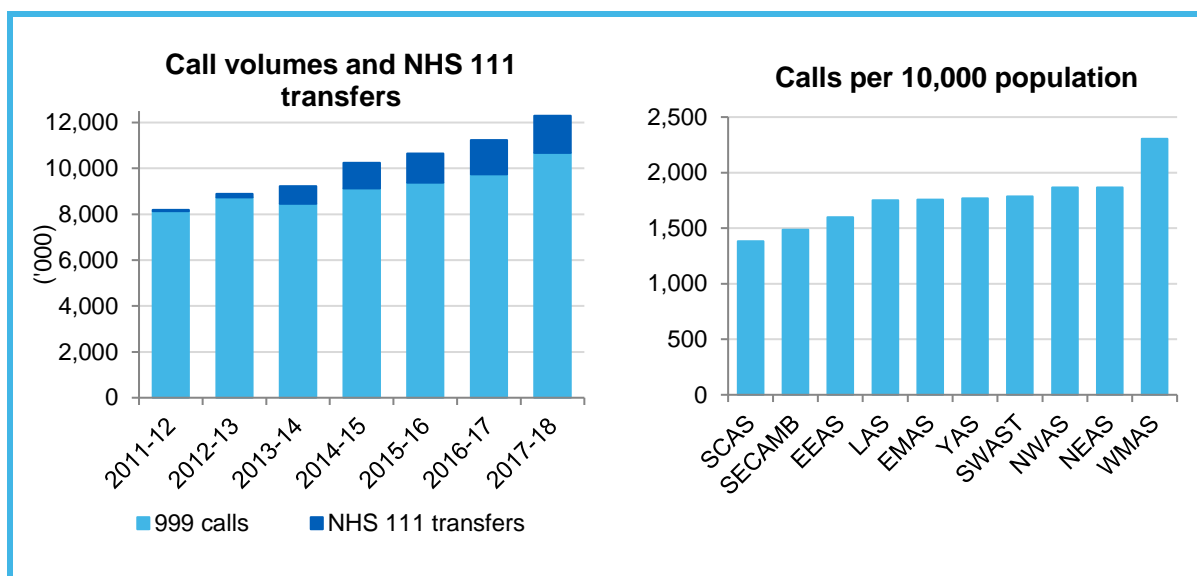


Figure 1.5: Demand has increased across ambulance services including transfers from NHS 111. Variation exists in call demand between trusts. NHS 111 minimum data set and AQI data set 2016/17.

The public makes nearly three quarters of calls to the ambulance service, with the remainder made by the police and healthcare professionals, including nursing homes and GPs. Some trusts have analysed the future demand for their services, but demand and the impact it will have on ambulance services is not nationally forecasted. This limits the ability of the ambulance service, commissioners and the Department for Health and Social Care to plan for the future.

Managing demand is an important part of delivering a productive and effective ambulance service. High intensity users or frequent callers are usually defined as people who contact the ambulance service five or more times a month. Often these callers have chronic long-term physical health problems or mental health conditions but trusts also highlighted that some of these calls may be inappropriate referrals from other agencies and care homes.



Case study – Reducing avoidable demand

In 2017, North West Ambulance Service NHS Trust identified that some care homes were calling 999 for patients that could be better cared for in alternative health services. They built an evidence based model with clinicians for care home staff to identify which service should be contacted depending on the patient condition. The assessment model is now being used in over 200 care homes and has reduced the number of times they call 999 by 30%.

While all trusts have approaches to manage demand, few know if their interventions are having an impact. NHS RightCare is leading the rollout out of the high intensity user

programme, now in place across 20% of the country, to ensure good practice guidance is nationally available to assist ambulance trusts managing high intensity service users⁹.

Performance

The performance of the ambulance service has been measured against a set of time-based targets since 1975. These were based on the increased probability of survival if a patient with a life-threatening emergency, such as a cardiac arrest, received a quicker response. The delivery of operational performance against these standards has come under increasing pressure across the service in recent years.

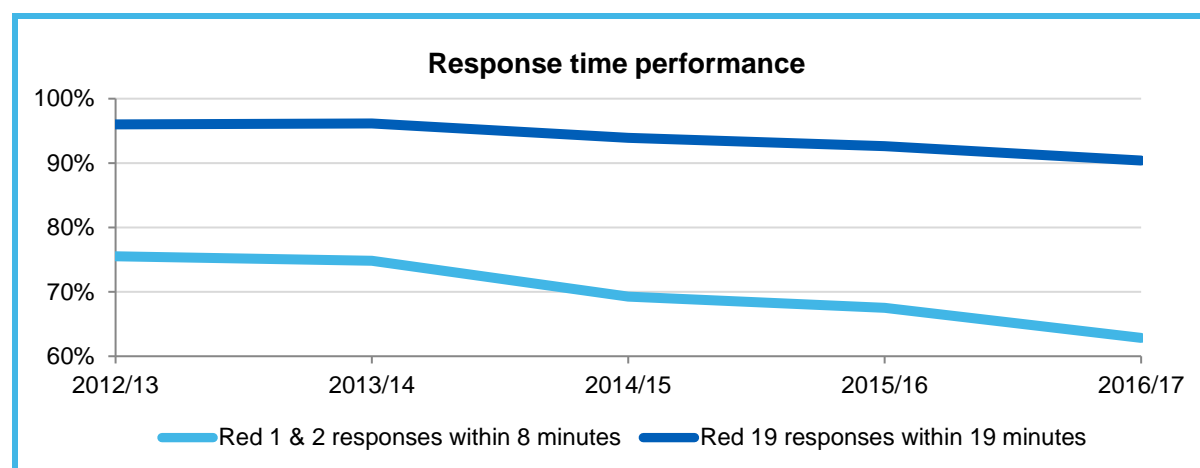


Figure 1.6: Performance of the ambulance service against the highest acuity categories has reduced over time, AQI data set 2016/17

The shift from mostly life-threatening to more urgent and emergency conditions, combined with increasing demand, meant that the standards were no longer appropriate for patients and were impacting performance. In 2017, NHS England led the introduction of the new performance standards designed to provide the most appropriate response the first time for each patient¹⁰.

⁹ NHS RightCare (2017), Setting up a High Intensity User Service, <https://www.england.nhs.uk/rightcare/wp-content/uploads/sites/40/2017/02/high-intensity-resource.pdf>

¹⁰ NHS England, New ambulance standards, <https://www.england.nhs.uk/urgent-emergency-care/arp/>

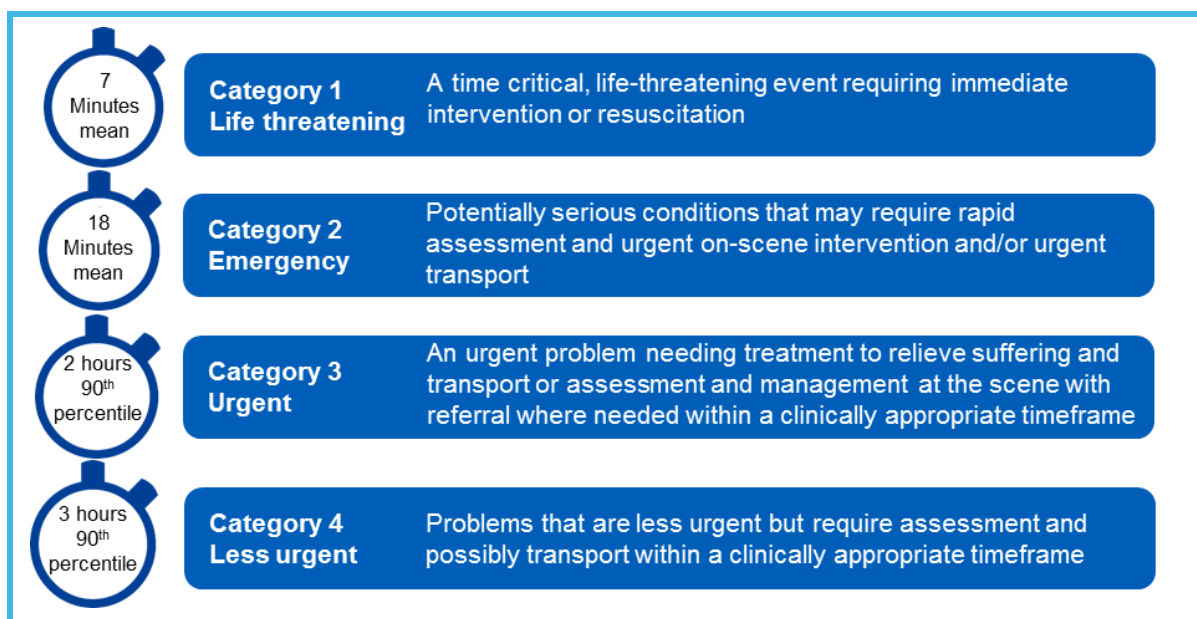


Figure 1.7: Ambulance service performance standards, NHS England 2017

Call handlers now have more time to identify the nature of the call before dispatching the appropriate resource, except for category 1 calls that require the quickest response. A Sheffield University study concluded that this change in approach could save over 250 extra lives every year across the country and it could also enable significant efficiencies across the service¹¹.

However, since the introduction of the new standards performance remains mixed.

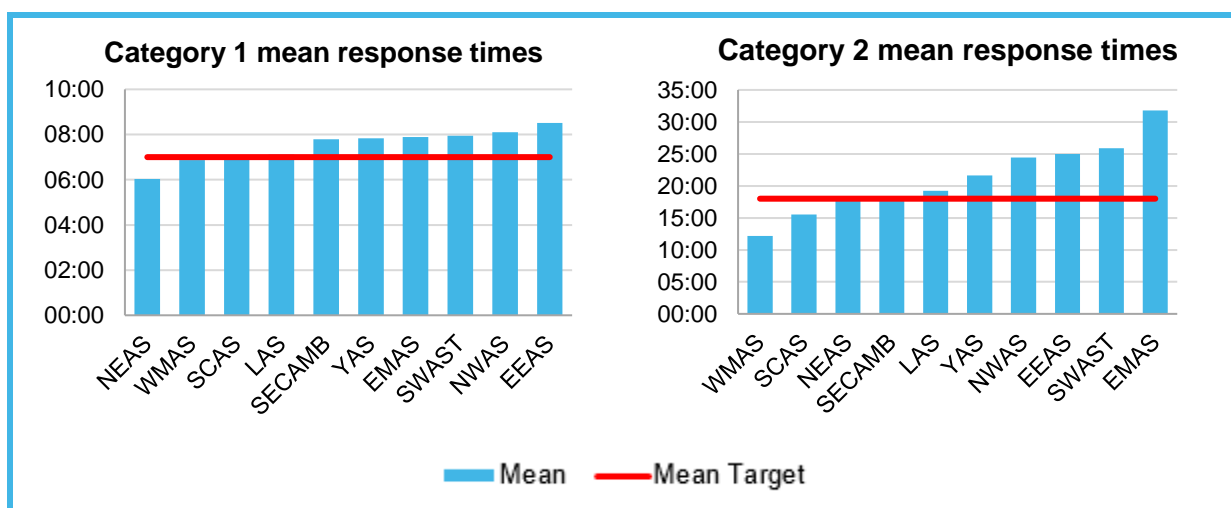


Figure 1.8: Ambulance service response times in minutes, where a trust below the line are meeting the standard, AQI July 2018

In July 2018, eight of the 10 trusts did not meet the category 1 response standard. Category 2 calls make up the majority of demand and eight trusts did not meet the 18 minute average standard during July 2018. The variation between trusts in the time they

¹¹ The University of Sheffield, Ambulance Response Report, www.sheffield.ac.uk/scharr/sections/hsr/cure/newsstories/arpreport

took to respond to these emergency calls is significant from 13 to 33 minutes. The current performance pressures highlight the importance of productivity improvements to help bridge the gap.

The ambulance service and the wider system – the ‘gearing’ effect

The decisions made by staff on the frontline of ambulance services, particularly whether it is necessary to convey a patient to hospital, has a significant impact on the wider health system. We analysed this impact and found that patients brought into hospital in an ambulance occupy around 40% of hospital beds in England at any one time.

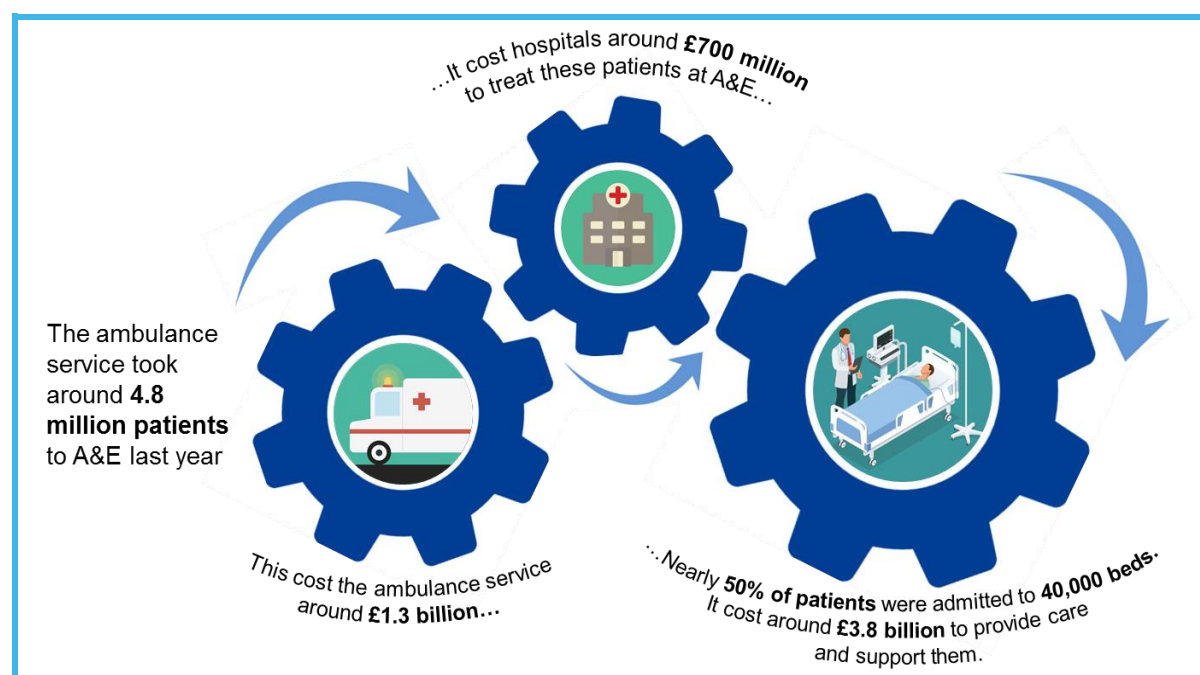


Figure 1.9: The wider system costs of patients conveyed to A&E by ambulance

The health system must ensure that patients’ best interests and preferences are met and that they are treated as close to home as possible. However, sometimes ambulance crews take patients to hospital when they could be better managed at home or by other health services. These are known as avoidable conveyances. They are not poor decisions made by ambulance crews as often they don’t have the information needed or access to the right alternative health services, and taking the patient to A&E is the only option.



Case study – Providing patient-centred care closer to home

Coordinate My Care is a service that trains clinicians to create advanced care plans to improve end of life care. In March 2018, London Ambulance Service NHS Trust introduced mobile devices for all crews to access advanced care plans. Paramedics can then carry out patients personal wishes such as taking them to their preferred place of care and death. These patients are then less likely to have emergency hospital admissions in the final months of their life. Where advanced care plans are in place, 80% of people die in their preferred place.

Reducing avoidable conveyances to hospital can have a wide range of benefits, including reducing costs for ambulance services, the wider system and supporting the aim of delivering services closer to home for patients. NHS England has modelled that savings equivalent to over £300 million could be seen if overall conveyances were reduced to 50%. These are mainly from reduced costs of A&E attendance and subsequent admissions. In the review, trusts told us they are working to reduce avoidable conveyance but it requires a system wide approach to enable better access to more appropriate services.

Chapter 2: Productivity of the ambulance service

The review focused on understanding the overall productivity of ambulance services and the variation between trusts. We analysed and benchmarked data from trusts' Computer Aided Dispatch (CAD) systems. This enabled us to isolate the key drivers of frontline productivity and identify that the productivity of ambulance services is highly dependent on other parts of the health service working effectively. The ambulance service holds significant data in its systems, but this information is not standardised or accessible. This means that trusts cannot easily benchmark and interrogate their frontline performance against their peers.

Understanding productivity

It is not possible to directly compare the productivity of ambulance trusts through simple calculations, such as the cost per incident or the cost per head of population. This is because they do not take into account variations in the population or geography of a trust, which can significantly impact the cost of providing ambulance services. For example, it is relatively more expensive to ensure that ambulances can meet the time standards in a sparsely populated rural area compared to a densely populated urban area. In the review we found there was no single national measure that could be used to benchmark the productivity between trusts.

We reviewed a number of different approaches that seek to analyse the productivity of ambulance services, including the work of the Australian Government Productivity Commission. Its 2017 report compared the productivity of individual ambulance state-level organisations over time rather than against each other¹². We adapted this methodology to produce an indicative productivity index for all trusts in England. This is calculated by dividing the number of calls by the cost and then adjusting for performance over time. Figure 2.1 shows the productivity of the highest and lowest performing trusts.

¹² Australian Government Productivity Commission (2017), Ambulance Services, page 11.17, <https://www.pc.gov.au/research/ongoing/report-on-government-services/2017/health/ambulance-services>

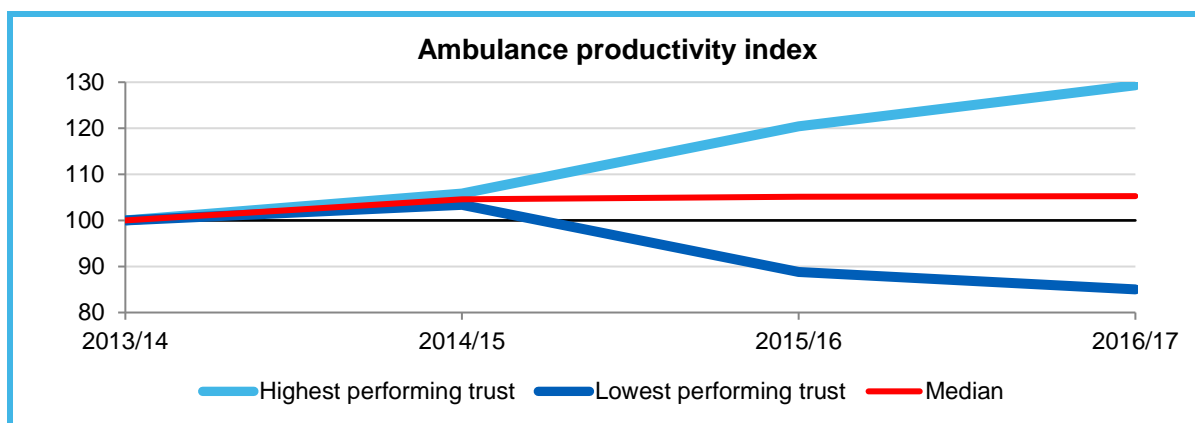


Figure 2.1: Indicative quality adjusted productivity index of the English ambulance service where a higher score means a trust is more productive, Reference Costs and AQI data set 2016/17¹³

This shows that on average the service has become more productive over time, but that there has been a significant divergence between trusts. The highest performing trust improved productivity by nearly 30% over the period, while the lowest performer reduced by 15%. We repeated the analysis using the number of incidents instead of call volumes. This showed a similar range in productivity between trusts. We found the trusts that improved their productivity generally started at, and then maintained, higher levels of performance and clinical standards. This shows that productivity can be improved without impacting on quality and performance.

Further work is required to develop the methodology and improve data quality, but this analysis is consistent with the view from trusts that there has been a significant improvement in productivity in some services, but others require further support. Understanding what drives variation in productivity between trusts, identifying what good looks like and how to rapidly share this across the service forms the core of this review.

Key drivers of productivity

We reviewed performance across a number of related areas to analyse the underlying productivity of ambulance services. These included: the way in which calls are categorised; the type of response or model of care that is provided to the patient; the time taken to resolve an incident involving a patient, known as the job cycle time; and the overall staff time deployed for each incident. We found significant unwarranted variation in all these areas.

Call categorisation

When someone calls the ambulance service, their call is triaged and placed in one of the four categories set out in Chapter 1. This categorisation determines the level of urgency of the response provided by the ambulance service. For example, category 1 calls

¹³The index was calculated by dividing the number of quality adjusted calls by inflation adjusted reference costs. A 20% weighting was given for 'quality' based on call performance against the highest acuity call time performance standards over the period. The data excludes 111 and other service transfers as these are not currently available at trust level. The index may therefore underestimate productivity performance.

should be responded to in a mean time of seven minutes whereas the service has three hours to respond to the 90th percentile of category 4 calls. Ensuring calls are appropriately triaged has a direct impact on the costs of providing services and importantly preserves resources for patients with the most urgent health needs. We found significant variation in the distribution of call categories between trusts.

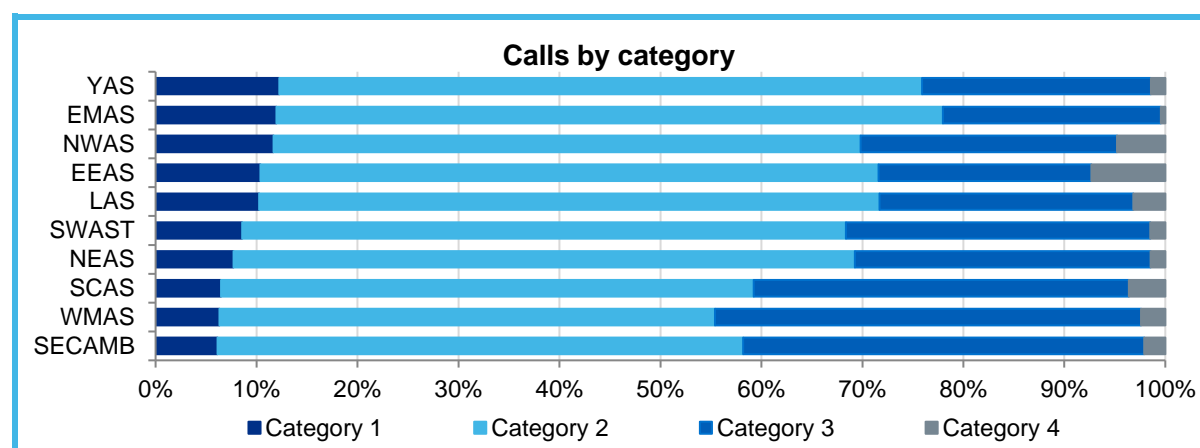


Figure 2.2: The volume of calls trusts receive differ by call category, AQI data set January 2018 to July 2018

Some trusts reported almost twice the level of category 1 calls compared to other trusts, and generally those with a greater number of category 1 calls had a higher acuity of triaged calls overall. This means an increased cost of providing responses because of the required time targets for these calls. Across the ambulance service over half of all calls are triaged as category 2. These are calls that are considered emergencies and require a mean response of 18 minutes. Trusts triage between 49% and 66% of calls as category 2. Category 3 calls are considered urgent but require a response within two hours for the 90th percentile of calls. There is considerable variation in the number of category 3 calls between trusts from 21% to 42%. Some trusts are triaging half the amount of category 3 calls as compared to category 2. NHS England found that variation in the way in which ambulance services determine the call categorisation is generally unwarranted. We support their reconstitution of the Emergency Code Prioritisation Advisory Group to reduce unwarranted variation in call categorisation and prioritisation.

