

# Emergency Medical Response by Fire and Rescue Services

---

Financial and economic modelling of impact

November 2017  
New Economy

**new  
economy**

A cost benefit model of emergency medical response by fire and rescue services on a UK-wide footprint, with a specific focus on the impact of cardiac arrest response on long-term health and social care outcomes.

---

### Cost Benefit Analysis & New Economy

*New Economy research helps agencies to identify the costs and benefits of new ways of working. We have developed and continue to refine a Cost Benefit Analysis (CBA) model that can be used to estimate the fiscal, economic, and social value of project outcomes, and specify which public agency sees this benefit.*

*Agencies are using our model to rethink whether activities previously funded and delivered by one agency can be better funded and delivered by partnerships. Topics upon which the model has been applied include support for troubled families, health and social care provision and redesign of the criminal justice system.*

*[New Economy's CBA model](#) has been developed with national experts from HM Treasury and other government departments, and its methodology has been adopted as supplementary guidance within [HM Treasury Green Book](#) recommendations on appraisal and evaluation.*

---

# Executive Summary

---

## Introduction

Fire and rescue services (FRS) have experienced considerable success in preventing emergency fire incidents over the last decade. Various factors have been recognised as driving this trend – for example societal change, technological improvements, and a concerted focus on risk reduction. There has been recognition by both sides of the NJC that FRS activity in relation to fires, other incidents and public safety needed to be reviewed. In light of the success of their prevention agenda, FRS have been presented with an opportunity to replicate their effective emergency response capability within other operational contexts where services face increasing demand pressures. This potential was also recently recognised in the Policing and Crime Act 2017, which introduced a duty for the police, fire and rescue, and emergency ambulance services to keep opportunities for collaboration under review ‘where doing so would improve their efficiency or effectiveness’<sup>1</sup>.

Emergency Medical Response (EMR) involves the deployment of FRS operational staff into contexts where they can help protect the health and care of the public. The volume of services deploying staff in EMR conditions has increased greatly over the last few years, largely accelerated by a UK-wide trial instigated by the National Joint Council of Local Authority Fire and Rescue Services (NJC), starting in 2015. A range of EMR offers exist across the UK, and services have differed in their specific focus, but between 2015 and 2017, most FRS have delivered it in one form or another. One of the most common forms of EMR is co-responding. The NJC trials involved a dispatch in parallel with ambulance services, under blue-light conditions, making a particular impact when reducing risk in the event of time critical out-of-hospital cardiac arrests (OHCA). The patient was then transported to hospital by the ambulance service.

In areas where EMR co-responding has been practiced, when a person suffers a suspected cardiac arrest, firefighters are deployed in parallel to the ambulance service under blue-light conditions. Staff from whichever service arrives first immediately begin to provide potentially life-saving treatment before the other arrives. Not only does parallel dispatch therefore facilitate the probability of a timely response; the additional on-scene activity also supports ambulance crews to undertake advanced clinical work while FRS operate in a support capacity.

In early 2017, the University of Hertfordshire delivered ‘Broadening Responsibilities’, an independent evaluation report commissioned by the NJC which sought to collate the

---

<sup>1</sup> The National Archive, Policing and Crime Act 2017 (retrieved from [www.legislation.gov.uk/uppga/2017/3/contents/enacted](http://www.legislation.gov.uk/uppga/2017/3/contents/enacted))

evidence around EMR activity within the NJC trial, and reflect on its positive impacts. The report identified a strong strategic fit between the rapid intervention capability of firefighters and the circumstances encountered during EMR, suggesting a wider opportunity to involve firefighters in an expanded range of medical response work. One of the report's key findings was that: "appropriately trained and equipped firefighters co-responding to targeted, specific time-critical medical events, such as cardiac arrest, can improve patient survival rates"<sup>2</sup>. It used some of the conventions of health economics to express the 'value' of EMR in terms of its life-saving potential / quality-adjusted life years (QALY) gained by beneficiaries. The authors concluded, based on the available evidence, that the benefits demonstrated in the trial outweighed the costs.

This Executive Summary provides a high-level overview of work undertaken by New Economy between June and October 2017 to build on the work detailed in 'Broadening Responsibilities', with a specific focus on Cost Benefit Analysis (CBA). New Economy was approached to undertake this work because the NJC was keen to develop a financial appraisal of the EMR trials that could: (i) explore in more detail the evidence around benefits of co-responding in the event of OHCA; (ii) take a view on potential benefits of EMR if it were adopted in the standard firefighter role profile; and (iii) weigh up those potential benefits against the full cost implications of a scaled approach.

