

## **TITLE**

Critical Care Paramedics in England: A national survey of ambulance services.

## **SHORT TITLE**

Critical Care Paramedics

## **NAMES**

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## **CONFLICT OF INTEREST**

None declared.

## **SOURCES OF FUNDING**

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## **ABSTRACT**

### **Introduction**

Critical care paramedics (CCPs) have been introduced by individual ambulance trusts in England, but there is a lack of national coordination of training and practice.

### **Methods**

We conducted an online survey of NHS ambulance services to provide an overview of the current utilisation and role of CCPs in England.

### **Results**

The survey found significant variations in training, competencies and the working patterns of the approximately 90 CCPs working in five ambulance services. All ambulance trusts currently employing CCPs are planning on increasing CCP numbers, while 'insufficient financial means' and 'insufficient scientific evidence' are the two major barriers to CCP utilisation.

### **Discussion**

The CCP model established in five ambulance services in England is unique within Europe. With increasing numbers of CCPs, concerns about lack of supportive scientific evidence and clinical need should be addressed. Optimal delivery of pre-hospital critical care in England remains controversial.

**KEYWORDS (MeSH)**

Emergency Medical Services

Critical Care

Paramedics

## INTRODUCTION

Over recent years, critical care paramedics (CCPs) have been introduced by individual National Health Service (NHS) ambulance trusts in England after reports raised concerns about the lack of critical care skills amongst pre-hospital providers.[1, 2] The concept of paramedic-delivered pre-hospital critical care is well established in parts of the USA and Australia,[3] but, to the author's knowledge, is unique within Europe. CCPs in England are experienced paramedics who undergo additional training at universities, hospitals and/or within the ambulance services, allowing them to gain additional competencies in pre-hospital critical care.[2, 4] While paramedics are a registered profession with the Health and Care Professions Council (HCPC) and therefore have national regulations of education and practice, this is not the case for CCPs.[5] Instead, the additional training and clinical practice which CCPs possess is determined by their regional NHS ambulance trusts. We therefore hypothesised that training and practice of CCPs in England varies amongst regions. In addition, there remains a considerable debate whether pre-hospital critical care should be provided by paramedics or physicians.[6] The most influential of the few publications addressing CCPs in England is a report by Jashapar from 2011,[4] claiming improved cost effectiveness for CCPs in comparison to pre-hospital physicians. It has subsequently been criticised for drawing these conclusions from inappropriate methods.[7] In an effort to provide the foundation for further discussion and research of CCP practice, we completed a national survey of NHS ambulance

trusts regarding training, competencies and working pattern of CCPs in England.

## **METHODS**

Between December 2012 and February 2013 we conducted an online survey of all 12 regional NHS ambulance services in England. The survey consisted of a mixture of multiple choice and free-text answers. Distribution to the ambulance trusts' clinical directors occurred via email, and consent was assumed for participants who voluntarily entered information. The clinical directors were given the option to delegate completion of the survey to a relevant clinical lead within their organisation. Follow-up was through a reminder email and telephone contact if necessary. Results from all replies are presented as absolute numbers and proportions. Topics covered in the survey were: CCP utilisation; CCP training and competencies; CCP working patterns.

## **RESULTS**

The survey achieved a 100% (12/12) response rate from NHS ambulance trusts in England.

### **CCP utilisation**

Approximately 90 CCPs are currently utilised in five different ambulance trusts (Figure 1). Additionally, there are about 14 paramedics not registered as CCPs who are authorized to undertake certain critical care procedures in one ambulance service. All of these five ambulance trusts are planning to expand the availability of CCPs. Amongst the ambulance trusts not utilising CCPs, reasons given are '*insufficient financial means*' (5/7), '*insufficient scientific evidence*' (4/7), '*no clinical need*' (2/7) and '*no training scheme available*' (1/7). Two of these seven ambulance trusts are considering utilising CCPs in the future; two further ambulance trusts would consider CCP utilisation if supportive new evidence was to emerge.