As noted in Chapter 1, a growing proportion of calls to the ambulance service are triaged and categorised by NHS 111. When these are passed to the ambulance service, trusts cannot re-categorise calls unless there is new information on the patient's clinical condition. We observed significant differences in the number of calls that are passed through by NHS 111 to ambulances trusts.

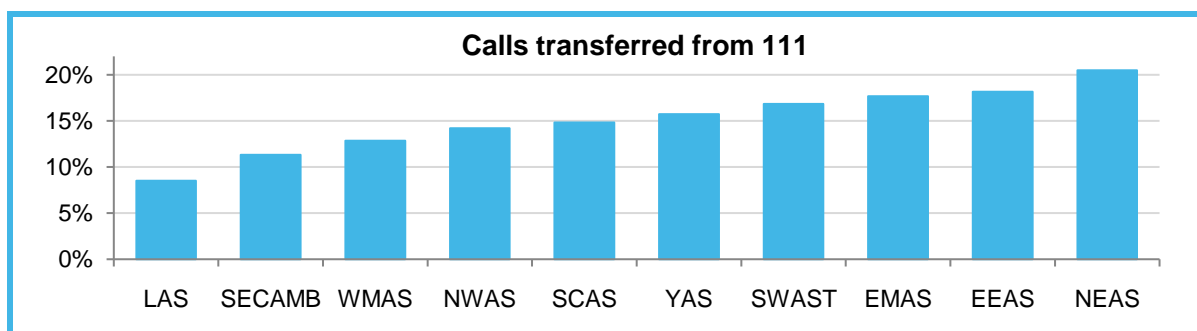


Figure 2.3: Variation in demand from NHS 111 across the ambulance service as a proportion of total calls received, NHS Improvement Summary Data Request Q1 & Q2 2017/18

Since March 2018, NHS England has required all NHS 111 providers to clinically revalidate category 3 and 4 calls before passing them to the ambulance service. Within the first two months the number of calls passed to trusts by NHS 111 from these categories reduced by 40%. Moving to a standardised triage model will enable efficiencies to be realised and ensure patients receive an appropriate level of care.

Model of care

After a call is categorised, the ambulance service provides an appropriate response or model of care. There are three main models of care: hear and treat, see and treat, and see and convey, as described in Figure 1.2.

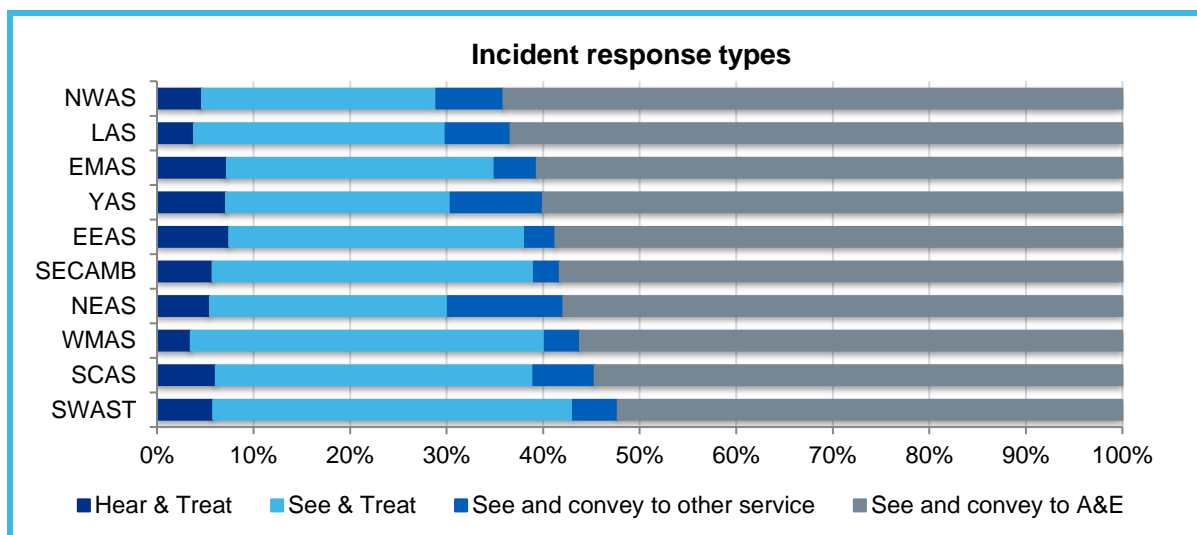


Figure 2.4: Variation in the model of care provided by trusts, AQI data set January 2018 to July 2018

Hear and treat and see and treat levels differ significantly between trusts. This leads to substantial differences in the proportion of patients who are conveyed to A&E from 52% to 64%. There is also considerable variation in the proportion of patients that are transported to other services, mainly urgent treatment centres, from 3% to 12%. This largely reflects the availability and accessibility of these alternative services to the trusts.

The type of response the ambulance service provides to a patient will depend on their presenting condition. We have explored the extent to which variation in the model of care provided to a patient relates to the severity of the call.

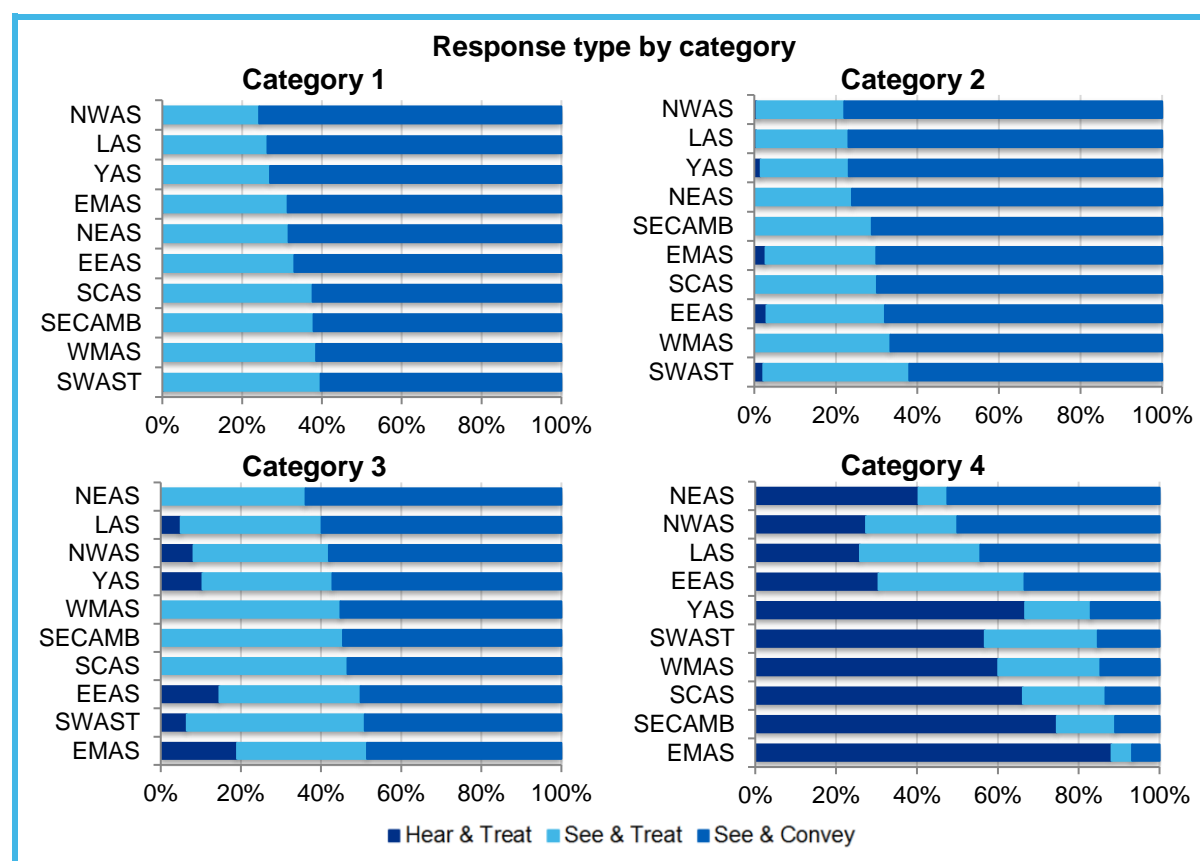


Figure 2.5: The model of care provided by each trust shows the variation even when the severity of the call is taken into consideration, NHS Improvement Computer Aided Dispatch (CAD) data request December 2017 to May 2018¹⁴

The likelihood of a patient requiring conveyance is directly linked to the category of call and the most significant variation is seen between the lower acuity call categories. Conveyance rates for category 4 calls are between 3% and 53% and indicate significant scope to reduce avoidable conveyance. STPs and ambulance trusts should work together to regularly review the effectiveness of change in the configuration and accessibility of health services in the community and the impact on conveyance.

Job cycle time

An incident is when a call is connected to the ambulance service and a clinical response is provided. The total time taken responding to an incident is known as the job cycle time (JCT), the key stages of which are recorded on trust CAD systems.

¹⁴ Category 4 and category 4 H have been combined for this graph.

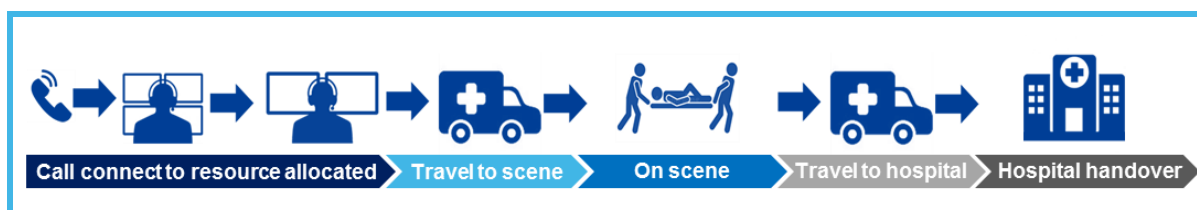


Figure 2.6: The stages of the job cycle time

There is little trusts can do to influence some elements such as travel time, which is largely dependent on the areas that they cover, and call connect to resource allocated will be dependent on the availability of resources. The most significant elements of the JCT that can be operationally influenced are the time trusts spend on scene and hospital handover time. The latter element requires ambulance and acute trusts to work together as it is a shared responsibility. We analysed the JCT and found variation between trusts.

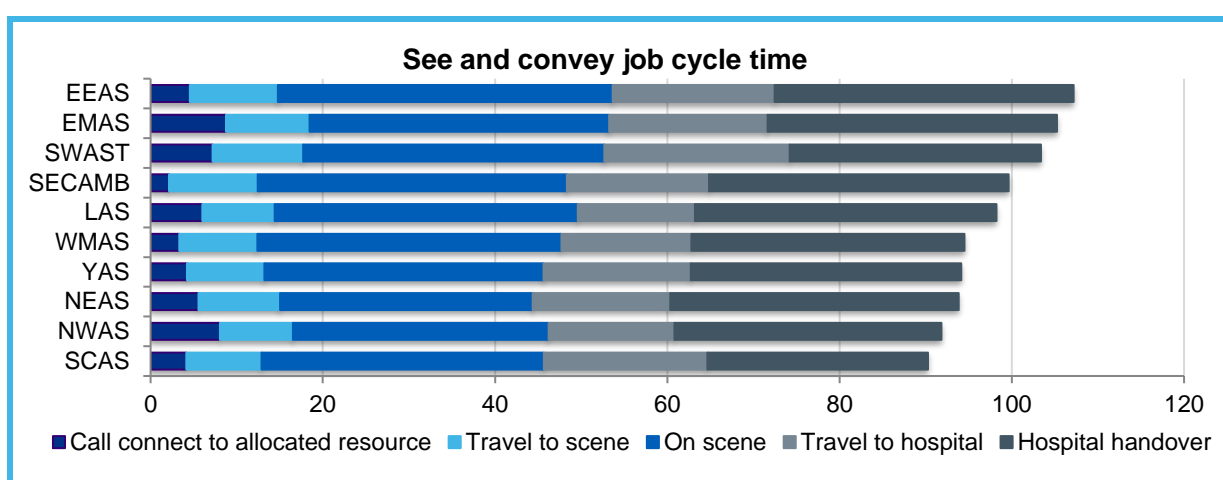


Figure 2.7: The average time taken by trusts at each stage of an incident when they convey a patient to A&E, CAD data request December 2017 to May 2018

We reviewed the JCT against the call category and found considerable variation between trusts, again particularly for patients in lower categories.

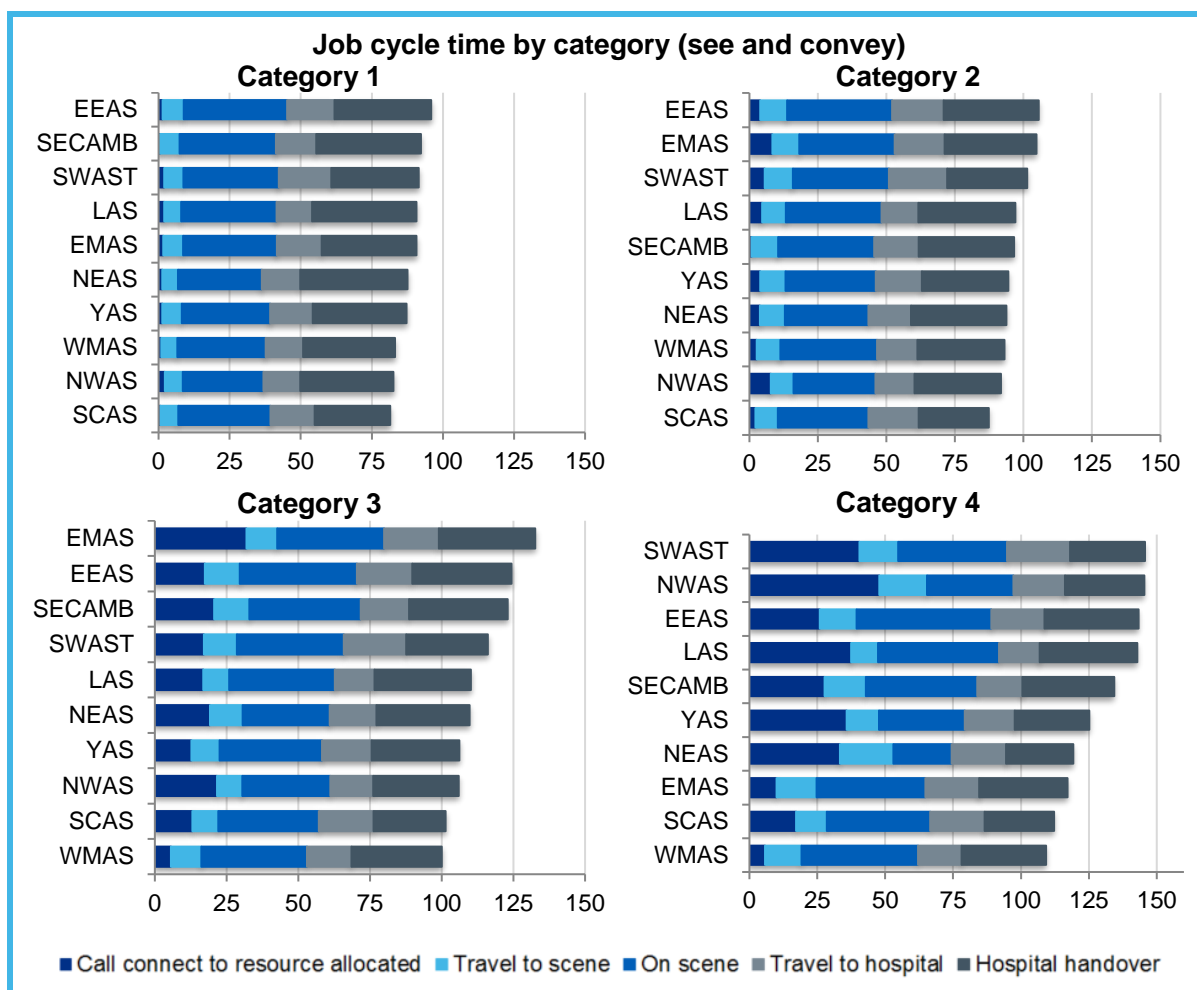


Figure 2.8: The category in which a call is placed will impact the see and convey job cycle time, CAD data request December 2017 to May 2018

Overall JCT increases as the severity of the call decreases and the variation becomes more pronounced as the categories reduce in acuity. Variation in call connect to resource allocation will be affected by the availability of resource. On scene time is more readily managed and the data shows considerable variation between trusts.

The model of care delivered also influences the overall JCT. When a patient is treated on scene, the total JCT is shorter as the incident will not require any time spent conveying them or handing them over to hospital. This means it is always more efficient at an aggregate level for the ambulance service to deliver clinically appropriate see and treat to a patient than to convey a patient despite the longer on scene times¹⁵.

¹⁵ We have assumed a clinically appropriate see and treat will not result in the patient re-contacting the service about the same condition. Further work is required to assess this relationship

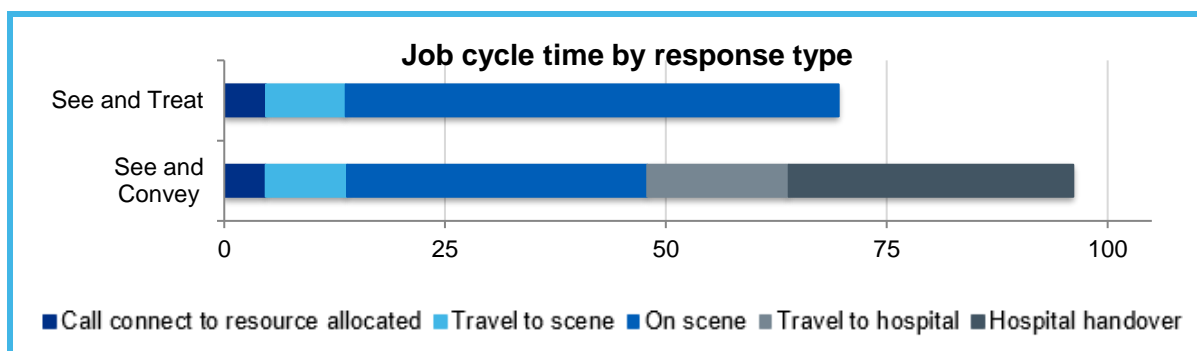


Figure 2.9: The average time taken by trusts at each stage of an incident when treated at scene against those conveyed to A&E for all call categories, CAD data request December 2017 to May 2018

The data shows that trusts with longer on scene times generally see and treat more patients. Overall, for every 10% reduction in the number of incidents conveyed, there is an increase in on scene time of two minutes and 20 seconds. In simple terms, this means that as trusts reduce avoidable conveyance, on scene times are likely to increase. This will be important for trusts and commissioners to include in service planning, but it is highly unlikely to outweigh the overall benefit of reducing avoidable conveyance for patients, the ambulance service and the wider health system.

Reducing hospital handover delays

Handover of a patient to hospital should usually take no longer than 30 minutes. This is made up of two 15 minutes stages: the pre-handover phase where the crew book the patient into A&E; and a post-handover phase where they get the ambulance ready before making themselves available to respond to the next incident. It is important to note it is not always possible to be ready for a new case in 15 minutes. For example, staff should be allowed time to emotionally recover if they need it after dealing with a stressful incident. However, the 30 minute standard is now routinely breached.

Over the last decade, the time an ambulance spends at hospital has increased by 32% from an average of 27 minutes to 35 minutes per patient¹⁶. This is largely caused by the delays in the pre-handover stage. The additional time ambulances spent at hospital last year was equivalent to £12 million a month in lost time across the service over the winter period. More importantly this reduces the ability for trusts to respond to calls as their crews are at hospitals waiting to transfer patients and the delays can be bad for patients as it risks their condition deteriorating.

There is a disproportionate impact of handover delays across different trusts costing from between 38,000 to 172,000 staff hours over six months.

¹⁶ Operational Research In Health 'A decade of change: the capacity challenge' presentation to the Ambulance Leadership Forum, 20 March 2018

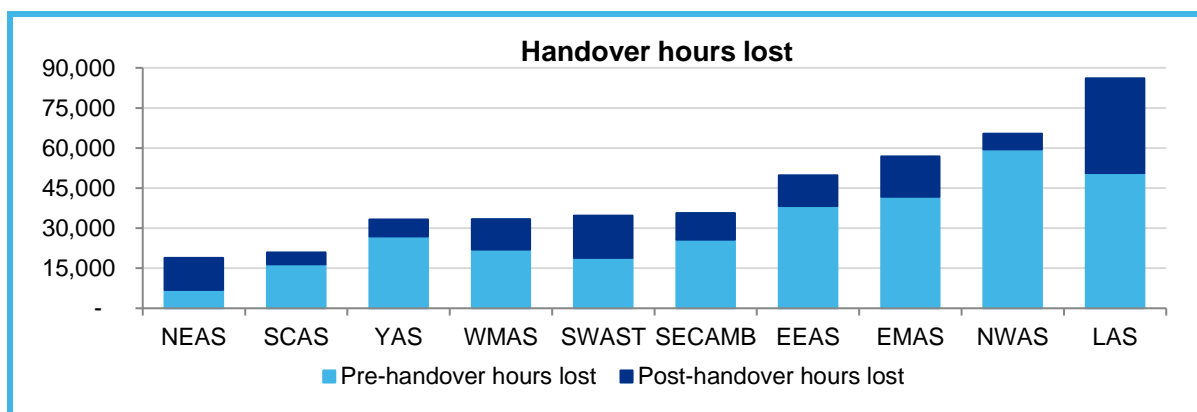


Figure 2.10: The number of hours lost to pre- and post-handover delays at A&Es across the ambulance service, CAD data request December 2017 to May 2018

NHS England and NHS Improvement have set clear guidance for local A&E delivery boards in how to tackle hospital handover delays. It sets out expectations around normal working practice and the actions they must take if ambulances start to queue. Delays of over 60 minutes should never be tolerated and action must immediately be taken to tackle them, with all incidents escalated to the regional team. Boards should also concentrate on reducing delays of between 30 minutes and one hour.

A&E boards should deliver improvement initiatives such as redirecting avoidable demand by having senior clinicians at the front door to triage patients and having staff maintaining ownership of handovers, rather than a hospital ambulance liaison officer. NHS Improvement launched the ‘fit to sit’ initiative in 2017 to encourage frontline staff to identify patients able to wait in a chair rather than on an ambulance stretcher, allowing earlier help of release crews to respond to the next call¹⁷. All boards are expected to agree local standard operating procedures to reduce these unacceptable delays for patients and trusts.

Ambulance services supporting patients with mental health conditions

It is important that ambulance services respond appropriately and effectively to all urgent and emergency calls and this includes those relating to mental health. We have analysed data from the nature of call data set. It is a pre-triage system whose purpose is to predict, as early as possible, what the likely triage category will be. The actual disposition and severity will often change as the call proceeds. However, this data provides a basis to examine the number of calls that relate to mental health.