The remainder of this document will seek to elaborate on the findings of that financial and economic appraisal. As per established New Economy methodology, research involved a synthesis of the best available data, insights from experts, and evidence from academia to develop a clear logic model, based on the 'chain of survival' of a patient following out-of-hospital cardiac arrest

Four main points should be made with regard to the limitations of this analytical exercise:

1. The report hypothesises patient outcomes, in the absence of a longitudinal study of actual case records;
2. The report makes a best – but ultimately estimated – judgement on how much co-responding would take place in a UK-scaled model of EMR, and takes a generalised view of implementation;
3. The report's findings describe the costs and benefits of EMR at the level of the UK, and cannot be disaggregated to the level of individual services;
4. The report's findings include the total costs and total benefits associated with EMR, without reference to the degree to which costs have already been borne by specific services.

More detail is included with regards methodology in the "Research Aims, Methodology and Scope" section of this paper.

---

<sup>2</sup> University of Hertfordshire, "Broadening Responsibilities", March 2017

## Key Findings

Analysis sets out a strong value-for money case for EMR. The indicative benefits to both health and social care partners far outstrip the initial investment required, with an overall financial return on investment of £4.41 per £1 invested, taking a conservative view of the population served. Taken as a very broad average, this equates to a net financial saving of approximately £214 per callout; even accounting for the 79% of co-responding attendances in which it is determined that cardiac arrest has not occurred.

At scale, the intervention is likely to see FRS attend to about 15,000 out-of-hospital cardiac arrests per year (about half of all those seen by ambulance services)<sup>3</sup>. While only 4.3% of cardiac arrest patients are likely to experience a life-altering impact, those that do will be independent and cognitively functional, where before they would have suffered severe, permanent neurological impairment – at sizeable cost to both health and social care partners.

For each individual with new, good cerebral performance, it is broadly estimated that a benefit is created in the order of:

- £24,000 for clinical commissioners as a result of reduced length of stay in intensive care and less costly treatment requirements; and
- £44,500 for social care commissioners as a result of reduced demand for post-cardiac arrest domiciliary care.

## Financial Case

**Definition of terms:** *Financial benefits are the outcomes of an intervention which – depending on context and decisions by stakeholders – can be realised to some degree as a cashable fiscal saving to the public purse. All headline figures quoted in this Executive Summary in respect of financial benefits give an indication of what would be termed the potential fiscal benefits. This is not the actual visible budget impact likely to be experienced by services, but rather a more general expression of the financial savings generated by EMR.*

EMR, when modelled at UK scale, has the potential to create considerable financial benefits over a ten-year time period, and these benefits are estimated to outstrip the projected / estimated costs. The overall financial return on investment (ROI) for the wider public purse is 4.41. This means that for every £1 invested over a ten year period, approximately £4.41 of gross fiscal savings are generated, a proportion of which is likely to be cashable.

---

<sup>3</sup> British Heart Foundation, March 2017, (retrieved from <https://www.bhf.org.uk/news-from-the-bhf/news-archive/2017/march/cardiac-arrest-report>)

The financial ROI is calculated based on a comparison of the cumulative costs of rolling out and delivering EMR at UK scale, and the cumulative savings made where outcomes are improved. Economic convention is to apply a ‘discount’ rate to future costs and benefits, but otherwise the mathematics of the calculation is simply the product of dividing all the benefits by all the costs. The full profile of anticipated costs and benefits over the 10-year modelling period is shown in Figure 1.

**Figure 1 – Fiscal Costs and Benefits of EMR**

Fiscal Benefit	Financial Year										Net Present Value (NPV)
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Costs	£10.9m	£4.8m	£4.4m	£4.1m	£4.0m	£3.9m	£3.7m	£3.6m	£3.5m	£3.3m	£46.1m
Benefits	£19.6m	£22.6m	£22.8m	£22.0m	£21.2m	£20.4m	£19.7m	£19.0m	£18.4m	£17.7m	£203.4m