### **CCP training and competencies**

All CCPs undergo additional training modules at a university or college. All other aspects of training and competencies in the five ambulance trusts utilising CCPs vary and are summarised in table 1.

### **CCP working patterns**

CCPs in all five ambulance trusts work alongside pre-hospital physicians at least intermittently (approximately 70% of shifts alongside physicians in the three trusts who provided percentages). All five ambulance trusts utilise CCPs for staffing of their air ambulances. Further details of working pattern are summarised in table 1.

## DISCUSSION

CCPs are a relatively new concept in five out of 12 NHS ambulance trusts in England and plans to increase their numbers suggest commitment to the CCP model in these trusts. On the other hand, associated costs and a lack of scientific evidence regarding CCPs combined with an uncertainty about the actual clinical need are valid concerns raised by pre-hospital clinical leads. A cost-benefit analysis, inherently difficult to undertake for pre-hospital interventions, has been attempted regarding CCPs in England.[4] It shows CCPs to be more effective per life saved compared to pre-hospital physicians. However, these results rely on a literature review for the clinical benefits of paramedic and physician delivered pre-hospital critical care, while the potential costs are based on the CCP and physician model of one NHS ambulance trust.[4] These findings are therefore susceptible to multiple sources of bias and, given the variations in practice and working pattern found in this survey, difficult to generalise. In order to address the perceived lack of evidence, we have submitted a systematic review of paramedic-delivered pre-hospital critical care for peer review and publication (in submission). Whether there is a clinical need for CCPs will depend to a degree on regional aspects such as geography, the population served and currently existing pre-hospital services. This might to a degree explain the variations in CCP utilisation and practice found in this survey. They are similar to findings by Hyde et al.[8] who showed that pre-hospital critical care physicians in the UK are of 'varying availability and capability'.

The fact that CCP training is a regional ambulance trust's responsibility is reflected in the variations found in the formal training rotations and modules. Increasing numbers of CCP and increasing experience with the concept might create both a need and an opportunity for nationally regulated training programmes. Regional differences are also found in regards to CCP competencies, working pattern and modes of dispatch. All CCPs possess a combination of critical care skills with the notable exception of rapid sequence induction of anaesthesia (RSI) which none of the five trusts list as CCP competencies. This is in keeping with the guidelines on pre-hospital anaesthesia in the UK which limit RSI to physicians with adequate training and regular exposure to the procedure.[9] Table 1 shows that CCP competencies such as procedural sedation, joint or fracture reduction and thoracostomy have been adopted by a majority of trusts (4/5, respectively). However central venous access, use of ultrasound and thoracotomy are much less widely practiced (one trust each). This highlights the complexity of introducing new skills in the pre-hospital environment and the questions which need to be considered, such as: Is there a clinical need for (i.e. benefit from) the intervention? What are the risks? Can training, skills maintenance and equipment be provided? Further research on the safety and effect of specific interventions delivered by CCPs but also the effect of CCP care on certain conditions such as cardiac arrest or major trauma in England would be helpful in aiding this process.

Finally, the current lack of homogeneity of CCP training and practice can be linked to a survey of individuals in senior positions in pre-hospital organisation



in the UK regarding pre-hospital critical care, published in 2009. It showed disagreement regarding statements about the structure of a possible CCP curriculum and whether pre-hospital critical care should be organised at regional level.[10]

## **LIMITATIONS**

This survey was intended to provide an overview of CCPs in England. In order to achieve a meaningful response rate, it was necessary to focus on the features of CCP training and practice presented. Other aspects, such as skills maintenance training or comprehensive lists of CCP competencies are beyond the scope of this survey. We did not aim to compare specific ambulance trusts, and in order to encourage survey completion chose to present data anonymously.

## **ACKNOWLEDGMENTS**

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## LEGENDS FOR ILLUSTRATIONS

**Figure 1:** NHS ambulance trusts and CCP utilisation in England