The nature of call data set identifies mental health as the primary cause of around 2% or 340,000 calls every year to the ambulance service. Analysis showed there is significant variation in the conveyance rates from 27% to 54%. We reviewed the job cycle time for these calls which also shows significant variation between trusts at each stage.

¹⁷ <https://improvement.nhs.uk/resources/are-your-patients-fit-sit/>

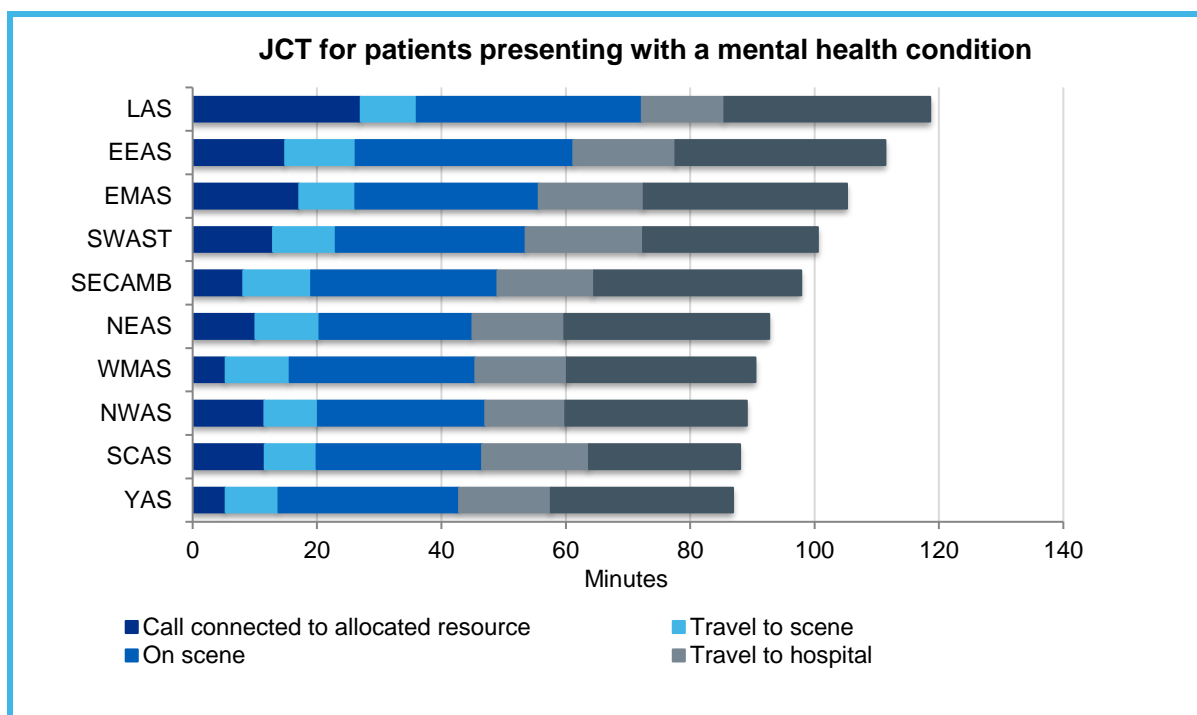


Figure 2.11: Variation at each stage of an incident for patients who have been identified with a mental health condition as the nature of call, CAD data request December 2017 to May 2018

Call to dispatch times are significantly longer for these patients and we were told this is mostly because they are generally triaged as category 3. The hospital handover for patients with mental health conditions breaches the 15 minute target for almost every trust on average and some trusts also have lengthy on scene times. This is likely to be caused by the attending crew trying and failing to secure access to more appropriate and alternative support. Conveyance rates are likely to be associated with the extent to which paramedics can access 24/7 crisis services and NHS England are committed to making sure these services are available across England by April 2019.

Some of the mental health patients the ambulance service respond to will have been taken to a place of safety by the police under section 136 of the Mental Health Act. Commissioners are required to ensure sufficient places of safety are available at all times under this Act. In 2014 the Government published its Mental Health Crisis Care Concordat with all public services agreeing to align and improve the response for those experiencing a mental health crisis¹⁸. It set out that the use of police custody or vehicles should be limited for patients for whom other mental health services are not available. This means the ambulance service is required to take responsibility for such patients from the police as soon as possible to complete their assessment. We support the NHS England proposals for the mean and 90th percentile response times for Section 136 calls to be reported.

¹⁸Department of Health and Concordat Signatories (2014). Mental Health Crisis Care Concordat, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/281242/36353_Mental_Health_Crisis_accessible.pdf

Trusts told us that often people with mental health conditions have frequent crises and require a collaborative approach across the public service to ensure they are getting the right support.

Staff minutes per incident

The JCT is an important measure of a trusts' efficiency in responding to a patient but it does not capture all the resources involved. Often more than one vehicle is sent to an incident, sometimes unnecessarily. For example, an ambulance can be dispatched and then stood down when a closer crew becomes available and can more appropriately deal with the patient. This means that we need to consider the number of 'activations' – the number and type of vehicles dispatched to the same incident, and the overall staff minutes per incident. Figure 2.12 shows how differences in the way an incident is managed can affect the efficiency of the response.

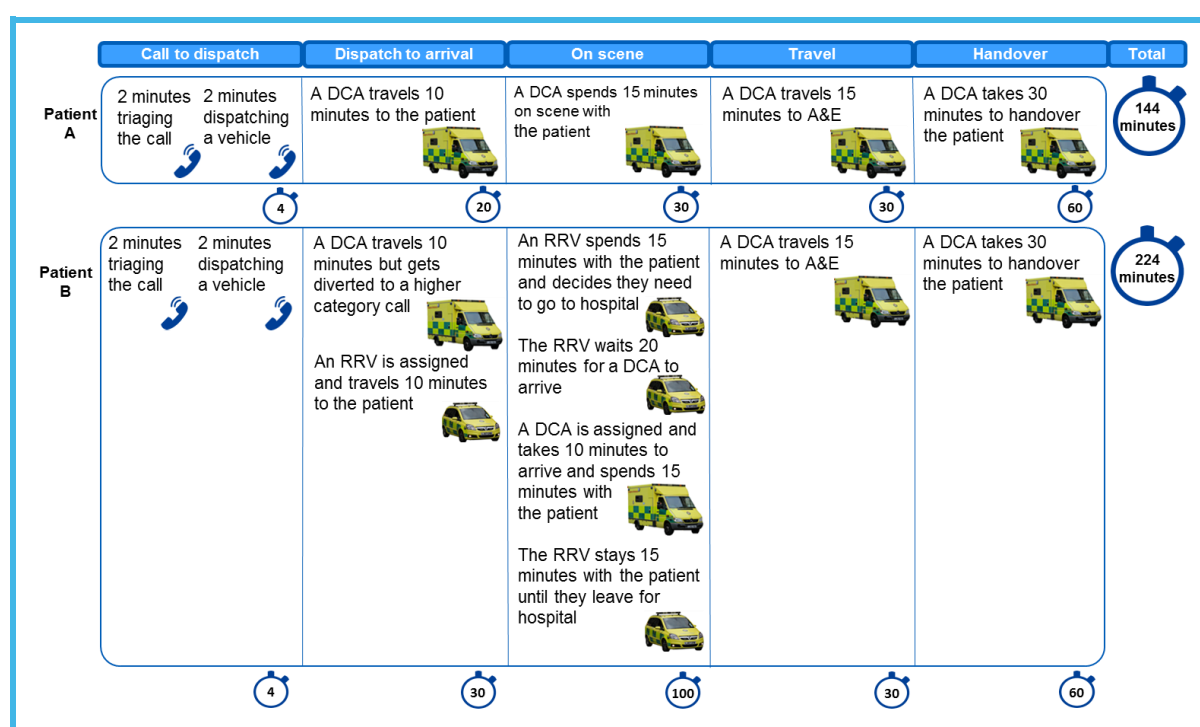


Figure 2.12: The impact of different response models on staff minutes per incident. A double crewed ambulance (DCA) have two members of staff, however a rapid response vehicle (RRV) has one.

We examined the differences in the number of activations between trusts. One trust only sent on average 137 vehicles to deal with 100 incidents however another trust sent on average over 174 vehicles. This is an important part of the 20% variation in the total number of staff minutes per incident we observed between trusts. The new response standards have helped reduce inappropriate activations as trusts now have longer to triage a call and are able to send a more appropriate resource.

The data and information we have analysed is not routinely available to ambulance Trust Boards in a form they can review and interrogate. This needs to change and Trust

Boards should review their response models to ensure they are activating and responding to incidents appropriately and making the best use of their resources.

Recommendation 1 – Enabling effective benchmarking

NHS Improvement should make operational data routinely available to ambulance trusts to enable them to effectively benchmark their services starting in autumn 2018, and trusts should take action to review levels of variation.

Delivered by:

- NHS Improvement routinely providing operational productivity and performance benchmarking data to ambulance trusts from autumn 2018, building on the data used to support this review.
- A&E delivery boards developing comprehensive and agreed plans for minimising ambulance handover delays in line with the guidance issued by NHS Improvement and the Royal College of Emergency Medicine prior to winter 2018.
- Ambulance trust boards working with A&E delivery boards to agree local standard operating procedures for any hospital handover delays over 30 minutes by winter 2018.
- NHS Improvement and ambulance trust boards working together to identify the most appropriate data source to enable effective benchmarking and opportunities to improve the patient journey for those presenting with mental health conditions by spring 2019.

Chapter 3: Improving ambulance service productivity

Delivering the best outcome for patients is at the heart of improving both the productivity of the ambulance service and the wider health system. A National Institute for Health Research study concluded that the decisions frontline staff make are mainly influenced by the following factors: demand; access to care services; performance targets; fear of risk; training and education; communication and resources (staff and equipment)¹⁹. Focusing on these areas will help staff on the frontline make the right decision for patients and reduce avoidable conveyance.

Improving access to the wider health service

NHS England is leading the reform of urgent and emergency care to ensure patients get the right care in the right place. This includes extending the availability of urgent treatment centres (UTCs). These are GP-led, open at least 12 hours a day, every day, and are equipped to diagnose and deal with many of the most common ailments that people present with at A&E. The trust with the highest number of UTCs has the lowest conveyance rate. Standardising the range of treatment options for patients is important, as many end up calling 999 due to the confusing array of healthcare choices.

Effective hear and treat

Clinical advice is provided in around 5% of calls but there is variation between 4% and 8% across trusts (Figure 2.4). Clinical assessment teams have been established in all ambulance control centres to increase the proportion of patients who can be appropriately treated over the phone. They assess whether an ambulance is required, give patients telephone advice on how to manage their symptoms, and put them in contact with more appropriate services, such as a GP or pharmacy. There are about 500 staff, mostly paramedics, employed by trusts in clinical assessment teams. Some trusts also employ other clinical staff including nurses, and more recently mental health clinicians. We observed significant differences in the way in which these teams operate and the apparent effectiveness of the approach.

¹⁹ O'Hara et al. (2014), *A qualitative study of decision making and safety in ambulance service transitions*, <https://www.journalslibrary.nihr.ac.uk/hsdr/hsdr02560/#/full-report>

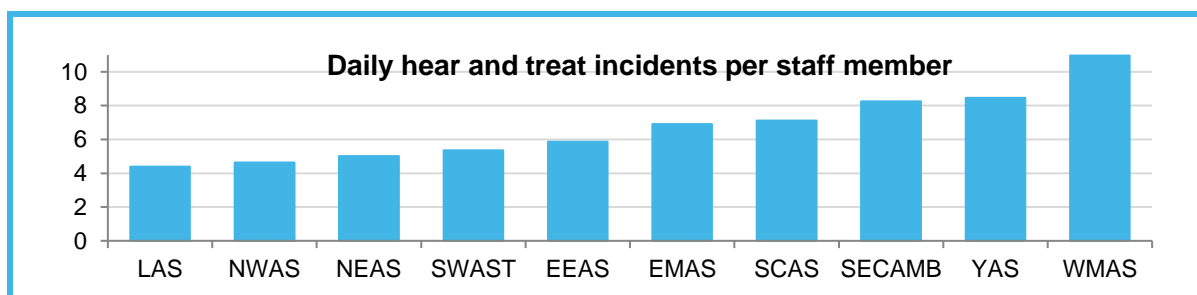


Figure 3.1: Variation between trusts in the number of incidents resolved over the phone per clinical assessment staff member, AQI and Deloitte Control Centre Data Request.

The number of clinicians in control centres varies significantly between trusts, from 7% to 19% of total control centre staff and practice is varied. Clinical assessment teams represent a significant investment by trusts and can reduce the costs associated with dispatching ambulances unnecessarily. However, trusts should work together with support from NHS England to identify, codify and share evidence based best practice in delivering clinical assessment and how to work effectively with existing services in the Integrated Urgent Care system. During the review we identified a number of excellent examples of strong clinical support to enable hear and treat.



Case study – Supporting frontline staff in clinical decision making

South Western Ambulance Service NHS Foundation Trust is building an evidence based tool to increase appropriate hear and treat and reduce avoidable conveyance. A risk score is developed from the presenting patient condition, response and outcome from analysis of clinical and operational data. This can support staff to make clinical decisions including when sending an ambulance response is not the right thing for the patient and reduce avoidable conveyance.

Commissioners are enabling improved on scene support for frontline staff through rapid access to GP advice with mobile phones, also known as the *5 initiative using the NHS 111 clinical assessment service. In London, from May 2017 to May 2018, there were over 15,000 calls to the *5 line from ambulance staff. Trusts should work with commissioners and clinical assessment providers to ensure this service is available locally to support their staff as part of the National Service Specification.

Access to information

Access to patient information such as medication, allergies, medical history, care and crisis plans are critical information for clinicians who usually respond to patients with no prior knowledge of their conditions or medical history. The summary care record (SCR) is a tool that enables clinicians to access an overview of these key pieces of patient information and is automatically updated from their GP record. If agreed by the patient, the record can also hold additional information including medical history, the reason for medication, anticipatory care information including that about the management of long-term conditions, end of life care and immunisations.

Seven of the 10 ambulance trusts currently have access to SCR. NHS England incentivised trusts to access these records as part of their 2017/18 and 2018/19 commissioning for quality and innovation (CQUIN) framework improvements goals. However, use remains low with only frontline staff in London Ambulance Service NHS Trust regularly accessing the information. In some areas, trusts can access local care record portals that may include patient notes and care plans to supplement the use of SCR. Trusts need to take action to improve accessibility to patient information and its use on the frontline.

To reduce avoidable conveyance, ambulance staff need to know the other services that are available to the patient. All paramedics should have access to an easily navigable electronic directory of services which provides up to date information. However, in some trusts it is only available as a paper resource and updated infrequently. Trusts also told us that the quality of information in the directory was variable. This means ambulance staff are less likely to view it as a trusted resource, particularly when they are operating outside of their usual area, which can increase avoidable conveyance. Lead commissioners and trusts must work together to ensure that the directory of services is up to date and easily accessible to frontline staff.

On scene clinical support and review

A key enabler to reducing avoidable conveyance to A&E is supporting frontline clinicians through a clinically empowered environment. The role of the first line manager and wider management team is critical. Where staff perceive their managers are risk averse, then conveyance rates are higher²⁰. Many staff receive limited feedback on their clinical and personal performance. First line managers also do not always have easy access to key information. This includes the patients their staff have treated, their professional development and basic staff management data, such as sickness absence information.

The importance of clinical review can be seen from Figure 3.2 comparing the distribution of on scene time between two trusts for category 3 calls. Overall median on scene time for both trusts are within 25 seconds of each other but the distribution is markedly different. Trust A treats 41% more patients on scene compared to Trust B and overall are more efficient.

²⁰ O'Hara et al. (2014), *A qualitative study of decision making and safety in ambulance service transitions*, <https://www.journalslibrary.nihr.ac.uk/hsdr/hsdr02560/#/full-report>

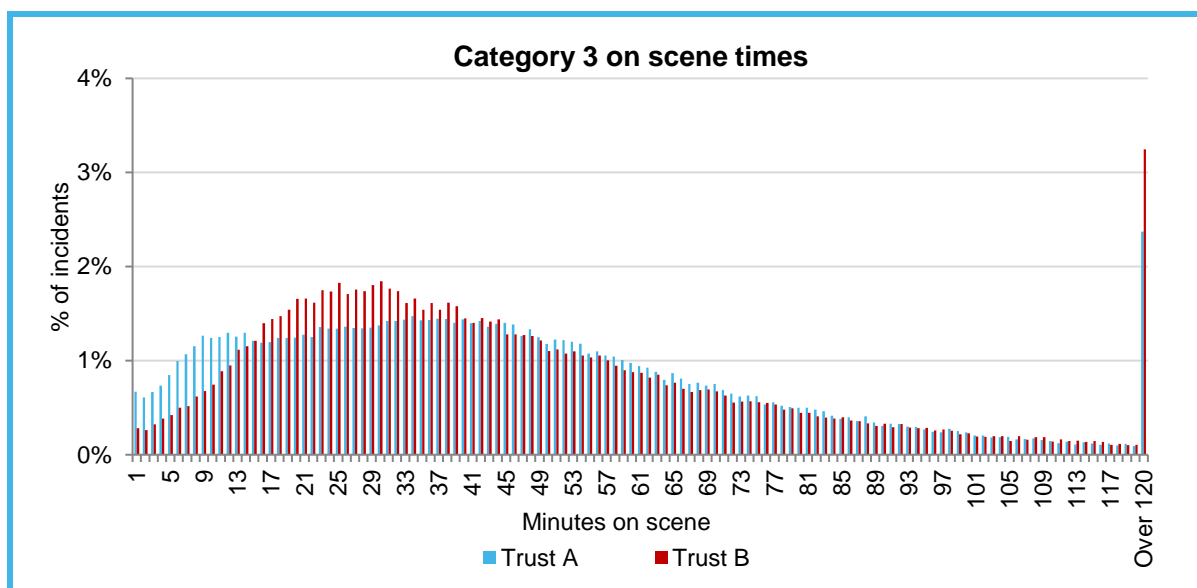


Figure 3.2: The average on scene time distribution for two trusts for category 3 calls, CAD data request December 2017 to May 2018

This sort of information should be analysed and used by trusts, from board to first line managers, to support frontline staff to make improvements in patient care and efficiency. This should include analysing the on scene time and clinical decisions of individual staff to identify whether further guidance and support is required. Boards and senior managers should also ensure that the underlying causes of long on scene times and avoidable conveyances are addressed.

A set of national, evidence based protocols should be developed that support frontline and control centre staff to reduce avoidable conveyance and improve patient outcomes. This then needs to be aligned with and supported by effective clinical support arrangements. We found that trusts often implement these clinical support arrangements and case review processes but cannot sustain them due to operational pressures. Strong clinical leadership and a balanced approach from commissioners and regulators is required to ensure this is improved and maintained. Ambulance trusts need to significantly strengthen this aspect of their management process.

Skills model

Trusts operate with significantly different workforce models, often due to resource and workforce limitations. Research indicates that conveyance rates are lower for trusts that have a consistent paramedic skill mix among frontline staff and where advanced paramedics are used effectively²¹. The changes in April 2018 that enable advanced paramedics to become independent prescribers are to be welcomed. Some trusts told us they are working towards having a paramedic on every vehicle. While generally this is the preferred model, it is unlikely to be universally achievable in the short-term given financial and workforce constraints. Trusts need to ensure that they deploy paramedics as effectively as possible within their operating model and further research is required to

²¹ O'Cathain, A (2018), *Understanding variation in ambulance service non-conveyance rates: a mixed methods study*, <https://www.journalslibrary.nihr.ac.uk/hsdr/hsdr06190#/plain-english-summary>

understand the relationship between the deployment of paramedics, including advanced paramedics, and avoidable conveyances.

Recommendation 2 – Delivering the right model of care and reducing avoidable conveyance to hospital

NHS England should accelerate work to support reduction of avoidable conveyance to hospital, working with ambulance trusts, lead commissioners, Sustainability and Transformation Partnerships, NHS Improvement and NHS Digital.

Delivered by:

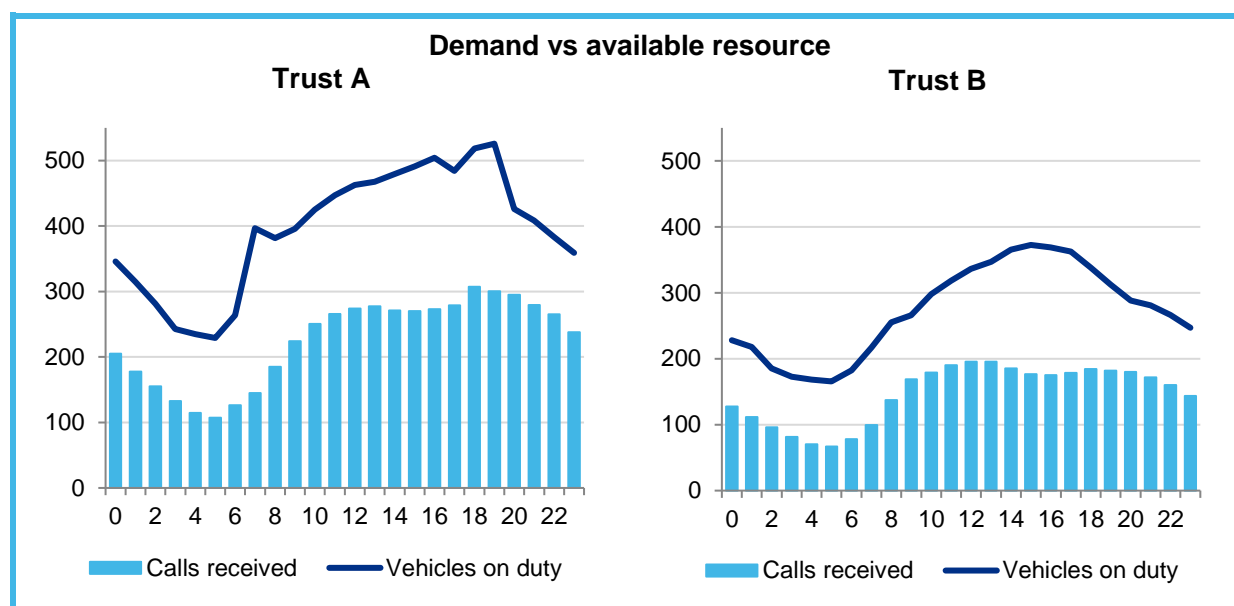
- NHS England working with lead commissioners, ambulance trusts and Sustainability and Transformation Partnerships to develop a long-term plan to reduce avoidable conveyance by 2023. This plan should be developed and agreed by spring 2019.
- NHS England and NHS Digital supporting trusts to enable ambulance staff to access patient information and set out the delivery timetable by winter 2018.
- Lead commissioners working with trusts and Sustainability and Transformation Partnerships to ensure the directory of services is an accurate and useful resource provided to frontline ambulance staff. Trusts should undertake a review of the directory of services and provide a report to their Board before April 2019.
- NHS England developing a common set of evidence based clinical protocols to support reductions in avoidable conveyances and effective patient care by summer 2019.
- Ambulance trust boards agreeing a common clinical supervision model by April 2019 and then rolling this out across the service, ensuring it is fully embedded by April 2021.