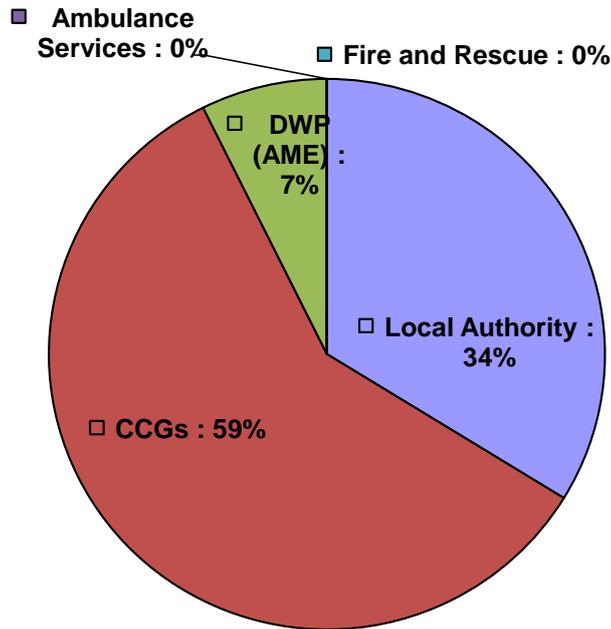
Net Present Budget Impact*	- £157.3m	<i>*the degree of additional fiscal benefit created, having accounted for costs.</i>
Overall Financial ROI**	4.41	<i>**the gain generated by an intervention, relative to the costs invested.</i>
Payback period***	1 Year	<i>***the estimated length of time required for an investment to become profitable.</i>

An alternative way of presenting the financial case is to subtract the cumulative costs from the cumulative benefits. With discounting applied, this provides a figure called the ‘Net Present Budget Impact’ (effectively an expression of total financial benefits, less total costs). Weighing costs and benefits against one another, EMR’s net impact is - £15.7m on public budgets, on average each year – based on an average cost draw of £4.6m and an average cost saving of £20.3m each year. After ten years, it is estimated that EMR will have had a Net Present Budget Impact of -£157.3m. Taken as a very broad average, this equates to a net financial saving of approximately £214 per callout; even accounting for the 79% of co-responding attendances in which it is determined that cardiac arrest has not occurred.

The payback period for return on investment is 1 year, meaning that in the first year, EMR is projected to generate benefits greater than the cost of implementation. This is a reflection of the intensive support cardiac arrest patients require on admission, as well as the immediacy of support required post-discharge; in averting these system costs, the benefits are modelled to accrue quickly once EMR begins.

Value is chiefly created for clinical commissioners and social care commissioners, with ambulance services and fire and rescue services only projected to be secondary beneficiaries. It has been assumed that Clinical Commissioning Groups (CCGs) are broadly responsible for most clinical commissioning, and that local authorities (LA) are broadly responsible for most social care commissioning throughout the UK. Where these groups are referenced, they serve as proxies for national health and social care commissioners. The split of gross fiscal savings by agency is represented in Figure 2.

**Figure 2 – Gross Fiscal Benefits by Agency**



Reference to Fig 1 shows that the costs of implementing EMR across the UK (some of which are already being borne by FRS who have undertaken co-responding) are estimated to amount to an average of approximately £4.6 million per year. Annual costs are projected to peak in the first year at £10.9 million and decline each subsequent year throughout the ten year model, reaching £3.3 million in the tenth year of implementation. Costs are chiefly borne by FRS and ambulance services (where they commission EMR), with some additional costs incurred by social care commissioners; more detail on the split of cost burden by sector is outlined later in this report. Please see Figure 5, at the end of this executive summary, for a visualisation of costs and benefits contained within this model.

### **Cashability**

A natural next step for strategic leads is to give consideration to the degree to which savings are cashable. Cashability is the extent to which fiscal benefits can be realised in the budget of beneficiary agencies, which in turn influences their spending power. Figures presented in this document are pre-cashable fiscal savings. Factors influencing cashability are unique to the contractual and strategic landscape of individual services.

If taking a longer-term view of the cashability of EMR, assuming systemic transformation and large-scale engagement, the return on investment ratio of EMR is 2.90. Based on this analysis, for every £1 invested in EMR, £2.90 of benefit to the public purse is modelled and cashable.

Long-term cashability (sometimes called ‘large-scale’ cashability) is designed to simulate an achievable, realistic degree of benefits realisation following a more systemic change within local systems, following strategic decisions by commissioners taken over time. Whether through commissioning and procurement decisions, workforce reform or other forms of funding redistribution, most agencies have a general strategic context for cashing a saving. Savings associated with long-term cashability take a broad view of what ‘normal’ realisation looks like following such engagement. The timing of retrievability for long-term cashable savings is contingent on the timings of engagement.