Optimising resources

Trusts produce a number of resource hours per day which are used to respond to emergency and urgent calls. Utilisation levels vary according to the geography served and activity levels at different times of the day, with minimum staffing levels needing to be maintained during low activity periods. However, the lack of standard frontline resource utilisation or efficiency metric for the service needs to be addressed. There is scope for ambulance trusts to reduce wasted staff hours and increase productivity by: matching resources to demand through effective modelling and rostering; reducing the time ambulance crews spend at the start of their shift checking and stocking their vehicle; and increasing vehicle availability.

Demand modelling and rota management

Call patterns vary for each ambulance trust and are influenced by local factors such as the time of year, tourism, availability of primary care services, the weather, deprivation, age profile and even sporting events. Effectively matching supply with demand is key to productivity. To illustrate this we reviewed the daily resource patterns across a number of trusts.



Figures 3.3: Comparison of daily demand on two trusts, based on average across six months, CAD data request December 2017 to May 2018

Trust A has spikes in available resource when shifts change over at 7am and 7pm, whereas Trust B smooths demand across the day by staggering its shift patterns. The staggering of shifts is more efficient and helps manage the flow of 999 calls. Trusts' capability in demand modelling varies significantly with some using sophisticated modelling and simulation software to identify the resource type and the amount required to meet forecast and seasonal variances on an hourly basis, while others use adjusted historic demand.

Case study – Demand and capacity modelling

South Central Ambulance Service NHS Foundation Trust had static staff rotas which limited their ability to meet changing demand. In 2015, the trust changed its rostering and demand prediction to enable better resource planning. The new largely automated modelling tool predicts demand to within 3% of actual requirements.

Ambulance trusts vary in how they manage rotas. Some operate a fixed rota to meet most of the demand and supplement this with varying degrees of unplanned relief staff. This is to cover short-term unplanned demand changes or staffing shortfalls from annual leave and sickness. The amount of fixed and relief elements used by trusts differs. Some trusts by contrast operate an annualised rota where annual leave and shifts are pre-

planned allowing for informed decisions to be made and resource planned well in advance, but potentially limiting flexibility. We found some trusts were not effectively managing staff hours, with some working over or under their contracted hours. One ambulance trust told us that they had identified that a member of staff had underworked by 300 hours yet was working additional shifts as overtime. All ambulance trusts should take steps to ensure that they are adequately managing this issue as this has a financial and productivity impact but is also unfair on staff that work their correct hours.

Ambulance trusts meet seasonal and short-term demand peaks in different ways, through the allocation of unplanned relief shifts, overtime and private ambulance services, often on a short notice basis. Private ambulances services account for 2.5% of total service spend at a cost of £58 million per year, but their use is varied²². Some trusts embed them into their operating model while others do not use them at all. We were told that where trusts use private ambulance services, a long-term strategic relationship provides a better supply of resources that is able to meet demand fluctuations.

All ambulance trusts acknowledged that demand changes over time, but there is no standard policy on how often the rota should be reviewed. One trust told us that it had not completed a significant rota review for three years and when it did, the change had effectively increased resource availability by 10%. This is an area where the ambulance service needs to identify the best models and each trust should then agree a clear plan to move towards best practice.

Fleet management

When ambulance vehicles break down, availability of frontline clinical time is reduced. Our analysis showed that those trusts with an older fleet generally require more unplanned maintenance from vehicle breakdowns and defects, resulting in largely hidden inefficiencies. An effective planned maintenance regime and good management of this important resource can reduce this downtime. Fleet is an area considered in more detail in Chapter 5.

Use of technology - reducing the number of activations

The introduction of the new performance standards will help reduce the number of inappropriate activations and responses on scene. Some trusts have reduced the number of activations and improved response times by using auto dispatch software which allocates and dispatches the closest and most appropriate ambulance to certain types of patients. All trusts have now implemented auto dispatch for the highest priority calls. One trust is trialling the use of auto dispatch to other call types and, while this may be more appropriate in urban areas, the ambulance service should make a decision on the overall application of this approach. Auto dispatch was first deployed in 2006 and adoption of this successful technology across the service will have taken 12 years. With the pace of change, the cycle of development, testing and adoption of new technology must be faster. The growing importance of technology is considered in Chapter 6.

²² NHS Financial returns, 2016/17

The make ready system

Ambulance crews have traditionally checked and prepared their vehicles at the start of a shift, restocking and cleaning as necessary. This takes time and reduces the availability of crews to respond to patients. With a make ready system, non-clinical specialist staff re-stock, maintain, refuel and clean ambulances. Shift start times are staggered and stations have enough vehicles available to maximise the availability of ambulance clinician time to respond to calls.



Case study – Maximising clinical time

West Midlands Ambulance Service NHS Foundation Trust has fully implemented the make ready system and reduced the clinical staff hours used preparing vehicles by 60%. This puts over eighteen thousand staffed vehicle hours back into the system equating to over fifteen hundred extra twelve-hour ambulance shifts a year.

This model is easiest to deliver in urban areas but it can also be adapted and implemented to support ambulance services in rural areas. Trusts should review the scope to implement make ready within their area. This is considered in more detail in Chapter 7.

Recommendation 3 – Efficient use of available resources

Ambulance trusts should maximise resource availability and reduce lost hours to ensure an ambulance response is available for patients that need it the most.

Delivered by:

- NHS Improvement working with ambulance trust boards to develop a standard measure of efficient resource utilisation by April 2019.
- Ambulance trust boards reviewing rotas and demand modelling approaches and agreeing a good practice approach by April 2019.
- Ambulance trusts reviewing staff hours worked to ensure a balance between contracted and actual hours with plans to manage this in a report to their board by April 2019.
- Ambulance trust boards reviewing their private ambulance spend annually to ensure it offers value for money and that adequate controls are in place.
- Ambulance trust boards developing plans to implement make ready systems with support from NHS Improvement by April 2019.

Chapter 4: Workforce, leadership and human resource processes

Staff across the NHS work incredibly hard and those in the ambulance service are no exception. At £1.6 billion per year, they are the biggest investment ambulance trusts make and their importance in providing lifesaving care often in extreme circumstances cannot be understated. In 2016, paramedics were moved up the NHS Agenda for Change pay scale from band 5 to band 6, recognising the additional responsibilities and knowledge they need to carry out more clinical work.

Ambulance staff are highly motivated to do the best for patients but are not always well supported and the service has struggled to recruit and retain staff. The high levels of bullying, harassment and sickness absence must be understood and improved. Empowering and supporting ambulance staff through improved culture, leadership and other organisational factors will enable staff to provide the best care for patients and have the greatest long-term impact on their productivity.

A People Strategy team has been established in NHS Improvement to improve the health and wellbeing of the NHS workforce. They aim to reduce sickness absence rates across the NHS to the average public sector level of 2.9% by 2022. To achieve this, they are implementing a programme of improved reporting and collaboration building on the Stevenson Farmer review²³. Other areas of this work are focused on the reduction in levels of bullying and harassment. Under the new joint working arrangement agreed between NHS Improvement and NHS England, NHS Improvement will be appointing a Chief People Officer to support the NHS, including ambulance trusts, in improving all aspects of leadership and people management.

Staff engagement, culture and leadership

Staff engagement is key in driving organisational improvement and maximising patient experience, particularly during times of austerity and increasing pressure on performance. Working for the ambulance service is challenging as most staff are mobile and frequently deal with difficult situations with limited support. Work in ambulance control centres is well-recognised as being highly pressured, both in terms of the volume and nature of calls and will be set out more in Chapter 6.

NHS England has set up #ProjectA for ambulance trusts to mobilise frontline ambulance staff and patients to identify and implement ideas that will lead to service improvements. This 12 month project is being led and facilitated by the NHS Horizons team and the Association of Ambulance Chief Executives (AACE). The #ProjectA team has collected 600 ideas on how to improve ambulance services. This has been accomplished on an online platform that has been designed around the following specific challenges identified by frontline ambulance staff:

- Partnership with the public
- Patient pathways

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/658145/thriving-at-work-stevenson-farmer-review.pdf

- Roles, practices, wellbeing and career progression
- Working with partners
- Thinking the unthinkable and current rules and perceptions

The ideas are being reviewed by a decision making group that includes frontline ambulance staff and core stakeholders. They are looking to identify themes and ideas that can be taken to the ambulance service for testing. Ideas will be evaluated to identify at least four major change ideas with nationwide potential. They can then be implemented by frontline staff across the service to start making a difference in winter 2018.

A more engaged workforce will deliver a better quality of care through improved organisational performance²⁴. Analysis showed that engagement scores for the ambulance service are consistently the lowest levels in the NHS but have improved in recent years. We found significant variation in staff engagement scores between ambulance trusts from 64% to 72% showing that there is opportunity for trusts to learn and share best practice.



Case study – Improving staff engagement

In 2015, North East Ambulance Service NHS Foundation Trust identified several key challenges impacting staff engagement levels. A staff survey found cultural issues which were addressed by running team building exercises. A leadership programme was held to develop managers, and operational management teams were restructured. Management rotas were adapted to ensure they are always available to support frontline staff. Finally, the trust created clinical care manager roles who are qualified paramedics and would work similar shifts to frontline staff offering more direct support. Overall staff engagement improved by 23% by 2017 to be the most engaged ambulance trust.

The King's Fund²⁵ identified that an engaged workforce is intrinsically linked to a culture of collective and inclusive leadership. We analysed data from the NHS staff survey and found variation between trusts for key indicators of staff engagement.

²⁴ https://www.kingsfund.org.uk/sites/default/files/field/field_publication_file/improving-nhs-care-by-engaging-staff-and-devolving-decision-making-jul14.pdf

²⁵ The King's Fund, Staff Engagement, https://www.kingsfund.org.uk/sites/default/files/field/field_publication_file/staff-engagement-feb-2015.pdf

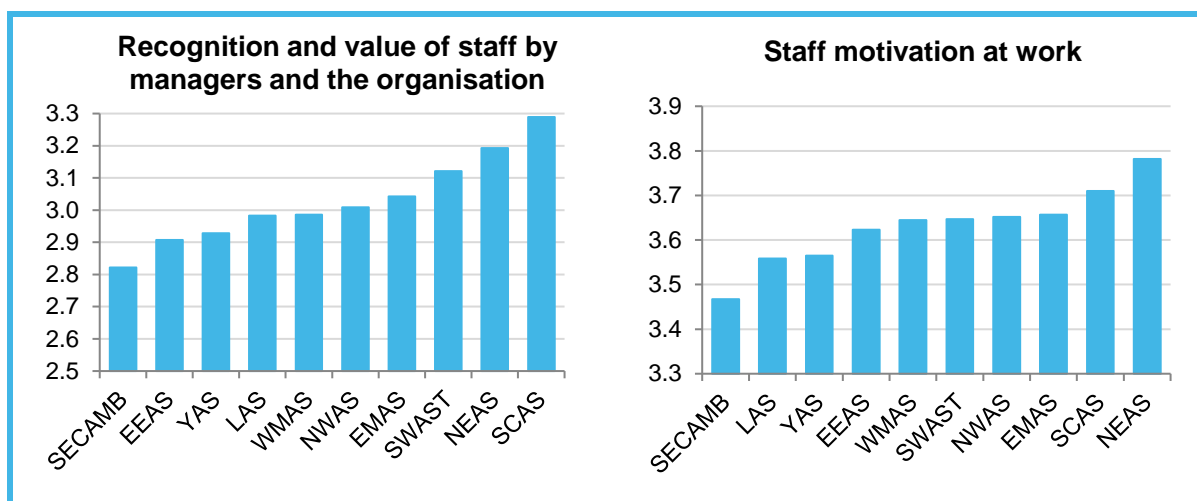


Figure 4.1: Staff engagement indicators, NHS Staff Survey 2017

This shows that generally staff who feel recognised and valued by managers and the organisation are more motivated at work. NHS Employers has developed resources to help the ambulance service improve its engagement with its mobile workforce; including for example how to encourage regular staff recognition from senior leadership teams, suggestions for potential communication channels and some best practice examples from NHS trusts²⁶. Ambulance trusts indicated that national bodies need to work together to support them to engage and encourage their staff, not impose solutions on them.

Regular performance reviews, if delivered effectively, enable staff engagement and a culture of continuous improvement. The data shows variation between trusts in the amount of staff that had an appraisal and in its quality. There should not be a compromise in either.

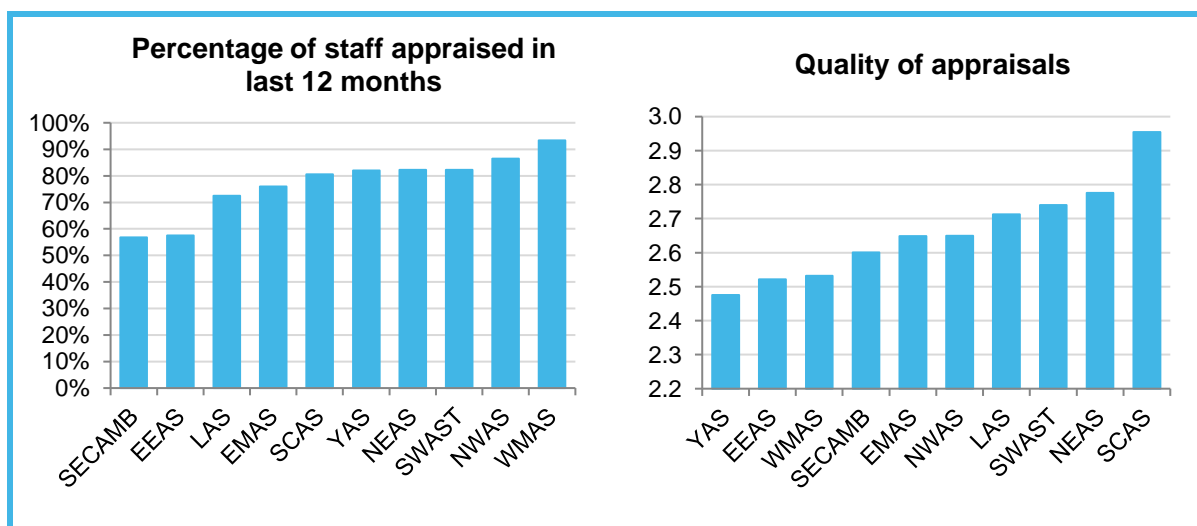


Figure 4.2: Staff appraisal indicators, NHS Staff Survey 2017

²⁶ <http://www.nhsemployers.org/your-workforce/plan/ambulance-workforce/recognition-and-value>

As set out in the NHS Constitution, ambulance trusts should ensure that appraisals are completed at least once a year alongside a standardised process to ensure they are of a minimum and consistent quality.

Health and wellbeing

A focus on the health and wellbeing of staff across the NHS and particularly in the ambulance service is vital to enable safe, sustainable, patient-centred care²⁷. Sickness absence rates, the key indicator of staff health, are the highest in the NHS of all public service organisations, and more than double those in the private sector. The ambulance service has the highest sickness absence rate in the NHS, losing 20 days per member of staff each year. If reduced by 1% this could save £15 million every year.

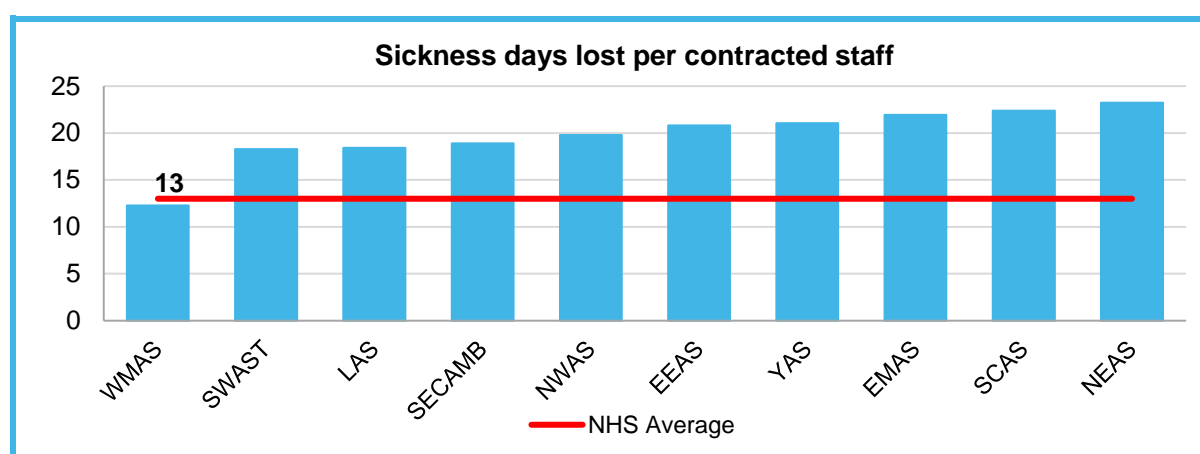


Figure 4.3: The number of days full time staff take due to sickness absence, ESR 2017/18

These sickness absence rates are likely to be lower than the true levels as reporting will vary in the way staff record this data. Ambulance trusts told us that calculating the rate based on a 365-day denominator was not appropriate for most of their staff. Moving to a standardised recording of the actual number of hours lost to sickness as a proportion of total working capacity would enable accurate benchmarking and tailored interventions.



Case study – Supporting staff to reduce sickness absence

West Midlands Ambulance Service NHS Foundation Trust maintains the lowest sickness absence rate in the ambulance service at around 3% through a sustained CEO focus on sickness management and support. An early sickness management and intervention policy was developed with staff unions alongside a health and wellbeing strategy. In-house occupational health services are now provided such as physiotherapists, mental health service access, remedial masseuses, nurses and a pastor. Over 400 staff have taken part in a free weight management programme.

²⁷ Royal College of Physicians, Work and wellbeing in the NHS: why staff health matters to patient care, <https://www.rcpsych.ac.uk/pdf/RCP-%20WorkWellbeingNHS.pdf>

Sickness policies across the service are broadly similar, but ambulance trusts told us that they are implemented in very different ways and this must be standardised. They also said that the high levels of sickness are in part likely to relate to the physically demanding nature of the role and high level of violence against staff.

There are many reasons staff are absent from work because of sickness in the ambulance service, but the most common are mental health and musculoskeletal problems, although a significant proportion of absences are recorded as other. NHS England has developed the Health and Wellbeing Framework to help trusts identify causes of sickness absence and produce health and wellbeing plans including trajectories for reducing these rates²⁸. The NHS Improvement People Strategy Team will work with ambulance trusts using this framework and provide opportunities to share best practice, to enable the service to work together to reduce sickness and improve staff health and wellbeing.

The Stevenson Farmer review highlighted the need for the ambulance service to support the mental health of its staff as their jobs carry high risk of trauma and stress. All 10 ambulance trusts have now signed up to Mind's Blue Light Time to Change Pledge to encourage a holistic approach to health and wellbeing across blue light services through public local action plans, including raising awareness of mental health²⁹. Trusts should use the AACE Employee Mental Health Strategy Guidance to ensure their staff are provided with suitable health and wellbeing support³⁰.

Reducing bullying, harassment and violence against staff

Everyone should be able to go to work without the fear of being abused, threatened, assaulted or attacked, and NHS staff are no exception. The level of bullying and harassment in the ambulance service is the highest in the NHS.

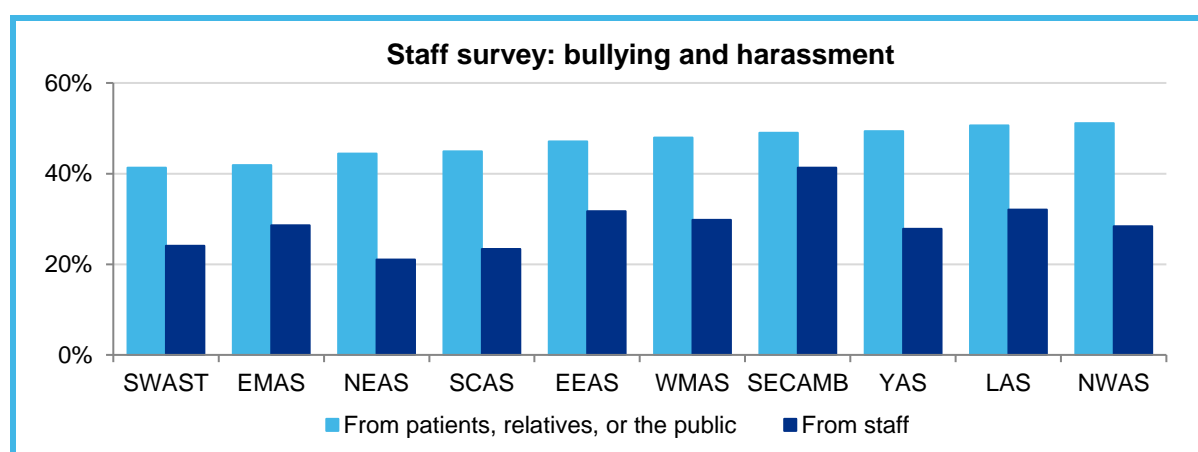


Figure 4.4: Bullying and harassment in the service, NHS Staff Survey 2017

²⁸ <http://www.nhsemployers.org/your-workforce/retain-and-improve/staff-experience/health-work-and-wellbeing/health-and-wellbeing-framework>

²⁹ <https://www.mind.org.uk/news-campaigns/campaigns/blue-light/blue-light-time-to-change-pledge/?ctaId=/news-campaigns/campaigns/blue-light/slices/blue-light-time-to-change-pledge/>

³⁰ <http://www.nhsemployers.org/-/media/Employers/Documents/Ambulance-workforce/AACE-Employee-Mental-Health-Strategy-Guidance.pdf>

On average, over 48% of ambulance service staff report bullying and harassment from patients, relatives or the public and 28% from other staff. This is unacceptable. The significant variation in levels between trusts shown in Figure 4.4 indicates opportunities to share elements of best practice across the service. Ensuring staff are treated with dignity and respect is intrinsically linked with changing organisational culture.



Case study – Tackling bullying and harassment

In 2015, London Ambulance Service NHS Trust had high levels of bullying and harassment and nominated a non-executive director to lead on a campaign to reduce it. They recruited a specialist and provided training for confidential discussions without HR involvement. Senior staff were trained on how to investigate allegations and awareness workshops were held. “A day in the life of” events in control centres, legal services, NHS 111 and the hazardous area rescue team were organised for the public to attend. Finally, the ‘Bullying and Harassment’ policy was renamed to ‘Respect and Dignity at Work’. Since 2015, bullying and harassment has reduced but there is further work to be done as seen in Figure 4.4.

Violent attacks against NHS staff have not been recorded nationally since the abolition of NHS Protect, which leaves the voluntary NHS Staff Survey and local reporting mechanisms as the only indicators. This means that actual percentages may be much higher. We analysed the levels of physical violence that staff experienced and found considerable variation between trusts.

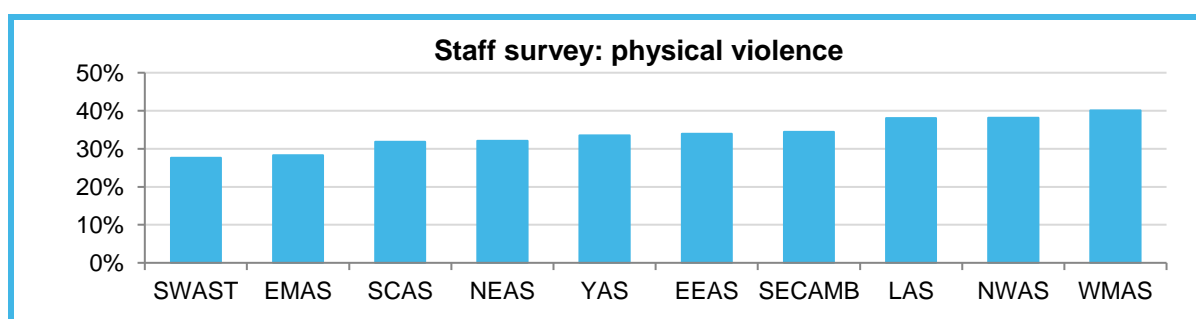


Figure 4.5: Percentage of ambulance staff experiencing physical violence from patients, relatives or the public in last 12 months, NHS Staff Survey 2017

More than 350 prosecutions have been brought for attacks on ambulance staff over the last year³¹. 465 ambulances and their paramedics will be equipped with body cameras in a pilot with the potential for a full roll-out to all paramedics and other priority areas. The use of this technology will help protect staff.

Research has shown that staff who experience violence in the workplace are four times more likely to take sick leave than those experiencing any other type of work injury³².

³¹ <https://www.gov.uk/government/news/paramedics-to-be-given-body-cameras-to-protect-them-from-abuse>

³² Brophy, J et al. (2017), *Assaulted and Unheard: violence against healthcare staff*, <http://journals.sagepub.com/doi/abs/10.1177/1048291117732301>

The AACE should build upon the work they have already done to reduce and lead a service-wide campaign of zero tolerance for physical violence towards staff and ensure they are supported through any incident. The Assaults on Emergency Workers Bill, if passed, will classify certain offences as aggravated offences committed against ambulance staff on duty, making staff feel supported when reporting offences and also acting as a deterrent to those who may consider abusing these staff³³.

Staff recruitment, retention and progression

The number of staff employed by the ambulance service is increasing by 1.8% every year, but there are still many vacancies across trusts with a reported variation between 0% and 13%.

The high vacancy rates mean existing staff are under even more pressure to meet rising patient demand and are often over worked, as may be evident from the high sickness rates. We were told the spend associated with meeting short-term demand requirements with overtime, agency and private ambulances may often be due to a lack of available staff. Further work must be done to reduce vacancy rates and the reliance of trusts on these external services.

We were told that some trusts have successfully recruited from Australia, New Zealand and across Europe, but this often only provides a short-term fix as recruits frequently return home within a few years. Health Education England (HEE) have recruited and trained new paramedics to meet the paramedic shortage. They have increased the number of paramedics entering training from 750 in 2013 to 1,850 in 2018. However, HEE workforce modelling has identified that more are needed to meet increasing demand.

Across the ambulance service we found significant variation in staff turnover between trusts from around 9% to 17% of total staff and we found further differences in the two main areas of operational and control staff.

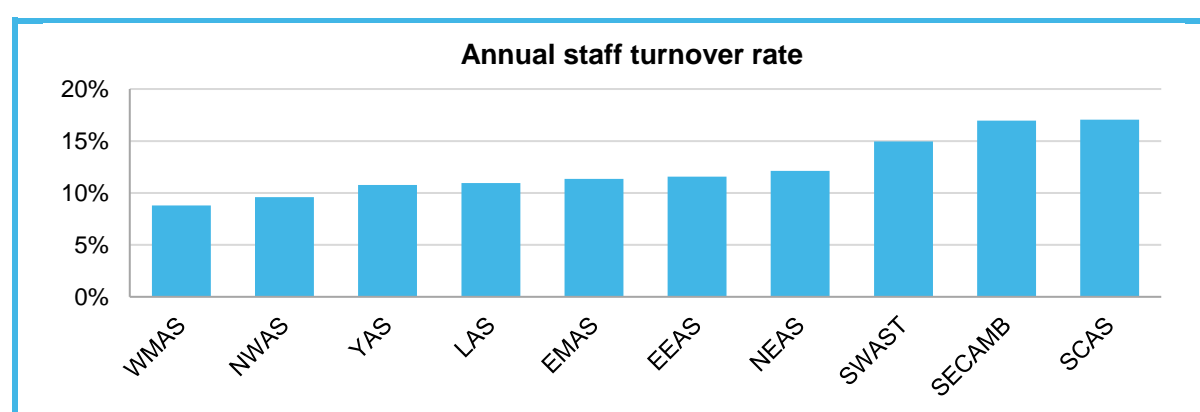


Figure 4.6: Percentage of staff turnover in ambulance trusts, ESR 2017/18

³³ United Kingdom Parliament Bill, Assaults on Emergency Workers (Offences) Bill 2017-19, <https://services.parliament.uk/bills/2017-19/assaultsonemergencyworkersoffences.html>

The College of Paramedics argues that retention is a more significant issue than recruitment and requires investment from ambulance service leadership teams by having an experienced paramedic on every ambulance trust board³⁴. It raised concerns that many staff feel unsupported and will be unable to reach retirement age in their jobs. NHS Improvement support the involvement of allied health professional groups, including paramedics, in leadership teams and have provided a self-assessment evaluation for trusts to review and improve their involvement³⁵.

Many reasons were identified for people leaving the service, including lack of pay in comparison to other roles, the stressful nature of the job, bullying and harassment, the lack of meal breaks and issues with shift work. Trusts highlighted that often staff may have left a role but moved into a different position within the organisation or the NHS, and this is not reflected in the staff turnover figures from the Electronic Staff Record (ESR). We were told that understanding the true number of staff who leave the ambulance service and their reasons for leaving would enable more effective staff recruitment and retention planning.

The ambulance service is no longer the sole recruiter of paramedics. Several other areas in the health service offer higher paid positions without some of the aforementioned issues. For example, GP practices do not require shift work. In these roles paramedics provide invaluable support to address increasing demand and recruitment issues at various points of the patient journey. Trusts identified that staff who leave to take on roles outside the ambulance service often return within a number of years.

In 2017, HEE and the Department of Health launched a national programme to support paramedics whose registration lapsed in the last five years to return to work and also alleviate vacancy rates more generally³⁶. A national rotation plan across the NHS for ambulance staff could reduce staff turnover, alleviate certain demand issues across the NHS, enable staff to develop a wider skill-set, produce better paramedics and ultimately provide better care for patients in a more appropriate setting.



Case study – Improving career development

In January 2018, HEE began piloting a new rotational working model with four trusts enabling specialist and advanced paramedics to work across a range of primary and community based care settings³⁷. It was designed to reduce staff turnover through enhanced career development opportunities. The trusts are still in an early stage of the pilot, however feedback has been positive and one has been approached by a local acute trust to extend the programme.

³⁴ <https://www.collegeofparamedics.co.uk/news/national-audit-office-report-into-nhs-ambulance-services>

³⁵ <https://improvement.nhs.uk/resources/leadership-allied-health-professions-trusts-what-exists-and-what-matters/>

³⁶ <https://www.collegeofparamedics.co.uk/news/national-programme-to-support-paramedics-to-return-to-practice>

³⁷ <https://hee.nhs.uk/our-work/paramedics/rotating-paramedics>

Ambulance trusts have been working with the AACE and others to improve workforce equality and become an employer of choice for all, and one that reflects the diverse communities it represents. The national ambulance black and minority ethnic forum has been in place since 2011 to promote leadership and encourage career progression to improve representation within the ambulance service. East Midlands Ambulance Service NHS Trust won an award for its campaign to recruit frontline black and minority ethnic (BME) staff through holding targeted recruitment events in collaboration with local communities, universities and HEE. Ambulance trusts and others should also work together to promote equal gender representation and use the gender pay gap data set, first published in March 2018. Recruitment should focus on enabling equal opportunities for all, through using mixed interview panels and ensuring that any recruiting staff are provided appropriate training.

Training

The ambulance service has transformed from a traditional transportation service to one increasingly requiring its clinical workforce to make autonomous clinical decisions. Training must be adapted to enable staff to meet this change. We were told that significant variation exists in the amount and quality of training provided across the service. The paramedic evidence-based education project (PEEP) from 2014 recommended that HEE and the AACE should standardise education and training nationally, including its funding, and enhance the level of clinical skill on the curriculum to meet changing demand. This should be completed.

HEE invested £2.6 million in a paramedic pre-degree experience pilot from 2016 to 2018. This has enabled innovative models of recruitment for paramedic training to increase recruitment pools, provide clinical experience prior to applying for training and increase BME representation in ambulance services. Since 2016, HEE has invested £9.3 million in the development of the existing paramedic workforce to upskill them to degree level so they are able to deliver new models of care.

Pay and reward

The recent Agenda for Change agreement represents the most significant pay reforms since its creation in 2004, ending a lengthy period of pay restraint. Pay for two thirds of NHS staff on Agenda for Change is rising by 6.5% to 29% over the next three years. On top of immediate pay increases, which will particularly benefit the lowest paid health workers, the new Agenda for Change pay structure will enable staff to progress to the top of their pay band quicker. It also provides staff with an enhanced shared parental leave entitlement and the ability to buy and sell annual leave.

The pay band increases for paramedics and their new national job description will enable the delivery of the new models of care for patients, but these are not sufficient alone. Staff must also be supported to acquire the skills, experience and professional development necessary for them to operate the new models of care confidently. They need to work in a supportive and enabling environment, with appropriate systems and facilities to fulfil the potential of their professional role.

Recommendation 4 – Optimising workforce, wellbeing and engagement

The ambulance service should develop a five-year workforce, recruitment and staff wellbeing plan to: improve wellbeing and reduce sickness absence; encourage leadership at all levels of the organisation; improve staff engagement; and minimise vacancies.

Delivered by:

- Ambulance trust boards ensuring staff have an annual performance review and developing a standard appraisal process and reviewing this alongside appraisal quality measures.
- NHS Improvement People Strategy Team working with ambulance trusts to apply the Health and Wellbeing Framework assessment and present a plan to their boards for improvement against the key indicators, including sickness absence, by winter 2018.
- Ambulance trust boards encouraging their staff to engage in #ProjectA and support the implementation of the ideas they generate.
- The Association of Ambulance Chief Executives, NHS Improvement, NHS England, ambulance trust boards and the police working together to ensure that the toughest possible action is taken against every act of violence, bullying and harassment towards staff.
- Health Education England producing a clear national workforce plan with ambulance trusts to enable long-term recruitment planning.
- Ambulance trust boards analysing turnover rates for all staff groups to understand the true number of staff who leave the ambulance service and their reasons for leaving, to enable more effective staff recruitment and retention planning.
- Ambulance trust boards working with Health Education England to consolidate and streamline training across the service by developing a national core training package with local delivery and adaptation, to provide a consistent level of patient care across the country.

Chapter 5: The ambulance fleet

The ambulance service spends over £200 million on its fleet every year, excluding additional capital investment for new vehicles³⁸. This makes it the largest area of non-pay expenditure. There are over 5,000 vehicles in the English emergency ambulance fleet which is largely split between 3,200 DCAs and 1,500 RRVs³⁹. The ambulance service has a smaller number of other vehicles, including motorcycles and specialised vehicles such as neo-natal ambulances.

Ambulance trusts told us that they expect to purchase or lease 2,600 DCAs over the next five years as part of the usual cycle of replacing older fleet. The introduction of the new performance standards is leading to a change in ambulance fleet mix towards more DCAs. This change in standards is likely to require some trusts to reconfigure the shape of their overall fleet mix which could mean a further 700 DCAs are required. The recent announcement of capital funding from the Department for Health and Social Care for over 250 new ambulances is a welcome step in supporting the renewal of the ambulance fleet⁴⁰.

Unwarranted variation in ambulance fleet

Most members of the public would expect there to be a standard ambulance in use across England. However, we identified significant variation in the types of ambulances used by trusts. The two main types of DCA are the box DCA, where a modular unit is added to a base vehicle chassis, and a van conversion, where the interior of the base vehicle is converted (Figure 5.1).



Figure 5.1: Box ambulance (left) and van ambulance (right)⁴¹

Some trusts exclusively use box conversions, whilst others use vans, and some have a mix of the two. Most trusts use different specifications when converting their ambulances and in total we identified 32 different types of DCA in use⁴².

³⁸ Source: NHSI financial returns, 2016/17

³⁹ NHS Improvement summary data request Q1 & Q2 2016/17

⁴⁰ <https://www.gov.uk/government/news/multi-million-pound-investment-in-new-ambulances-for-the-nhs>

⁴¹ Reproduced with kind permission from www.flickr.com/photos/humbersidepolicepics

⁴² Inclusive of new and concept vehicles across the service

An ageing fleet

All ambulance trusts need an on-going programme to replace ageing ambulances with new fleet as they come to the end of their operational life. However, there is significant variation in the average age of the fleet in different trusts. Almost half of DCAs have been in operational use for over five years, 26% over seven years and 6% over 10 years. In one trust, almost 70% of its DCAs have been in operational use for over 7 years. There was significant variation in the average vehicle age at disposal and these differences can be seen in figure 5.2 below.

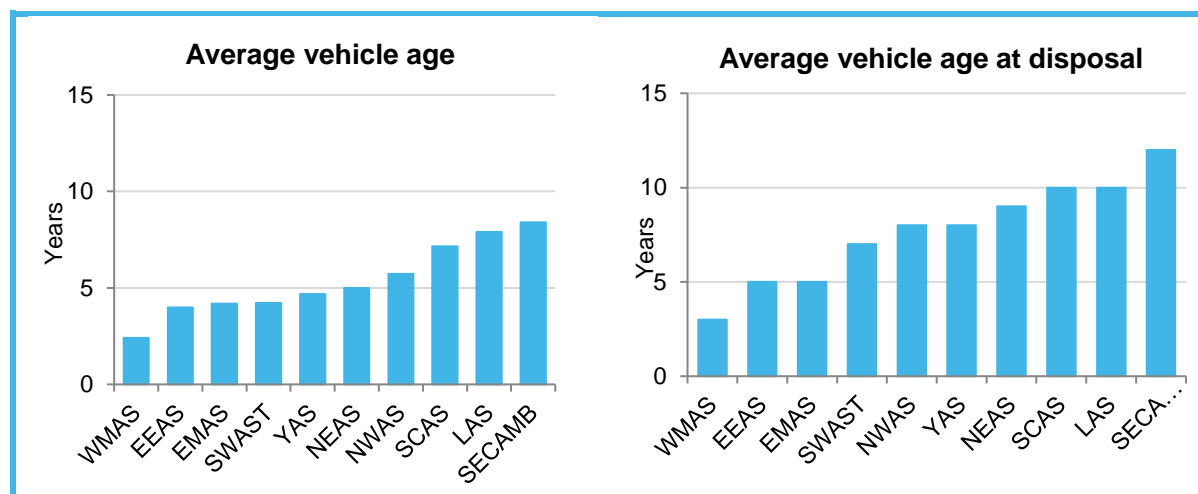


Figure 5.2: Variation between trusts in the average age of all DCAs and average age of DCA at disposal, NHS Improvement fleet data request 2017/18

The average ambulance across the whole fleet travels around 50,000 miles every year. This is five times more than the average personal car, and ambulances are subject to significantly more stress when responding under blue lights to emergency calls. The fleet itself is usually split into the core operational fleet used daily, and a relief fleet element or spare set of vehicles. This means that the core fleet is likely to work even harder.

Maintenance costs for vehicles in operational use for less than six years are on average £4,200 a year. Once a vehicle is in use for over six years, this increases to £6,900 on average. An older fleet is therefore generally more costly to operate than a modern fleet. They also are likely to become less reliable and more prone to breaking down. Ambulance trusts did not routinely collect data on this. The operational life of an ambulance depends on the base vehicle, maintenance regime and mileage. At seven years the average ambulance will have travelled around 350,000 miles and is likely to have required the engine to be replaced. The consensus amongst ambulance fleet managers is that this should generally be considered an upper limit for an operational ambulance in daily use. For some models, this should be even lower at five years.

We were told that a modern fleet can help increase staff morale and helps decrease the risk of infection. This is because there are fewer areas for potential infection to develop, for example in cracks, dents or tears in the cabinetry and seating of older vehicles.

The regulatory environment is changing with the government's commitment to banning the sale of petrol and diesel engines from 2040. All ambulances in England currently use diesel and these regulatory changes will impact on trusts well before 2040. An ultra-low emission zone is planned for implementation in London by 2019. This means London City Council will levy daily fines of £50 to £100 per vehicle for all diesel engines over the age of four years in the area. The scheme will initially cover a small zone but is likely to expand over time and may cover the whole of London by 2023. This will require a substantial change in the composition of fleet in London where the average fleet age is eight. The trust received capital funding as part of the recent round to replace some of its particularly aged fleet, and it is also exploring a retro-fit hybrid solution. Other major cities such as Birmingham are undertaking clean air zone consultations, meaning that most ambulance services will need to consider how they reduce their environmental impact. Responding to this challenge will require reduction in fleet age in the short-term and exploration of new alternatives such as electric ambulances and other innovative solutions.

A common ambulance

The ambulance fleet will evolve over time, not least in response to changing technology and the wider regulatory environment. However, we consider that the current level of variation in fleet is unwarranted. As a first step, ambulance trusts need to agree a standard common set of requirements for the base vehicle and conversion specifications, moving to one of the existing specifications. This standardisation will provide a platform for future innovation and cost savings.

We have reviewed the costs of the existing ambulance fleet. Data is limited, but the available data suggests that in the current fleet, van conversions appear to offer better value for money than box conversions. Figure 5.3 shows the average base vehicle purchase, conversion price and cost of maintenance, over five and seven years for an average box and van conversion.

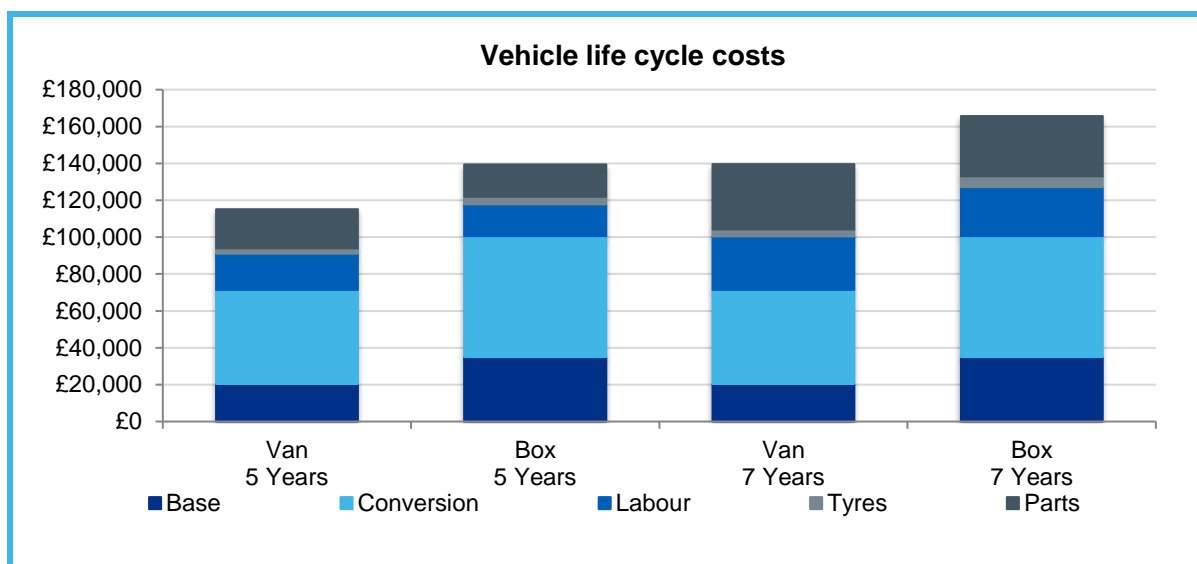


Figure 5.3: Combined average base, conversion, parts, tyres and labour maintenance costs for a box conversion and van conversion over 5 and 7 years, NHS Improvement fleet data request 2017/18⁴³

The data shows the average cost of a box conversion is around 20% more over both five and seven years. There are also differences in the weight between a van and a box conversion. The operational weight of a van conversion is typically around 4 tonnes, while a box conversion is usually between 0.5 and 1 tonne heavier. This difference is significant and implies that there will also be fuel efficiencies in using a lighter vehicle. We investigated the fuel consumption in three trusts that predominantly use either a box conversion ambulance or a van conversion ambulance, which showed that the average miles per gallon for a van conversion is over 35% more than for a box conversion.

The choice of ambulance and conversion models has significant cost implications. It would cost the service over £280 million to purchase and convert 3,300 DCAs over the next five years at the current average cost of all fleet. Around £56 million on the base and conversion price alone could be saved if they were purchased at the lower quartile cost of a van conversion.

Across the sector, if all ambulance trusts were to replace their DCA fleet ensuring there was nothing older than 7 years, in year one it would equate to £66 million at the average cost of a van base and conversion, compared to £95 million at the average cost of a box base and conversion.

⁴³These labour, tyres and parts costings are based on returns from trusts that included over 10 vehicles and included costs for more than four years. It therefore represents a subset of the overall fleet.

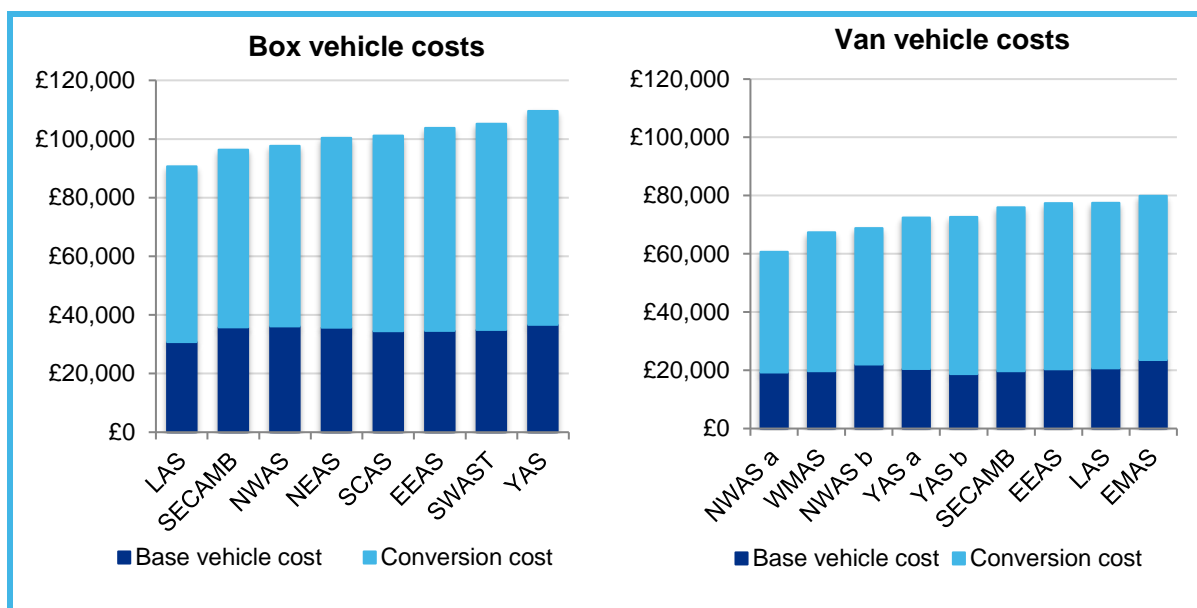


Figure 5.4: DCA base vehicle and conversion cost for boxes (left) and vans (right). Some trusts have different types of vans within their fleet and are denoted twice in the graph as 'a' and 'b'. NHS Improvement fleet data request 2017/18

Trusts told us that part of the challenge of moving to a common ambulance was engaging staff who are attached to their ambulance model and are concerned about change. To test this argument we invited frontline paramedics and fleet managers from all ambulance trusts to review the wide selection of DCAs in current use across the country. They agreed that moving to a common specification was the right direction of travel and they rated a van conversion highest from a design and usability perspective. This indicates that with the right engagement process, a common model can be secured across the service. This move has been achieved elsewhere with the worlds' largest private ambulance provider, Falck, largely standardising their emergency fleet to van conversions across their European operations.