**Figure 3 – Long-term cashable savings of EMR**

Long-term cashable benefit	Financial Year										Net Present Value (NPV)
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Costs	£10.9m	£4.8m	£4.4m	£4.1m	£4.0m	£3.9m	£3.7m	£3.6m	£3.5m	£3.3m	£46.1m
Benefits	£11.9m	£14.8m	£15.1m	£14.6m	£14.1m	£13.6m	£13.1m	£12.7m	£12.2m	£11.8m	£133.9m

Net Present Budget Impact*	- £87.7m	<i>*the degree of additional fiscal benefit created, having accounted for costs.</i>
Overall Financial ROI**	2.90	<i>**the gain generated by an intervention, relative to the costs invested.</i>
Payback period***	1 Year	<i>***the estimated length of time required for an investment to become profitable.</i>

Please refer to Figure 3, and the technical discussion paper attached to this summary, for New Economy’s indicative calculations on the broad cashability of EMR. Please also see Figure 7, at the end of this executive summary, for a visualisation of New Economy’s starting assumptions about the cashability of EMR.

## Economic Case

**Definition of terms:** *Public value benefits refer to the value generated by an intervention as expressed in terms of changes in the wider economy or in wider societal effects. Public value includes:*

- (i) all fiscal benefits except transfer payments that just move money from one place to another;*
- (ii) net growth in the local economy; and*
- (iii) wider social benefits, including gains to society such as improvements to health; educational attainment; safety; etc.*

*Public value benefits cannot be attributed to any one agency and do not amount to a pot of potential fiscal savings.*

EMR is estimated to create an average public value benefit of approximately £158.9m p.a. over ten years. Almost all (more than 99%) of the public value created by EMR is the result of prevented loss of life. In *Broadening Responsibilities*, the University of Hertfordshire derive the value of a life saved through an analysis of Quality-Adjusted Life Years (QALY) gained. Anticipated survival gains were applied to a set of assumptions made about the average remaining life expectancy of the national trial cohort. A further weighting was applied to recognise the expectation of health-related quality of life (HRQoL) after a cardiac arrest episode where neurological deficits were incurred. This underlying approach has also been used by New Economy<sup>4</sup>.

The additional element of public value benefit captured by New Economy is the economic output of an individual, and the resultant benefit to the wider economy. This is monetised through factors such as their participation in the labour market, the tax system and generic public service utilisation. New Economy calculations of economic benefit include an in-built allowance for factors influencing the extent of additional value, such as leakage displacement and substitution.

There are smaller - but in the scheme of this particular model less substantial - public value impacts associated with prevented admissions to residential care, the release of episodic NHS resource where cerebral performance is improved, and long-term relief to central government in terms of employment support.

---

<sup>4</sup> University of Hertfordshire, 'Broadening Responsibilities: Consideration of the potential to broaden the role of uniformed fire service employees', January 2017

## Impact on Services

### Fire and Rescue Services

The costs accounted for in this model are based on the average experiences of fire and rescue services in delivering EMR. Due to tremendous variation in preferred local approach, it is unlikely that this model depicts an accurate representation of the experience of any specific service. It is estimated that costs incurred by FRS, if co-responding was delivered at scale, would equate to approximately £3.3m per annum over ten years (though, in fact, the truer representation is that the model predicts an initial investment of £7.8m in the first year, followed by an average recurrent expenditure of £2.8m for each year thereafter). This does not include any additional costs covered by ambulance services or other clinical partners.

This model includes both direct and indirect resourcing of the EMR programme, and accounts for three different elements of cost:

- (i) **The value of operational staff resource.** This recognises that, while there is no additional spend incurred while deploying existing whole-time firefighters (and the model accounts for this), there is an inherent value to that operational resource<sup>5</sup>. It also includes an element of expenditure with regards retained firefighters;
- (ii) **Additional direct expenditure that is required in order to co-respond.** This chiefly accounts for newly purchased uniforms and equipment, as well inoculations/vaccinations and training<sup>6</sup>; and
- (iii) **Associated costs to services that result indirectly as a consequence of co-responding.** Costs which are not an explicit component of the EMR service delivery model, but which are an inherent output of implementation<sup>7</sup>. Some of these are attributable to FRS, and some to social care commissioners.