Innovation and procurement

The way ambulances are procured also needs to improve. Ambulance trusts do collaborate to specify and purchase some standard items including vehicle insurance and uniforms. However, they all procure the conversion of their own vehicles at significantly different costs.

Trusts are not using service-wide purchasing power effectively in the conversion of ambulances. Trusts often place orders at relatively short notice with converters, and use different specifications building both cost and uncertainty into the process. Trusts have told us that they do not coordinate their procurement activity and that the converter market in the UK is fragile. More effective management of this market may reduce costs and improve resilience and quality. Options could include agreeing longer term contracts with guaranteed volumes.

Fleet management and procurement functions are typically quite small in ambulance trusts and can lack the capacity to work with the market to test and develop innovative design solutions. However, there are some encouraging signs. One trust has worked with the Royal College of Art Helen Hamlyn Centre for Design to redesign an ambulance and potential entrants to the market are designing purpose built ambulances from scratch rather than converting existing vehicles for use⁴⁴. However, there is no accepted process for testing and then implementing changes at scale. For example, a study published by Advances in Automobile Engineering identified that emergency response vehicles with an aerofoil-based roof design reduces the overall aerodynamic drag by up to 20% and reduces the overall fuel consumption⁴⁵. When we challenged one trust about this, they told us that this benefit was outweighed by the increased costs of fixing these systems compared to a standard light bar. A robust evidence based process is required to support innovation becoming the new standard.

Delivering this will require trusts to work together but also the development of central capacity to shape the work and ensure economies of scale are secured in the procurement process. The requirement is more than just developing a specification as the supplier market needs careful management to stimulate and scale innovation.

Standardisation of medicines, consumables and equipment

DCAs carry a variety of medicines, consumables and equipment, commonly referred to as 'load lists'. Consumables are largely single use items, such as gloves, needles and bandages and medicines for conditions such as pain management, diabetes, asthma, allergic reactions, overdoses and heart failure. Equipment includes heart defibrillators and stretchers. Trusts spend over £50 million every year on their load lists.

We analysed trusts' financial expenditure and compared these against the number of ambulances. This suggests that they spend between about £8,900 and £16,000 per ambulance on consumables and clinical supplies. This variation is influenced by the composition of the fleet, so we reviewed the range, number, type and price of medicines and consumables used on ambulances across trusts.

Ambulance trusts spend around £11.5 million each year on medicines. The type of medicines used, presentation and quantities held all differ between trusts. We found that trusts carried between 33 and 49 individual medicines on their DCAs. Some of these were common to all trusts including the same presentation of adrenaline, which is used to treat anaphylactic shock. However, some medicines are only carried by one trust, such as midazolam and flumazenil, which are used for sedation and reversal of sedation. Even those medicines carried by all ambulances vary in their formulations. For example, glyceryl trinitrate which is used to relieve pain caused by angina, is used in the sublingual spray form by nine trusts, while one trust carries the tablet version. The tablet form is known to take longer to have a clinical effect compared to the spray. The

⁴⁴ <https://internationalambulances.com/#features>

⁴⁵ Taherkani, AR et al. (2015), *Aerodynamic Drag Reduction of Emergency Response Vehicles*, <https://www.omicsonline.org/open-access/aerodynamic-drag-reduction-of-emergency-response-vehicles-2167-7670-1000122.php?aid=61559>

quantities of medicines carried also differs significantly between trusts. Some ambulances carry four 10ml boxes of sodium chloride 0.9%, which is used to clean or 'flush' a cannula (a thin tube used to inject drugs or give fluid infusions). Others carry 64 boxes as standard.

Initial analysis has shown 80% of consumable spend is on about 20 products costing about £9 million every year and includes defibrillator accessories, needles, gloves and cannulas. The picture for consumables is similar to medicines, for example, one trust stocks all five sizes of gloves on its ambulance, while most others only stock the sizes most commonly used. Trusts also pay different prices for the same consumable products. We found the price of a similar branded defibrillator pad, which is attached directly onto a patients skin prior to the delivery of an electric shock in cardiac arrest, ranged from about £8 to £27 per unit. The price of intraosseous needles, used to gain emergency vascular access to severely compromised patients, ranged from £53 to £82 per unit. We have seen similar variation in the range of equipment used and consider that there is scope to reduce these costs.

Stock control and inventory management differs across ambulance trusts. One trust told us that the cost of replacing equipment, through either loss or damage, was nearly £40,000 per month, equating to nearly £500,000 for a one-year period. The implementation of robust stock inventory and asset tracking, such as radio frequency identification (RFID) monitoring will enable effective management of stock.



Case study – Improving ambulance vehicle stock systems

In 2011, the National Irish Ambulance Service developed a web-based supply chain system, standardising and consolidating its product portfolio. This increased the transparency of the procurement process, saved 37% of total spend in the first year and reduced stock levels by 19%.

Trusts need to agree a standard load list of equipment, consumables and medicines, and ensure they procure these effectively.

Fuel efficiency and costs

In 2017, DCAs travelled about 120 million miles and purchased 43 million litres of fuel at a median price of 99 pence per litre. Rising costs and increasing patient demand means that the cost of fuel will continue to put pressure on trust budgets.

Nearly all trusts purchase a mix of bunkered diesel fuel, where fuel is purchased and stored on site by the trusts, and fuel cards, which are used at garages at a discounted price. Bunkered fuel offers resilience in the event of a shortage, is generally cheaper than fuel cards, and reduces operational downtime during a shift for refuelling. However, fuel cards avoid the need for ambulances to return to base to refuel and provide flexibility in rural areas. Across the service, overall usage is fairly evenly split however there are significant differences between trusts.

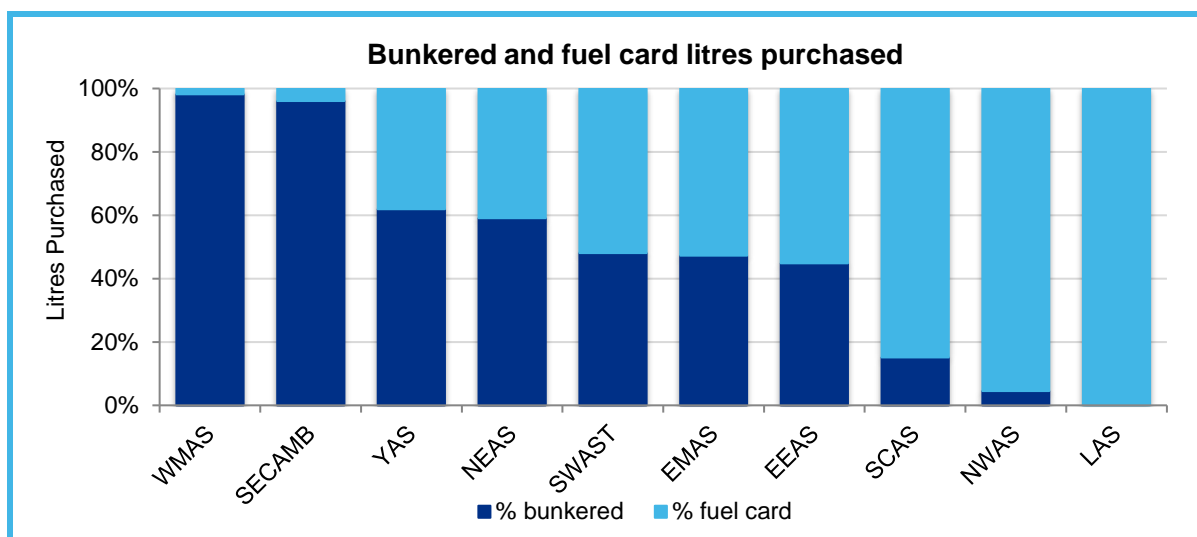


Figure 5.5: Proportion of fuel purchased between bunkered fuel and fuel cards, NHS Improvement fleet data request 2017/18

Our analysis shows the median price for bunkered fuel is 4 pence per litre cheaper than fuel card prices, and while the capital costs associated with bunkered fuel are higher, it is often regarded as the more economical option. Trusts should review their fuel management arrangements to ensure they are securing the best price for fuel and identify whether there is scope to increase the proportion of bunkered fuel or similar arrangements as part of their implementation of a make ready system. Where fuel cards are used it is important that appropriate governance procedures are in place to prevent fraud. These should include, for example, reviewing if a vehicle has been refuelled more than once in a 24 hour period and if the fuel card does not match the registration of the vehicle being fuelled.

There may be scope to use wider government purchasing power through effective procurement by combining volumes and working with other blue light services and other public bodies. Work is currently underway with the Crown Commercial Service to scope out the requirements for a new fuel card competition across the ambulance, fire and police services with the award of the contract planned for autumn 2018.

Fleet management systems and in vehicle data monitoring

Ambulance trusts operate their own fleet management functions, using different IT systems and management data. Some have digital fleet management systems that allow them to record fleet-related data and functionality in a single-data warehouse. This eliminates the need to house information in multiple systems, reduces administration time, and removes the need for paper-based documentation systems.



Case Study – Collaborating on a standard fleet management system

The Northern Ambulance Alliance was formed in 2016 by the 3 northern trusts – NNAS, NEAS and YAS - to enable efficiencies. In early 2018 they procured a single fleet management system to be used from October 2018. The joint tendering process alone saved £900,000 and provides a platform for future collaboration.

There are no common standards for recording fleet information or analysing fleet performance across trusts. Data capture is poor and needs to be improved. For example, most ambulance trusts do not consistently record or know why, or how much time, each vehicle spends off the road due to mechanical failure or following an accident. We looked at a number of areas which suggest there is scope to make improvements.



Figure 5.6: Broken down ambulance

We found that ambulances spend at least two hours of an average 12 hour shift travelling to an incident or conveying a patient to hospital, and an even smaller proportion of this time driving under blue light conditions, excluding idling time and driving to other locations. This shows that fuel efficiency is an important component of efficient fleet management, as it is in any other fleet-based industry. In vehicle data monitoring systems (IVDM), commonly referred to as black boxes, can transmit and record accurate statistical real-time data on efficiency and safety. Black boxes can help reduce fuel costs by up to 14% on DCAs and 22% on RRVs⁴⁶ and reduce

maintenance costs by about 20%⁴⁷. They can also provide important staff and patient safety information. Black boxes are industry standard equipment for large logistics companies including Royal Mail. However, less than half of ambulance trusts have black boxes installed and we found where information is collected, it is not always monitored or used effectively to change driver behaviour. Falck, the world's largest ambulance provider, have deployed black box technology on their European fleet and have seen a reduction in fuel use and improvements in driver safety. We believe black box technology should be utilised across English ambulance services, and patient transport services, as standard.

Trusts analysed over 30,000 accident claims submitted and these cost trusts over £60 million between 2014 and 2018⁴⁸. In the last 12 months, the top 10 most frequently occurring accidents accounted for over 80% of incidents, costing nearly £10 million. It

⁴⁶ Source: Pilot study by Cranfield University

⁴⁷ Levick and Swanson (2005), *An optimal solution for enhancing ambulance safety: implementing a driver performance feedback and monitoring device in ground emergency medical services vehicles*, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3217460/>

⁴⁸ Analysis supplied to the review by QBE Insurance and JLT Group

was found that two of the most frequent accidents were hitting property and colliding with parked vehicles, often while reversing at low speeds. These types of avoidable accidents must be reduced.

The reduction of vehicle accidents and the safety of employees and members of the public is managed by the National Accident Reduction Group (NARG) who share best practice and provide benchmarking for ambulance trusts.

Trusts should report accidents to insurers quickly as this can help bring down overall costs. NARG have led action to reduce the significant variation in the days it takes to report accidents from about 14 days to less than five, decreasing costs by an average of £300 per claim. Trusts should continue to manage this issue closely through performance monitoring and taking action where necessary.

Recommendation 5 – Effective fleet management

NHS Improvement should work with trusts boards and the Association of Ambulance Chief Executives, to agree proposals to rapidly move to a standard specification for new fleet across England and deliver significant improvements in the way fleet is managed.

Delivered by:

- NHS Improvement working with ambulance trust boards and the Association of Ambulance Chief Executives to agree which of the current specifications, and associated load list, should become the common standard for any new investment across England by February 2019.
- NHS Improvement developing and implementing a centralised procurement and market management model for fleet by autumn 2019 and developing a model for testing and then implementing proven innovations at scale.
- NHS Improvement agreeing clear plans with each trust for moving to a modernised common specification and load list by April 2019.
- Ambulance trusts boards developing plans for the implementation of robust stock inventory and asset tracking systems by April 2019.
- Ambulance trust boards reviewing their fuel arrangements to ensure they are securing value for money and ensuring the governance process for fuel cards is robust where its use is appropriate by April 2019.
- NHS Improvement agreeing the requirements for a new fleet and fuel national data collection and implementing this by April 2019.
- Ambulance trust boards agreeing plans to install and utilise black box technology and strengthen management of accidents by April 2019.

Chapter 6: Control centres and the digital ambulance service

Control centres are at the heart of ambulance trusts and a key gateway to the health service. They are fast paced environments with staff often dealing with distressed members of the public. There are 22 control centres in England and each trust has at least two separate centres to ensure it has the resilience to answer calls if one fails. Around 3,800 staff work in control centres performing three distinct functions.

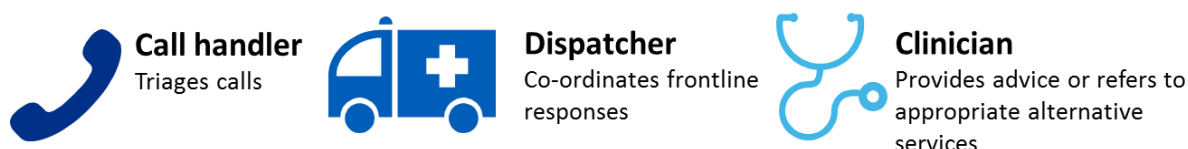


Figure 6.1: The key functions undertaken by control centre staff

Trusts told us what 'good looks like' in a control centre is one that:

- meets performance standards by answering calls quickly and effectively, and efficiently dispatching resources while adhering to standard operating procedures
- provides patients with the right clinical advice
- has engaged teams with strong leadership and people who have the right blend of experience and sufficient stability in the workforce
- has a resilient and high quality estate which has the capacity to meet forecasted demand over the medium term

We reviewed each of these areas and found significant unwarranted variation between trusts in performance and underlying differences in operational processes, practice, estates and the technology used. We also looked at staffing, resilience and interoperability, that is, whether trusts are able to exchange calls, cases and information between their control centres. This identified a number of areas of concern that need to be addressed. Finally, we considered what may be a possible future for the ambulance service in a digital world, what this might mean for patients and the scope to deliver a more efficient and effective service.

Performance and operating procedures

The overall performance of an ambulance control centre is measured by the way in which they handle calls, dispatch resources and provide clinical advice to patients. This chapter focuses on the call handling and dispatch processes as the clinical assessment function was assessed in Chapter 3. Each trust has a different level of call demand and resource pattern to meet this, as can be seen in Figure 6.2.

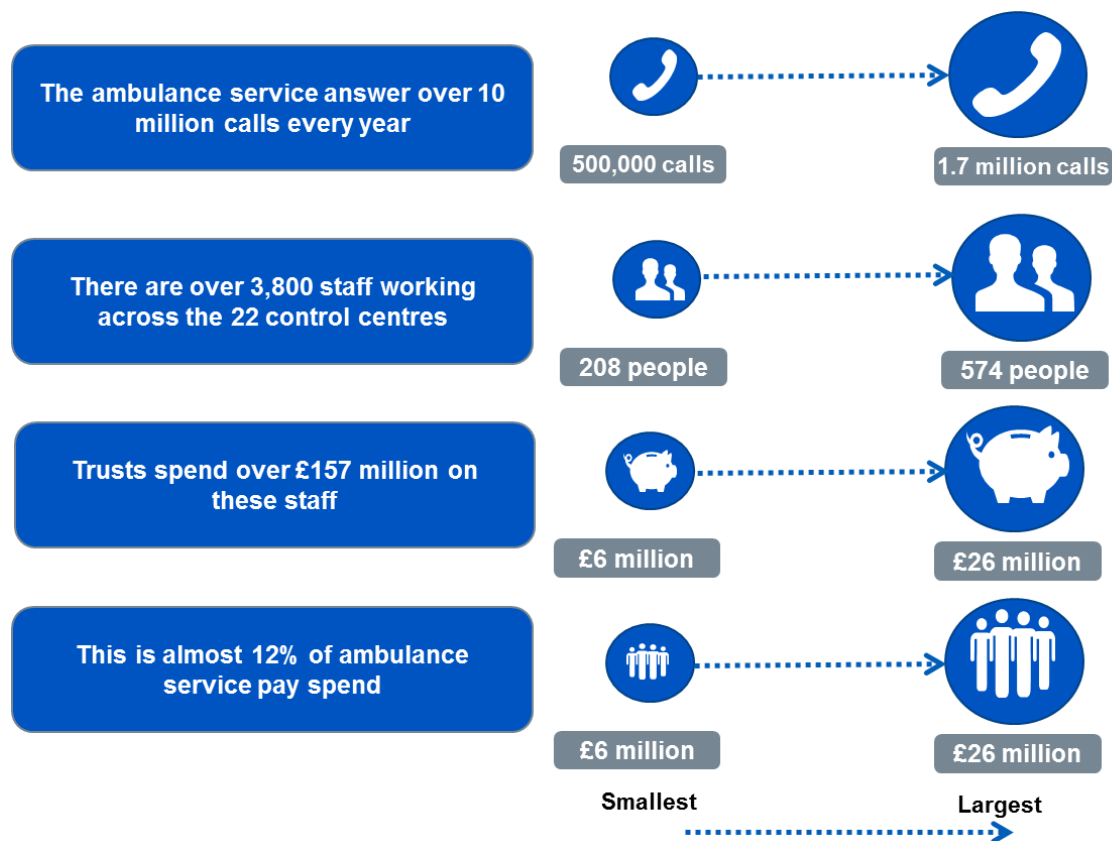


Figure 6.2: The current demand and staff of ambulance service control centres and the variation between the smallest and largest trust, Control centre data request, 2017/18

Call handling

A 999 call is first answered by a BT operator who identifies the emergency service the caller requires and connects the caller. Ambulance trusts employ nearly 1,500 call handlers to take and triage calls and provide pre-arrival advice to callers. We analysed their performance and observed significant variation. The best performing trust took up to eleven seconds to answer calls at the 95th percentile, while the worst performer took almost two and a half minutes.



Figure 6.3: Variation in the time ambulance trusts took to answer 95th percentile of calls, AQI data set, January to July 2018

We found significant variation between trusts in their call handling performance shown in Figure 6.4.

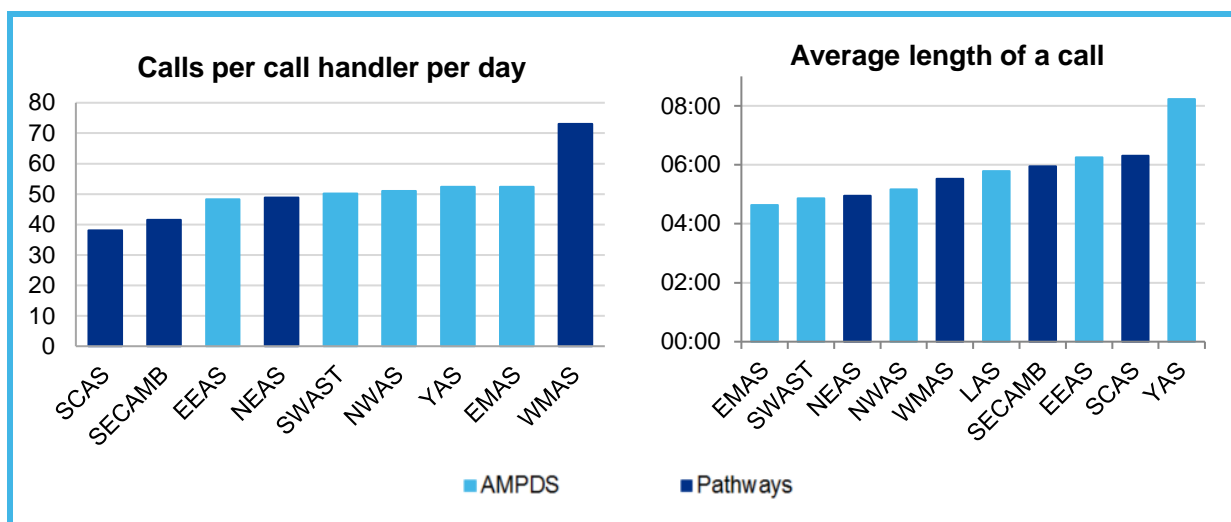


Figure 6.4: Variation in call handling performance across trusts, Control centre data request 2017/18⁴⁹

Across ambulance trusts, call handlers use one of two triage systems to identify the acuity of the patient and provide the most appropriate response. One of these is the Advanced Medical Priority Dispatch System (AMPDS) which is designed to prioritise the patients acuity and support appropriate response decisions to calls. The other is NHS Pathways which is designed to triage the health problem and refer to an appropriate service or ambulance response. Both systems provide pre-arrival instructions to the caller and in cases where patients are in a life threatened situation, guide them through life saving interventions such as Cardio Pulmonary Resuscitation (CPR). Figure 6.4 shows no correlation between the triage system used and the call performance measures suggesting that other factors, such as local standard operating processes, appear to be driving this difference. However, moving to one triage system would enable more consistency and support integration between trusts.