All FRS in the UK which have delivered co-responding, regardless of involvement of the NJC trial, were given an opportunity to input into a survey of implementation leads and chief fire officers, undertaken throughout September 2017. Estimations of costs and (in-part) benefits were calculated with reference to detailed inputs provided by 42 FRS from across the UK who responded.

---

<sup>5</sup> Because this involves no additional budgeted expenditure, this is included as an in-kind cost but not reflected in the return on investment or other figures described elsewhere in this document. This cost is described in more detail in the discussion paper attached to this report.

<sup>6</sup> A small number of services have delivered co-responding work for several years, making it difficult to delineate organisational spend which is specifically in service of EMR.

<sup>7</sup> Specifically, additional demand within the wider system is accounted for where it relates to 'new' referrals made for cardiac arrest sufferers into the adult social care system and 'new' members of the workforce referred into counselling as a result of undertaking EMR activity.

## Ambulance Services

41% of FRS state that they have received financial support from a partner ambulance service to deliver EMR. Based on the nature of remuneration, which most often takes the form of a contractual arrangement similar to a Payment by Results (PbR) mechanism, it is estimated that there is a cost implication for ambulance services across the UK equating to approximately £1.3m p.a. on EMR (again, a truer reflection of the investment requirement would be £3.1m p.a. for start-up costs in the first year of activity, and recurrent annual costs of £1.1m p.a.).

In the context of a parallel dispatch, the impact of EMR on ambulance services is not to reduce demand. It is possible that in some cases, due to expedited on-scene activity, the duration of total on-scene time may be reduced. This might enable ambulance crews to more quickly attend to other time-critical medical incidents in a timelier fashion.

## Clinical Commissioners

The financial benefits of EMR for clinical commissioners arise as a result of NHS savings accrued in the context of acute medical healthcare. The CBA considers those occasions where improved neurological performance in the period immediately following a cardiac arrest translates into different (and less costly) provision of inpatient hospital care. Specifically, an association of EMR response times with cerebral performance outcomes suggests that some out-of-hospital cardiac arrest sufferers achieve cerebral performance outcomes which are both 'new' and 'good'. In this instance, 'new' refers to outcomes which would not have been obtained without the presence of a co-responding FRS, and 'good' refers to 'good-to-moderate' cerebral performance (i.e. CPC1 or CPC2) such that severe neurological deficit is avoided. Where this is the case, duration of stay in hospital and the nature of support in an intensive care setting is partially mitigated. It should be noted that the volume of patients benefitting in this way is relatively small – just 4.3% of cardiac arrests attended. However, the gross saving created per 'new' and 'good' neurological outcome is significant for each individual who does benefit. The gross fiscal saving to clinical commissioners is approximately £12.6m p.a.

The core methodology which supports this is a modelled calculation of the relationship between EMR response times (where an additional responding resource leads to faster response), return of spontaneous circulation (ROSC) prior to arrival at hospital, and cerebral performance outcomes. Published literature in this area provides the basis for the modelling. The level of estimated savings to clinical commissioners have been presented in the model in appropriately conservative terms, in part to reflect this.

A consensus paper jointly published by NHS England, the UK Resuscitation Council and the British Heart Foundation acknowledges and affirms the commonly-referenced statistic that each minute without defibrillation and CPR is likely to reduce a patient's

chances of survival by between 7% and 10%<sup>8</sup>. A review was undertaken of trial data on FRS response and “Category A” response times for ambulance services<sup>9</sup>. This comparison indicatively suggested that better outcomes were likely to occur as a result of the additional responding resource created by EMR.

With respect to the impact of response times on neurological outcomes, research suggests that there is a significantly reduced burden on the health sector as a result of better performance. An 18-month study undertaken in London found that patients exhibiting good or moderate performance generated median costs per hospital provider spell which were £24,000 less than that of patients exhibiting severe impairment. This is the result of the number of bed days occupied within an ICU, bed days spent on a non-intensive ward, and the nature of care provided<sup>10</sup>.

**Figure 4 – Estimated outcomes for clinical commissioners**

Clinical Commissioners	Financial Year										Net Present Value (NPV)
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Benefits	£14.7m	£14.2m	£13.7m	£13.2m	£12.8m	£12.3m	£11.9m	£11.5m	£11.1m	£10.7m	£125.7m

## Social Care Commissioners

It is assumed that some individuals who would have experienced severe neurological impairment as a result of cardiac arrest would have required care. The agency most likely to bear the cost of social care is the local authority (LA) in the locality of residence for the survivor<sup>11</sup>. Through avoiding this need for care as a result of better neurological outcomes, the gross fiscal saving to LA is estimated to be approximately £6.7m p.a.

It should be noted that any modelling exercise must also account for the potential that EMR may in some instances create an additional, indirect cost, which needs to be ‘offset’ against any anticipated financial saving to social care commissioners. This will apply where sufferers may otherwise have died, but survive in a severely impaired state (as a result of the intervention). This additional cost is estimated to be £3.0m p. a.

The gross fiscal saving reflected in the CBA can be further categorised into two forms of benefit in relation to:

<sup>8</sup> British Heart Foundation, NHS England & Resuscitation Council (UK), ‘Consensus Paper on Out-of-Hospital Cardiac Arrest in England’, October 2014.

<sup>9</sup> NHS Digital, Ambulance Quality Indicators (retrieved <https://www.england.nhs.uk/statistics/statistical-work-areas/ambulance-quality-indicators/>)

<sup>10</sup> J Petrie et al, ‘Hospital costs of out-of-hospital cardiac arrest patients treated in intensive care; a single centre evaluation using the national tariff-based system’, BMJ Open, January 2015

<sup>11</sup> Where Local Authorities are referred to in graphics or images, this refers to the association of Local Authorities with social care commissioning costs.

- a) a larger cohort of individuals who would have received home care for a given period as a result of cognitive defects, motor functioning difficulties, or other impairments; and
- b) a much smaller cohort of individuals who would have entered into residential social care as a result of more severe neurological impairment.

Both categories are based on the overall volume of individuals for whom it is estimated that cerebral performance at hospital discharge is both ‘new’ and ‘good’. They also each take account of research on the average length of stay in care by PSSRU, which estimates the people remain in care for 832 days on average<sup>12</sup>. This includes an account of mortality/recovery reflected throughout the cost benefit analysis. Then, looking at each category in turn:

- (a) For domiciliary care - An account has been taken of the proportion of patients discharged into rehabilitation<sup>13</sup>. A further weighting has been applied to account for the cost per hour of domiciliary care, based on unit cost research by PSSRU<sup>14</sup>.
- (b) For residential care – Research on the functional outcomes of cardiac arrest by the Department of Epidemiology and Preventive Medicine at Monash University in Australia suggests that 4% of adult survivors of out-of-hospital cardiac arrest moved into care homes<sup>15</sup>.

Modelling in this area is highly experimental, and findings are likely to provide only an indicative reflection of impact. In the case of residential care, research addresses a fundamentally younger cohort than that served by EMR. Failure to include the benefit associated with post-OHCA residential care would hinder the accuracy of the model more greatly than an account based on suboptimal evidence, and New Economy has adhered to HM Treasury conventions for optimism bias. As a source which addresses a population under the age of 40, it is assumed that evidence from this research is conservative with respect to savings for the EMR population, whose average age is 65. As elsewhere in the model, a confidence grade has been applied to reflect the nature of the evidence base. The smaller saving estimated for reduced residential care admissions is based on research on young adults from Australia – a very broad (and conservative) proxy for outcomes for the cohort served by EMR.

**Figure 5 – Estimated outcomes for social care commissioners**

Social Care Commissioners	Financial Year										Net Present Value (NPV)
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Benefits	£3.7m	£7.2m	£7.9m	£7.6m	£7.4m	£7.1m	£6.9m	£6.6m	£6.4m	£6.2m	£67.0m

<sup>12</sup> PSSRU, ‘Length of stay in care homes’, January 2011

<sup>13</sup> *Op. cit.* J Petrie et al, January 2015

<sup>14</sup> PSSRU, ‘Unit Costs of Health and Social Care 2016’, 2016

<sup>15</sup> Conor Deasy et al, ‘Functional outcomes and quality of life of young adults who survive out-of-hospital cardiac arrest’, July 2012.

## Department of Work and Pensions (DWP)

An estimation has been made of the benefit to DWP where survivors who receive 'new' and 'good' neurological outcomes are also of working age and likely to re-enter the workplace. A third of cardiac arrest sufferers supported by EMR during the NJC trial were under 65, and some were under 40. A saving is modelled where a proportion of individuals will not draw on benefits, such as Employment and Support Allowance (ESA) or the disability-related elements of universal credit, as a result of avoided neurological deficit. The gross fiscal saving to DWP of EMR is estimated to be approximately £1.1m p.a.