The ability of the call handler to manage calls can be affected by a number of issues including mobile phone signal problems and the emotional state of the caller⁵⁰. Call length targets that put pressure on call handlers to finish calls are always inappropriate. However, our work identified several areas where trusts could potentially make improvements. We observed in one trust that call handlers were routinely staying on the call in the majority of cases, even where this wasn't clinically necessary or required to support the patient. Other trusts have very clear operating processes which set out when it is necessary for the call handler to stay on the line and provide support and guidance for them. Similarly, in another trust, call handlers were often undertaking complex caller wrap up processes as a matter of routine even for relatively simple calls. Improvements in these areas could reduce pressure on the control centre and improve performance.

If trusts improve their current calls per call handler to the median of 50 this would be the equivalent of almost 460,000 more calls being answered across the service within

⁴⁹ LAS dispatch team also perform call handling functions and the data is not directly comparable so have been excluded from the calls per call handler per day analysis

⁵⁰ <https://www.bmj.com/content/323/7316/781.full.print>

existing resources. Call handlers need to be able to access health and wellbeing support, particularly after distressing calls, and trusts need to ensure this support is accessible. Given the pressures on call handlers, trusts will need to give careful consideration to how productivity improvements are approached.

Dispatch

Once the call handler has secured sufficient information to categorise the call and decide the required response, dispatchers allocate the most appropriate available resource to send to the patient. There are nearly 1,300 dispatchers working in ambulance trusts, each typically managing dispatch for a designated geographical area. They support frontline staff directly, providing more information about the patient or incident to enable them to provide the right response when they arrive on scene.

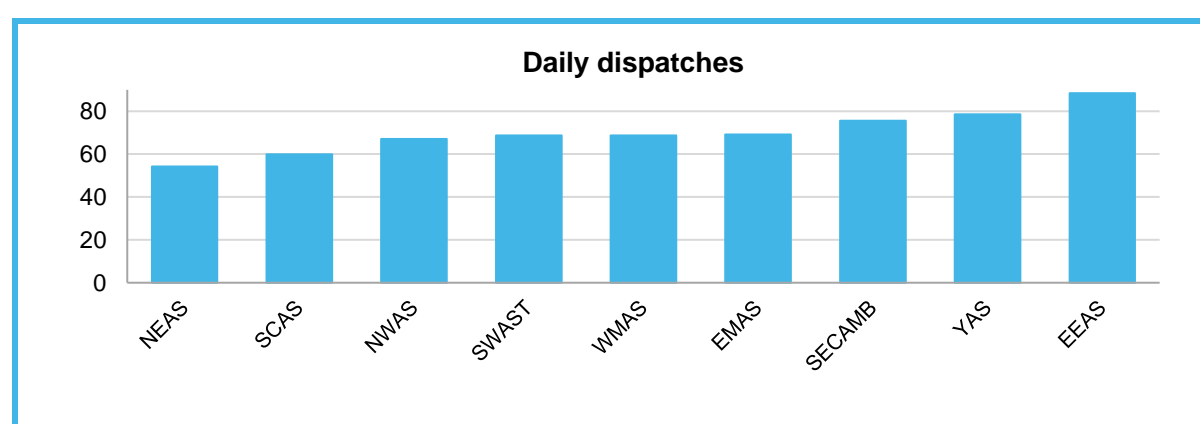


Figure 6.5: Variation in the daily dispatches per dispatching staff per trust, AQI data set and Control centre data request 2017/18⁵¹

Dispatch performance is related to the availability of ambulances and the resource model deployed. Therefore, it may not reflect the performance of the dispatch function itself but some of the wider challenges in delivery. There are significant variations in the proportions of call handlers and dispatchers within different control centres. Some trusts reported more than twice the number of dispatchers relative to call handlers, while others reported fewer dispatchers than call handlers. This may relate to staff performing both functions across the control centre but it may also indicate that there are some underlying differences in the operating models. One trust told us they have 170 standard operating procedures that control staff are required to comply with. This makes the process more complex and time consuming and may increase the risk of errors. This shows there is opportunity to improve consistency in practices and procedures across trusts to optimise performance through sharing best practice and innovative ways of working.

⁵¹ The data request was for the volume of dispatchers, and each trust may have interpreted this differently, with some including supervisors and controllers, and others not. LAS dispatch team also perform call handling functions and the data is not directly comparable so have been excluded

The control centre workforce

Chapter 4 sets out the broader workforce challenges for trusts but recruiting and retaining control centre staff is perhaps the most difficult challenge trusts face. Overall vacancy rates for control centres are 9% on average but one trust reported a 37% vacancy rate for call handlers and a 48% vacancy rate for dispatchers. There is also significant variation in turnover rates between trusts.

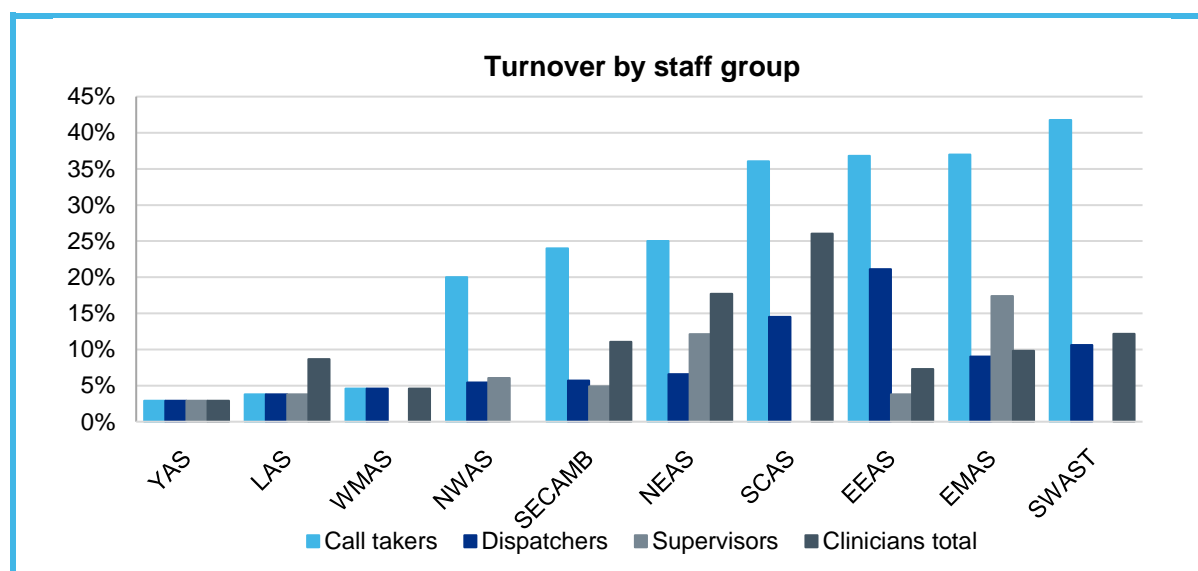


Figure 6.6: High turnover rates are an issue in most ambulance trusts and across nearly all control centre staff roles, Control centre data request 2018

This shows that some roles, in particular call handling, are difficult to retain across services but that some trusts have wider retention issues that must be addressed.

It generally takes around eight to 12 weeks to train a call handler to answer and triage calls without support, so high levels of turnover can have a significant impact on both performance and cost. Call handlers and dispatchers are generally the lowest paid staff in trusts which can make it difficult to attract and retain staff, particularly where the cost of living is high and local labour market conditions are strong. Retaining these staff will always be challenging but not all turnover results in staff being lost to the service. Control centres can act as a gateway for staff to move into other roles within the ambulance service, including technicians and paramedics. However, we found no clear career pathway for staff in control centres and we were told the development of this may improve recruitment and retention across the service.

The review identified many examples of good practice for improving staff health and wellbeing in the stressful environment of a control centre. These include access to counselling, sleep clinics and quiet rooms on the site. However, there is no consistent health and wellbeing programme across the service, and good practice could be more effectively shared.

We reviewed control centre staff rotas and found that some trusts have a standard flat rota pattern with flexibility provided by a relief pool, whereas others tailor theirs more

effectively to match anticipated peaks and troughs in demand. Where trusts provide 111 and 999 services and utilise the same triage system, we found scope for delivering economies of scale.



Case study – Utilising dual trained staff

North East Ambulance Service NHS Foundation Trust has 55% of their total call handling workforce dual trained across 999 and NHS 111. This gives staff increased role variety and progression opportunities and provides the trust with improved performance efficiency. Without dual trained staff, the trust would require over 20 extra control centre staff costing around £635,000 to manage demand appropriately.

Resilience and interoperability

All trusts have at least two geographically distinct control centres with two trusts operating three sites. The reason for this is that if one site fails, services can still be provided. This means that there should be sufficient capacity in both sites to manage all the calls for a defined period of time. The control centres must also have separate technical infrastructure in the event of IT failure and should not be too far apart to ensure staff from one centre can access the other relatively quickly. Since 2003 all trusts have a designated partner trust, meaning some or all of their calls can be routed to this trust by BT to be triaged in the case of an outage. However, this system only covers the call handling function and the partner trust is not able to dispatch vehicles on their behalf. This means that the calls requiring a response are manually passed back to the local dispatch teams rather than electronically shared and can be a major issue if they have had a telephony outage. We have concluded that the current trust partner system is not sufficiently resilient.

These are not theoretical risks: two trusts have suffered significant control centre failures in about the last 18 months alone. In one case a single failure in the power supply caused problems with the phone and trust computer systems at both sites. The trust was unable to take any calls and emergency arrangements were put in place which significantly impacted on performance across both organisations. This indicates that the infrastructure and resilience in some trusts is insufficiently robust. Trust boards need to test their disaster recovery plans at least annually.

Physical resilience

To understand the sustainability of trusts we reviewed the physical resilience of control centre infrastructure. We did this by analysing the remaining capacity of the trust if the main control site were to fail. For a trust to be resilient we consider that the remaining available capacity should be at least the size of the main control site when taking into account increases under business continuity arrangements. Only eight of the 10 trusts could meet this requirement and the remaining two trusts had less than 45% of the capacity available at their secondary site. We reviewed the Board Assurance

Frameworks for all ten trusts. The majority of trusts identified resilience as an issue but the mitigation proposed is not sufficient to resolve these.

Demand is forecast to increase by around 4% a year. This means that the ambulance service could be dealing with an extra 4 million calls by 2028. Under the current configuration this would mean we would need an additional 1,500 control centre staff and over 600 seats. With an average capacity of 70 seats, this growth is effectively equivalent to needing a new control centre in each trust. The review found that several trusts did not have robust plans in place for managing this potential growth.

Those trusts where concerns have been identified regarding the resilience of their control centre environment must urgently review their arrangements. All trust boards must ensure they have adequate arrangements over the next three years to manage increases in demand.

Technical interoperability

Control centres are supported by three key systems and there is significant variation in the systems used.



Figure 6.7: There are significant differences in the systems and reported costs of systems across trusts

The AACE has recognised the benefits of moving to a single triage system but this has not been possible as the costs associated are generally prohibitive for individual trusts. There is significant variation in CAD systems used and even where trusts have the same system often it has been adapted for local use and configuration. There is scope for trusts to work together on shared telephony systems.



Case study – Shared telephony systems

South East Coast Ambulance Service NHS Foundation Trust has recently invested £900,000 in replacing its current telephony system. This new centrally hosted system has enough capacity to support other services and may reduce overall costs across trusts.

The use of different systems significantly limits interoperability between trusts and reduces resilience and performance across the system. CAD interoperability is the capacity to pass calls, cases and information between CAD systems. Calls cannot easily be shared between control centres, and cases cannot be transferred from one CAD to another post-triage. Where BT is unable to connect a call to a trust in which the 999 call is located, it is transferred to another trust to assess the call and assign a category for response. The call is then manually passed to the trust where the call is located creating

potential delays in response. Trusts cannot see other trusts ambulances on their systems when support is required through mutual-aid, limiting the effectiveness of any response. This lack of interoperability extends to the National Ambulance Resilience Unit (NARU) who work with all ambulance trusts across the country to enable national resilience and communication, and support major national incidents or service failures. However, NARU use a different system to ambulance trusts which is not interoperable with them. The ambulance service have been working on enabling CAD interoperability but this must be accelerated.

Recommendation 6 – Improving performance and strengthening resilience and interoperability

Ambulance trust boards should take steps to improve performance in their control centres and have plans in place to provide a resilient service in the event of a major incident or system failure by winter 2018

Delivered by:

- Ambulance trust boards with support from NHS Improvement and NHS England working together to develop standard operating procedures (including performance metrics and measures) and models to identify best practice and reduce performance variation by April 2019.
- Ambulance trust boards undertaking a comprehensive assessment of their disaster recovery plans prior to winter 2018 and escalating concerns where they consider the risk to be outside of tolerable levels.
- Ambulance trusts working with Association of Ambulance Chief Executives and NHS Improvement to develop disaster recovery standards for inclusion in the Emergency Preparedness, Resilience and Response annual assurance guidance published in July 2019. These standards should be fully adopted across all services by summer 2020.
- Ambulance trust boards reviewing their current three to five year control centre capacity plan to ensure they are adequate to meet projected demand by summer 2019.
- Ambulance trust boards reviewing their current workforce strategies for call handlers and dispatch staff as part of wider workforce planning by April 2019.
- Ambulance trust boards accelerating delivery of national CAD interoperability between all trusts and agreeing a delivery date by winter 2018.

The digital ambulance

Ambulance trusts have traditionally been at the forefront of technological development but the service must do more to keep pace with rapid advances in technology. NHS

England has recognised three ambulance trusts as Global Digital Exemplars to help drive and share improvements in digital technology⁵². They will receive funding to support work to enable Wi-Fi in vehicles, access to electronic patient records, and remote clinical diagnostic tools such as video consultations.

In the review we identified implementation ready technology solutions that are not in routine use across all trusts. Trusts can reduce the time it takes for a call taker to identify the location of the caller by utilising advanced mobile location technology. This sends a callers location automatically to the control centre and can be used across an increasing number of networks. It is significantly more accurate than the current system however only four ambulance trusts are currently using this technology.

There is not yet widespread use of technologies that would be innovative in the ambulance service but are commonplace in ordinary life such as video triage or consultation. Innovative technologies are being trialled in other ambulance services and we should learn from these best practice examples from around the world once they are proven.



Case study – Artificial intelligence in control centres

Since 2016, Copenhagen Emergency Medical Services have trialled the use of artificial intelligence to improve detection of cardiac arrests. Call handlers have a digital assistant that listens to the conversation and compares to historical emergency calls. The system then sends its predicted clinical severity to the dispatcher.

⁵² <https://www.england.nhs.uk/digitaltechnology/info-revolution/exemplars/ambulance-global-digital-exemplars/>

The ambulance service of the future

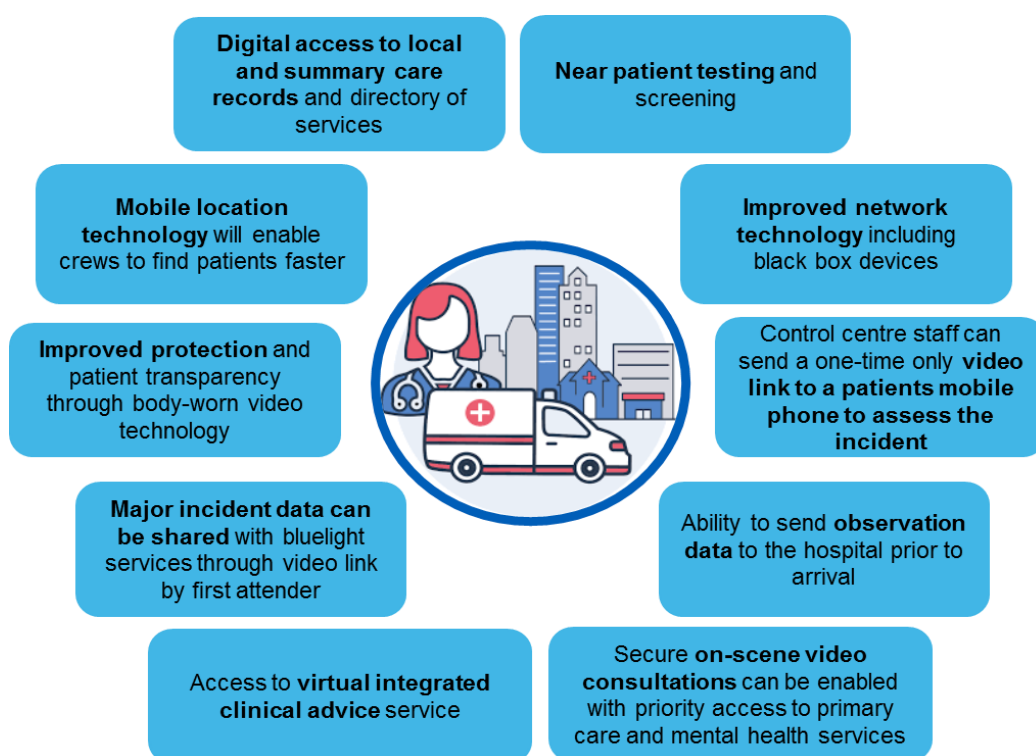


Figure 6.8: How utilising new technology across the ambulance service could improve the efficiency and effectiveness of the service for patients

The wider emergency services network (ESN) is due to be upgraded by 2020. This will centralise the data infrastructure and establish links between control centres and fleet. The new system will replace the existing aged infrastructure and deliver secure and resilient voice communication and broadband data services. It will reduce costs and provide the emergency services with communication capability to match and exceed that available to private individuals. The initial focus for the ambulance service, led by the Ambulance Radio Programme, has been to ensure that ESN is implemented effectively with no loss of service. However, ESN provides the capability to radically transform the way patient care is delivered in the long term.

The deployment of new technology at the frontline (Figure 6.8) must be supported by an efficient and resilient network that is connected to local services. The ESN network allows the development of a shared infrastructure.

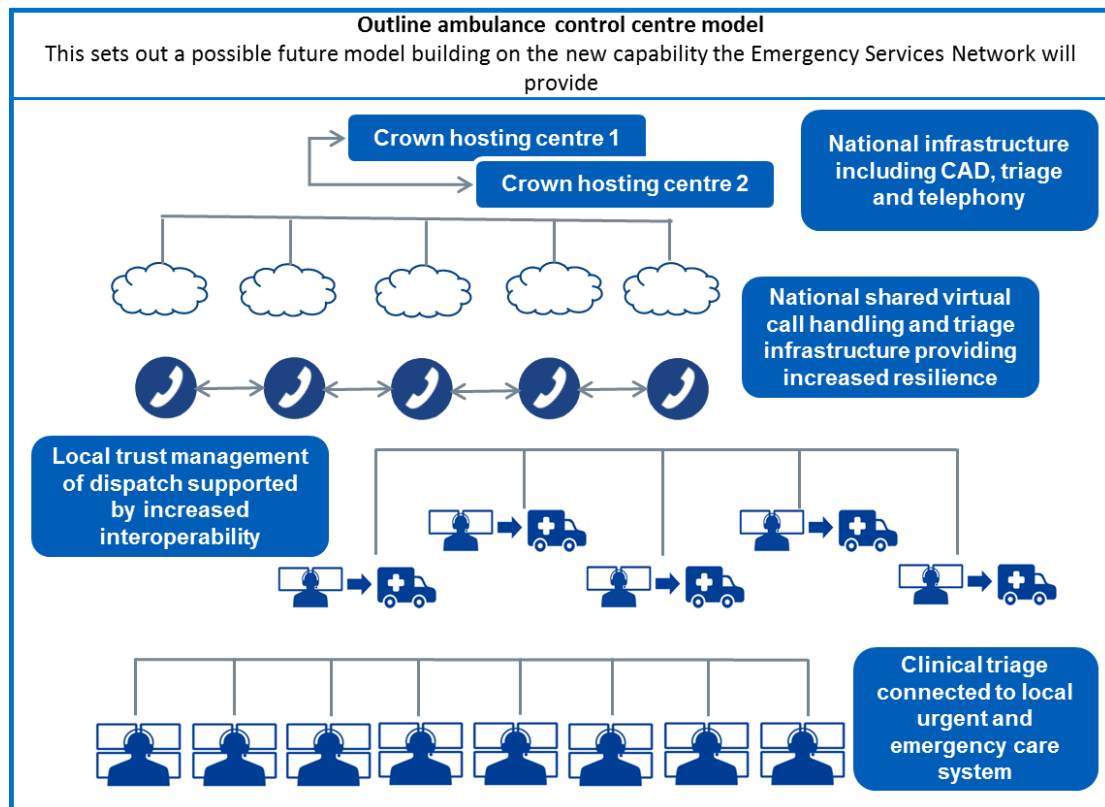


Figure 6.9: An outline of the potential future operating model for control functions

A national integrated infrastructure is required to enable this future system of control centres. This would have the ability to share calls, improve consistency of operational performance, enable consolidation where appropriate and drive efficiencies through the procurement of national systems.

The potential to move to a modern infrastructure and operating model across the English ambulance service should be considered and developed as part of the NHS ten year plan. Further work is required to develop the business case, implementation plan and identify the cost, but the alternative is to fund sub-optimal local infrastructure.

Recommendation 7 – Developing the digital ambulance

Ambulance trust boards must utilise available resources and invest in future technology within their control centres to enable an interoperable service with maximum resilience and improved operational efficiency.

Delivered by:

- NHS England and NHS Digital supporting ambulance trusts with the rapid adoption of technology assessed through the digital exemplar programme and identifying digital ready technologies that should be implemented by all trusts by April 2019.

- NHS England, NHS Improvement and NHS Digital working with ambulance trusts to develop the vision for the digitally enabled ambulance and control centre and how this can connect the patient with wider services and support reductions in avoidable conveyance by summer 2019.
- NHS England, NHS Improvement and NHS Digital working with ambulance trust boards and the National Ambulance Radio Programme to develop a costed business case by summer 2019 for delivering an interoperable and resilient call handling infrastructure.

Chapter 7: Optimising non-clinical resources

Estates, procurement and corporate service functions are essential to the delivery of frontline care. Opportunities for productivity can be significantly increased by collaborative working in these areas between trusts, across the wider NHS and with other blue light services.

Estates and facilities

Over £100 million, or about 5% of total expenditure, is spent every year across the ambulance service on estates and facilities at almost 1,000 sites. Ambulance estates are split into three broad functional areas: operational; control; and corporate sites. The operational sites make up the bulk of estates and we found variation between trusts.

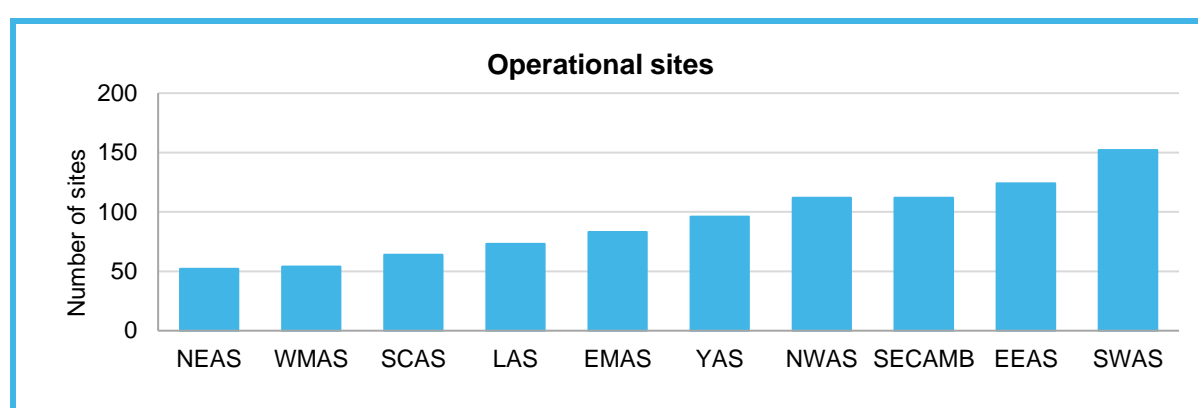


Figure 7.1: Variation in the number of operational sites across the ambulance service, NHS Improvement summary data request Q1 & Q2 2016/17

Our review found that each trusts estate is configured very differently, in part because they serve different types of communities but also because of differences in their operating model. A number of trusts told us there is significant scope to reduce unwarranted variation by rationalising their surplus operational estate. This would support the effective deployment of fleet and use of frontline resources.