## Research aim, methodology and scope

The overall **aim** of this research has been to support the NJC to understand the financial and economic impact of EMR on a UK-wide footprint. It describes the sum total of investment (past, present and prospective future) to establish a model of co-responding EMR nationally, and projects the likely outcomes of that investment for public sector partners. The time horizon used for this model is ten years.

As per established New Economy methodology, research included the following inputs:

**A clear logic model** – New Economy has rooted its modelling in an exploration of the effect of EMR on the 'chain of survival' of a patient - from the point of first response, through hospital admission and discharge, and where longer-term life-altering effects may occur.

**The best available data** – New Economy was given access to all relevant data from the NJC trials. In broad terms, this ensured that the same source material investigated by the authors of the *Broadening Responsibilities* report was re-considered and in some instances re-analysed for the new purposes required by CBA.

**Insights from experts** – Data from the EMR trials were combined with a range of valuable supplementary insights from survey of EMR implementation leads. Insight was provided by 42 senior FRS officers from across the UK. Among other things, this allowed New Economy to precisely account for the cost of delivering EMR. Expert advice was also sought from recognised subject matter experts involved in the *Broadening Responsibilities* report, from the Personal Social Services Research Unit (PSSRU), and from the research project steering group.

**Evidence from academia** – Like *Broadening Responsibilities*, this research necessarily draws conclusions based on evidence-based assumptions. It has not, therefore, monitored actual outcomes of the EMR trial. The CBA draws on the most recent and relevant academic literature to make projections about how patients suffering an out-of-hospital cardiac arrest are likely to access and depend on services in the future. In

most cases where FRS co-respond, they undertake work which is important but broadly supportive of ambulance services. In a crucial minority, they make a life-altering impact on cardiac arrest sufferers. The modelling considers both scenarios.

The model provides a number of different numerical outputs, all of which are documented and explained in the full technical report accompanying this Executive Summary. In headline terms, the model gives a set of estimates for the costs and benefits (fiscal savings, but also wider economic and social value) *were a co-responding model of EMR to be adopted at scale* across the United Kingdom. The model is also directly interested in articulating which public agency or agencies pay for the intervention vs which are most likely to accrue the benefits.

### **What this report does not do**

It is often helpful to be explicit about what a piece of research has *not* involved, i.e. to be clear on inputs that were not available for this work, and what was agreed with the report commissioners as “out-of-scope”. Four main points should be made in this regard:

1. **The report hypothesises patient outcomes, in the absence of a longitudinal study of actual case records.** This report is not informed by case matching between FRS records and partners from either NHS ambulance trusts, NHS acute trusts, or Local Authorities. There are a number of barriers preventing record-level data matching, including: (i) difficulty in obtaining consent to share identifiable information; (ii) an absence of information governance arrangements between partner organisations sufficient for the purposes of research; and (iii) the sheer volume of organisations potentially participating in such an exercise.
2. **The report makes a best – but ultimately estimated – judgement on how much co-responding would take place in a UK-scaled model of EMR, and takes a generalised view of implementation.** The NJC has requested this research in support of a case for implementation on a UK-wide basis. This research assumes that the experience of most services participating in the NJC trial has been somewhat representative with regards co-responding and service design, whilst recognising that data has not always been representative of the type of scale proposed, and few FRS have operated at the fullest capacity. It therefore describes the potential costs and benefits of EMR based on an upscaling of the implementation experience of services.
3. **The report’s findings describe the costs and benefits of EMR at the level of the UK, and cannot be disaggregated to the level of individual services.** Given the nature of the exercise, all research outputs relate to this scaled UK-wide model based on the composite of all FRS, and findings do not reflect the specific experience of any one service.

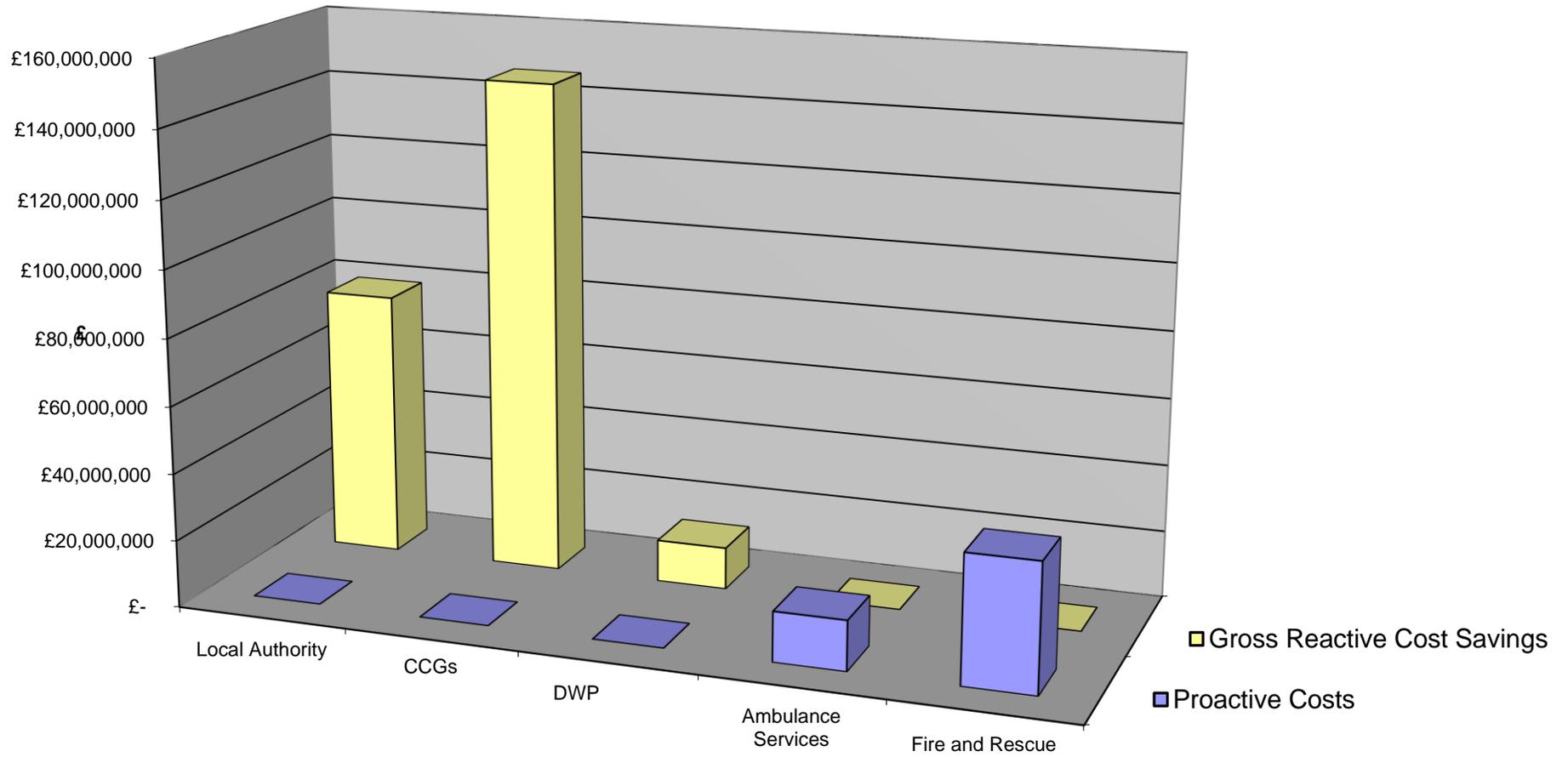
- 4. The report's findings include the total costs and total benefits associated with EMR, without reference to the degree to which costs have already been borne by specific services.** Most FRS have previously delivered some form of EMR. The profile of gross costs associated with the programme includes a peak in expenditure in the first year of £11.8m, declining thereafter. Many FRS have already borne these initialisation costs as part of the trial, and should consider this in considering findings (i.e. a service who began co-responding in April 2015 would find itself, in April 2018, to be in Year 4 of the programme).

There is a need for additional research in this area. Locality-based commissioners seeking to understand the footprint of EMR within their own area may wish to pursue further data analysis. The existence of stable payment mechanisms between ambulance trusts, clinical commissioners and FRS in many areas suggests a strong existing sense of the shared benefits of EMR, but there remains a lack of evidence, particularly around the relationship between response interventions and patient outcomes.

## **Conclusion**

This research indicates that EMR, at scale, generates a positive financial return on investment and achieves economic outcomes. Benefits are deemed likely for clinical commissioners, social care commissioners, and the Department of Work and Pensions. By delivering EMR, national FRS are able to enhance the offer of cardiac arrest response, with life-altering outcomes in a small but vital minority of cases.

**Figure 6 – Costs and benefits per agency**



**Figure 7 - EMR and cashability assumptions - chart**