Optimising benchmarking

Across the NHS all services are required to complete the annual Estates Return Information Collection (ERIC), which enables organisations to benchmark the performance of their estates and facilities services. The ERIC data set was primarily designed for acute hospital benchmarking and has some limitations when being used to compare ambulance trusts. For example, estates under 150m² are not currently required to be submitted in the return which excludes many operational ambulance sites. However, trusts told us the ERIC data enables them to identify some areas of opportunity and we found considerable variation across the service in the data.

We found variation in estates and facilities management costs between trusts. For example, £8.4 million is spent across the service every year on energy but there is variation in the cost between trusts from £13 to £21 per m². The savings opportunities in

these areas are not significant alone but should be considered within trusts strategic estates plans to ensure value for money.

Utilising space

Enhancing space utilisation is an important aspect of effective estates management. We found significant unwarranted variation in the amount of empty and underutilised space across the ambulance service and in space considered not functionally suitable⁵³.

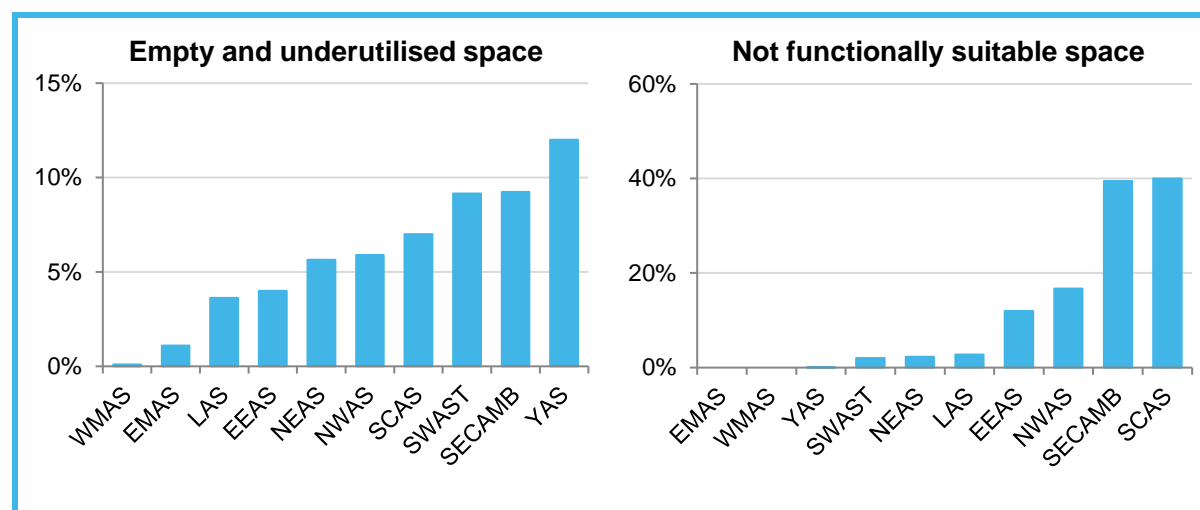


Figure 7.2: Analysis of estates utilisation measures found considerable variation between trusts, Estates Return Information Collection (ERIC) data set 2016/17

Some of the older estate ambulance is no longer in the right place. Optimising the use of current estates should be integral in trusts estate strategies to reduce unwarranted variation and make the best use of available resources.

We found that the ERIC data submission had not previously been an area of focus for ambulance trusts in part due to its acute trust emphasis. Trusts told us that ERIC returns were not routinely reviewed at board level so may not be of a suitable standard to enable effective benchmarking. The NHS Improvement Estates and Facilities team have been working with ambulance providers to improve the categories and definitions of the ERIC data collection from 2019/20 to enable more appropriate benchmarking and identification of potential improvement opportunities.

Make ready system

The introduction of a make ready system is a key enabler to productivity and can support significant savings through modernising trust estates. The make ready system is located in large hub stations at key strategic locations to match modern demand profiles and patient flows, generally replacing a number of older, smaller stations. Ambulances start and end their shifts at a hub to enable the vehicles to be made ready for the next shift.

⁵³ This is considered below an acceptable standard, or unacceptable in its present condition, or so below standard that a total rebuild is required

During a shift, ambulances are deployed to strategically located spoke sites to meet changing demand patterns.

Make ready is ideally suited to urban areas but can also be adapted and implemented in rural or geographically sparse regions. In rural areas collaboration with other public service organisations, such as co-locating with other blue light services, presents opportunity for cost and overhead efficiency savings and should be considered. Across the service the implementation of a make ready system is varied with a limiting factor identified as the availability of capital. The government announced an investment in two ambulance trusts in July 2018 enabling them to implement make ready systems at key sites.

We found one trust reduced their operational estates by 72% through fully implementing a make ready system. Rationalising their estates enabled a reduction in the running costs and savings in maintenance spend, particularly for the older buildings within their portfolio. The trust also found an improvement in staff communication and engagement with greater consistency of practice due to a reduction in the number of staff bases, making the mobile workforce more contactable.

In 2016/17 there was £20.4 million of backlog maintenance across the ambulance service, which is work that should have taken place to restore a building to an agreed state. Backlog maintenance is recorded by the amount of risk it poses to the safety of the building and across trusts: this includes high risk maintenance at £1.1 million, significant risk at £3.5 million, moderate risk at £5.3 million and low risk at £10.4 million. However, due to the limitations of current ERIC data reporting it is believed that this is significantly underestimated. Older sites are generally more expensive to maintain which can be reduced if trusts consolidate and modernise their estates by fully implementing a make ready system.

Corporate services

Corporate services functions include: human resources, finance, governance and risk, legal, payroll, procurement and information management and technology. The NHS Improvement Corporate Services team have been providing trusts with a benchmarking report using the Corporate Services data set they began collecting in 2015/16. Ambulance services spent £172 million on corporate services in 2016/17 and we found this was the highest in the NHS as a proportion of turnover in all functions. This is in part due to their smaller size meaning it is harder to achieve economies of scale. HR costs across ambulance trusts may be increased by the requirements to train clinical staff, as the paramedic profession is not yet a graduate only recruitment route. However, we found significant variation between trusts in their corporate services spend.

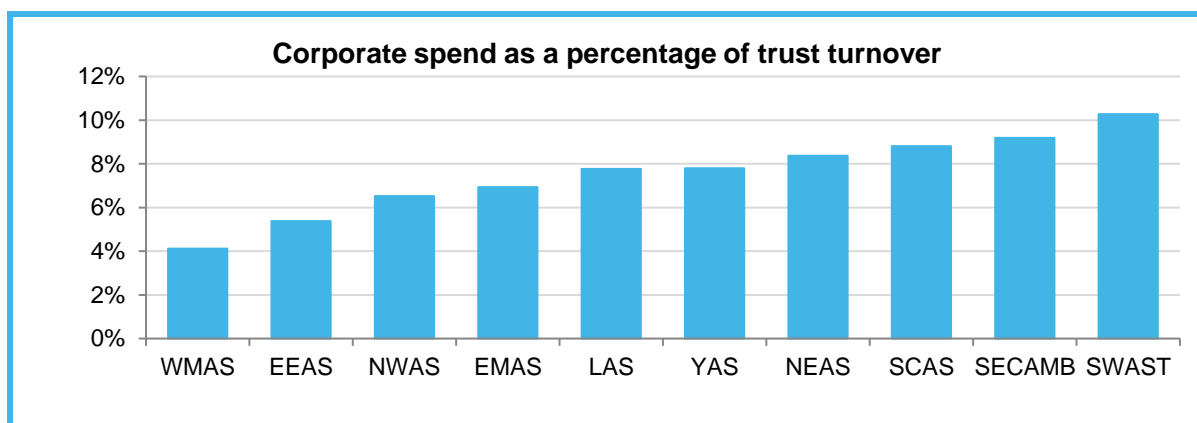


Figure 7.3: Corporate services spend as a percentage of turnover, NHS Improvement Corporate Services data set, 2016/17

We found substantial variation within all of the corporate services functions across the ambulance service, for example the cost per payslip ranges from £3.23 to £6.74 and the cost of human resources per full time equivalent are between £563 and £2,135. We were told that some of this variation could be due to differing applications of the definitions in the data collection however the overall picture suggests that trusts can and should make improvements.



Case study – Improving corporate services

Between 2015/16 and 2017/18, East Midlands Ambulance Service NHS Trust and East of England Ambulance Service NHS Trust reduced their corporate services spend by around 2%. Using the NHS Improvement corporate services benchmarking data the trusts worked together to identify improvements including a new model of working with joint appointments in corporate services.

Some trusts told us they have been collaboratively sharing their corporate services opportunity reports with their STPs and other trusts to enable identification of potential opportunities and to take advantage of economies of scale. The NHS Improvement Corporate Services team should work with ambulance providers to improve the completion of the data request to enable more accurate benchmarking of corporate services functions across the service. The team will continue working with providers to share benchmarked data to enable identification of cost reduction initiatives and improve performance of these functions to support the frontline.

Over the last twenty years, there has been little change in the methods of delivering corporate services in the NHS. We observed low levels of modernisation and variation in delivery methods, which are a core driver in the cost of corporate service functions. Technologies commonly used in other sectors and across government organisations are not yet used consistently in ambulance trusts. We believe automation (such as robotic process automation (RPA), machine learning algorithms, and artificial intelligence technologies) can support NHS corporate services to shift to a modernised operating

model and make sustainable savings. The NHS Improvement Corporate Services team is running a series of pilots to understand the potential of RPA with findings to be published in 2018 for adoption by trusts.

Procurement

Ambulance trusts spend around 3% of their total expenditure on procurement every year, which is around £74 million. Procurement functions support the frontline by ensuring vital goods, medicines, consumables and equipment are available when clinicians need them. The core activities of procurement functions are similar to those across other areas of the NHS, such as invoicing. Some of the goods, equipment and consumables the ambulance service procures are different. The review found that trusts are paying significantly different prices for the same goods, as set out in Chapter 5. The ambulance service must use benchmarking data to purchase goods at the best price possible. To help trusts achieve this, the NHS Improvement Procurement team have encouraged the use of the Purchase Price Index and Benchmarking (PPIB) tool. This tool enables trusts to identify potential savings in these areas.

The NHS Procurement & Commercial Standards were launched in 2012 to provide a clear vision of good procurement through trust accreditations against three defined levels, with level three being the most mature⁵⁴. Accreditation levels among ambulance trusts are varied with only two achieving level one accreditation, seven working towards level one, and one trust working towards level two. Trusts should use the self-diagnostic tool and the maturity matrix to continue to work towards improving procurement performance.

Recommendation 8 – Maximising use of non-clinical resources

Ambulance trust boards should review their estates to match modern demand and optimise their corporate services functions through improved collaboration.

Delivered by:

- The NHS Improvement Estates and Facilities team working with ambulance trust boards to improve the categories and definitions of the Estates Return Information Collection by 2019/20.
- Ambulance trust boards reviewing their strategic estates and facilities plans to modernise their configuration and rationalise their estate to match modern demand profiles identified from the Estates Return Information Collection data set by summer 2019.

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/539626/Standards_of_Procurement.pdf

- NHS Improvement working with ambulance trust boards to ensure the accurate application of the corporate services data request definitions to enable more effective benchmarking by winter 2018.
- The NHS Improvement Corporate Services team providing annual benchmarking reports to ambulance trust boards to enable identification of opportunities for improvement. This will be supported by the bi-annual publication of the opportunity list to enable ambulance trusts to identify potential Cost Improvement Programmes.
- The NHS Improvement Corporate Services exploring the benefits that could be achieved through the deployment of robotic process automation and publish findings by December 2018. Trusts should utilise these findings to adopt new ways of working made available through automation technologies by summer 2019.
- Ambulance trust boards identifying opportunities for collaboration in corporate service functions regionally, through alliances or across the wider NHS including across sustainability and transformation programmes where appropriate by April 2019.

Chapter 8: Securing effective implementation

Effective implementation of this review will be critical in meeting the needs of patients and retaining the confidence of the public in the ambulance service. A key first step will be making ambulance data visible and comparable to all trusts through the development of the Model Ambulance Service portal. This will enable trusts to identify unwarranted variation through effective benchmarking against all aspects of their service delivery models.

A common question raised by the service themselves was whether the review would recommend moving to a single national service, or smaller number of regional trusts. This discussion risks being a distraction given the fragility of some services. We have concluded that, in light of the significant pressure on the service, the immediate focus must remain firmly on improving performance and removing unwarranted variation within the current organisational structures. The movement to a common infrastructure, particularly for control centres, will both deliver some of the benefit of greater scale and provide a foundation for this question to be properly considered in the future. However, we would continue to encourage collaborative working including through models such as the alliance which has emerged in the north. The Northern Ambulance Alliance already has put in place: common fleet standards; appointed a shared public health advisor; and implemented a common payroll across two of the trusts which will be extended to the third. The Alliance is currently working towards a common CAD system.

However, learning from previous reviews suggests that simply sharing the data and emergent networks will not be sufficient on their own. The recommendations in this review amount to delivery of a common operating model for ambulance services across England. This includes:

- Standardising call triaging systems, processes and rules
- Delivering a best practice operating model and protocols for clinical assessment in the control centre
- Developing common protocols for staff on scene to reduce avoidable conveyance
- Implementing a common clinical support model for frontline staff
- Agreeing an approach to rota management
- Moving to a common specification for ambulances and load lists where divergence is the exception not the norm
- Developing a standard operating procedure for control centres and converging the technical infrastructure to enable shared call handling capacity across the system in the longer term
- Ensuring the rapid testing and deployment of innovation, including enablement of new technology
- Implementing make ready systems, where appropriate, across the country.

To secure effective delivery within trusts these recommendations should be codified through the contracting process and delivery incentivised including by use of CQUIN

national goals. This should include reviewing the effectiveness of the current CQUIN designed to support access to patient records.

We recommend that the 2019/20 contract round should include key measures, such as:

- Digitally Enabled Ambulance Service, requiring ambulance services to have technology, processes and systems in place to support clinical decision making
- Implementing defined pathways for those experiencing mental health crisis
- Moving to the common ambulance specification for new fleet, including the common load list
- Developing CAD and telephony interoperability (111 and 999) to enable seamless transfer of patients between services and call demand smoothing between ambulance trusts
- Increasing national system resilience in the event of local system failure or major incidents with the development of disaster recovery standards that are to be fully adopted across all services
- Increasing hear and treat / see and treat through the introduction of alternative pathways of care, or protocols for non-conveyance
- Focusing on reducing hospital handover delays

This should be strengthened in future years and consideration given to include the development of a national ambition for the safe reduction in avoidable conveyance. This should be through tariff incentivisation that reflects the additional time on scene and the costs incurred by ambulance services when supporting patients to stay at home or referred into alternative services. Other areas include more effective management of hospital handovers, and the development of model contracts and schedules to support the commissioning of an aligned, mutually supportive community approach across ambulance services and other elements of the UEC system.

To manage and support overall delivery of the recommendation, the Ambulance Improvement Programme should take accountability for delivery. This programme is already in place and oversaw, working with AACE, the effective implementation of the new response standards. It is led by NHS England with existing programmes of work covering quality, efficiency, workforce development and digital. Through the Ambulance Improvement Programme, NHS Improvement and NHS England must work with all ambulance trust boards and with the AACE to agree a delivery plan to ensure the benefits identified in this review are secured.

This should include building the case for continued capital investment in the ambulance service, particularly in fleet and technology and developing the commissioning and contracting model.



Case Study – Investment in efficiency

The government recently awarded East of England Ambulance Service NHS Trust £6.5 million capital investment to implement a make ready system and equipment tracking. The investment will realise £2.6 million savings each year by reducing equipment losses, increasing clinical staff availability and rationalising their estate.

Scale of the productivity opportunity in ambulance trusts

This review has identified the potential opportunity to release £200 million in productivity benefits in ambulance trusts by 2020/21. This should be reinvested in delivering performance standards and a better service for patients.

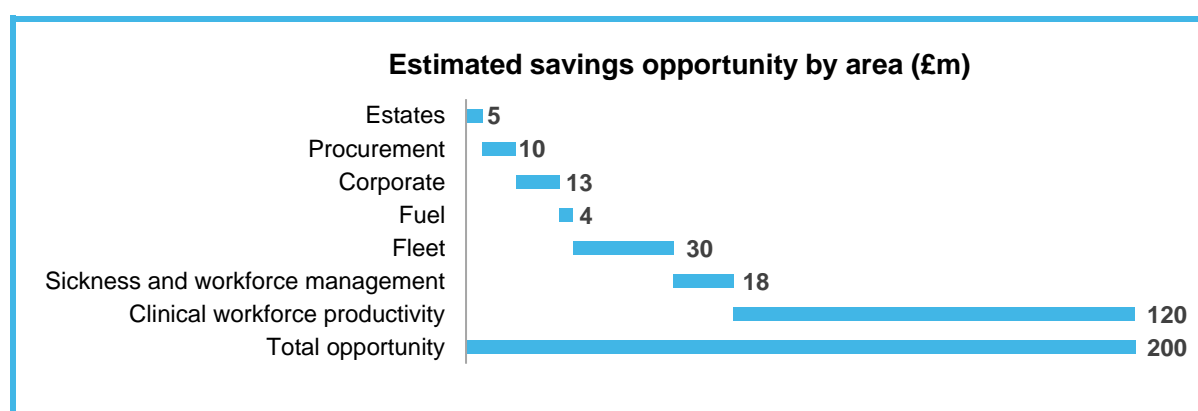


Figure 8.1: Potential savings opportunities for ambulance service in millions

These opportunities will directly assist trusts in delivering their cost improvement programmes (CIPs) which are monitored through the existing reporting process to NHS Improvement, as required in the financial planning guidance. In 2017/18 ambulance trusts delivered £47 million in recurrent CIPs. The work in implementation will focus on working with trusts to support them to continue to deliver their cost improvement programmes. The potential £300 million benefit to the system of reducing avoidable conveyances will need the leadership of STPs and the wider health system to help ensure patients are treated as close to home as possible.

Building the Model Ambulance Service

The Model Hospital has been developed to enable boards of acute hospital trusts to better fulfil their responsibility for improving efficiency and productivity and identify potential opportunities where unwarranted variation exists. We have already started to extend key areas including corporate services and estates to cover ambulance trusts. However, the requirements of ambulance trusts are very different to that of a hospital and we will work with trusts to design the Model Ambulance Service portal that meets their needs for benchmarking information. We will also work with NHS England to identify how the information ambulance trusts have could be used to support the design and delivery of community and other services.

Comparing activity and response times across ambulance trusts can be difficult because of the different populations and geography that they cover. NHS Improvement should undertake further work to develop the indicative productivity index and explore the feasibility of developing a weighted activity unit (WAU) for ambulance trusts. The data presented in this report should be refined and provided to ambulance trusts routinely through the portal and new data sets, for example fleet management should be agreed and implemented. This will be supported by the implementation of patient-level information costing systems (PLICS) which is being led by NHS Improvement across the ambulance service.

The review found that patient level data is currently collected from the ambulance service but it is not nationally collated or analysed in an interoperable format. The creation of the National Ambulance Data Set (ADS) is being led by NHS England to integrate existing and developing data sets across the urgent and emergency care system. We support this work which will improve care for patients as their journey can be followed through the healthcare system to enable improvements through evidence based clinical learning and more informed commissioning. It will also reduce the burden on ambulance trusts by minimising duplicate data requests. The ADS also has backing from key stakeholders and has been formally scoped, with funding being sought to undertake the work.

Recommendation 9 – Delivering effective implementation

NHS Improvement and NHS England must work with ambulance trust boards, the Association of Ambulance Chief Executives and other national bodies to take the required action to implement these recommendations and agree a clear delivery plan for taking this forward.

Delivered by:

- Ambulance trust boards, NHS Improvement, NHS England, the Association of Ambulance Chief Executives and other national bodies accepting and implementing the recommendations in this review.
- NHS Improvement and NHS England working with the Association of Ambulance Chief Executives to agree a delivery plan as part of the Ambulance Improvement Programme which clearly identifies the accountabilities and resources required to support delivery.
- NHS England ensuring that the recommendations of this review are appropriately reflected in the NHS business rules, including the NHS Standard Contract, national tariff and CQUIN starting in 2019/20.
- NHS Improvement tracking the implementation of each recommendation, and the Ambulance Improvement Programme Board reviewing progress regularly.
- NHS Improvement developing the Model Ambulance Service portal so that there is one source of data, benchmarks and good practice across the ambulance service, with the initial prototype delivered by autumn 2018.

- NHS Improvement developing the productivity index and exploring the feasibility of developing a single weighted activity unit or equivalent measure to understand the output of an ambulance trust by April 2019.
- NHS England and NHS Improvement developing a single data warehouse and national data set for the ambulance service that underpins the Model Ambulance Service portal by autumn 2019. This should include a single service specific data dictionary.

Thanks and acknowledgements

We would like to express our sincere gratitude and appreciation to all those who provided their insight and expertise resulting in the publication of this report. This support has been invaluable over the last 12 months.

First and foremost, we would like to offer particular thanks to the Chief Executives, Chairs, all Non-Executives and Executive Board members of ambulance trusts and their staff. They helped facilitate this review and provided us with both insight and data which formed the backbone of this document. We would like to provide a special thanks to ambulance staff for allowing the review team to listen to calls in the control centre and observe them on shifts, which helped us understand the commitment they have, and challenges they experience on a day-to-day basis.

We are appreciative to the key health and social care organisations including, but not limited to, NHS Improvement, NHS England, the Department of Health and Social Care, Health Education England, NHS Digital, NHS Providers, NHS Employers, NHS Commercial Alliance, ambulance commissioners and trade unions for their commitment and support throughout. Similarly, thanks goes to the Secretary of State, Stephen Barclay MP, Dido Harding, Simon Stevens, Ian Dalton, Jeremy Marlow and the Executive and Non-Executive team at NHS Improvement, whose support and guidance has been invaluable. We would particularly like to express our gratitude for the support and direction that other ambulance services provided towards the review, including Scotland, the Republic of Ireland, Wales, emergency medical services across America and Falck, based in Copenhagen.

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We are sure there will be many people and organisations that are not mentioned above, however, we would personally like to thank everyone who has contributed and helped the review team in the successful completion of this report.