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The MERIT 3 project: Alerting general practitioners to cardiac arrest in the community

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ABSTRACT

Background: The work context of the general practitioner (GP) potentially lends itself to the provision of early community based, cardiac arrest care. GPs have traditionally encountered out of hospital cardiac arrest (OHCA) as a component of routine patient care but have not been formally linked with the statutory ambulance service. Computer aided dispatch technology now allows real time GP text message alert to nearby cardiac arrest events.
Aim: To examine the feasibility, uptake and outcome of a novel scheme to alert GPs to nearby OHCA events in their communities.
Methods: GPs are recruited to voluntarily participate in a cardiac arrest text alert initiative called the 'MERIT 3′ project. GPs indicate the hours during which they wish to receive OHCA text alerts, and also specify a geo-location from which they will receive alerts to OHCA events occurring within a specified radius. Data on alerts, responses, OHCA incidents and outcomes are gathered prospectively, using ambulance control and GP data and with corroborative data from the national OHCA registry.
Results: 423 general practices throughout Ireland were invited to participate. In the initial 12 months, 100 GPs from 85 individual practices have enrolled, 74 GPs have received alerts and 26 GPs have responded to incidents. Only 222/781 (28.4%) text alerts issued by ambulance control have proven to be recognised as cardiac arrests with resuscitation attempts. GPs have attended 51/776 (6.6%) OHCA incidents to which they have been alerted, with resuscitation undertaken in 34 cases with three survivors.
Conclusion: Text alert activation of GPs to nearby OHCA events has proven feasible, with significant activity during the establishment period, but a low survival rate which is similar to the overall national OHCA survival rate. A high proportion of alerts do not involve resuscitation opportunities.

Introduction

Ireland is a northern European country with a population in excess of 4.75 million [1] for which out of hospital cardiac arrest (OHCA), primarily due to ischemic heart disease (IHD) is a key health issue; IHD causes approximately fifteen percent of all deaths [2]. In the region of 2000 OHCAs with attempted resuscitation are dealt with by the ambulance services in Ireland annually; unfortunately survival rates remain less than seven percent [3,4]. Early cardiopulmonary resuscitation (CPR) and defibrillation are vital but critically time sensitive treatments following OHCA [5]. Improved OHCA survival requires early availability of these treatments in the community where OHCA occurs.

Ireland has in the region of 3000 general practitioners (GPs) [6]. This group of health professionals live and work in the communities for which they provide comprehensive primary care. GPs are potentially well placed to deliver early, community based cardiac arrest care. GP participation in OHCA resuscitation has been associated with increased patient survival [7–11]. In Ireland the MERIT 1/2 (Medical Emergency Responders Integration and Training) projects [7] recruited more than 500 Irish general practices to receive automatic external defibrillators (AEDs) and training in OHCA management. The project demonstrated that 18.7% of patients who suffered an OHCA and were treated by a participating GP, survived to hospital discharge [8].

In general however, the role of the GP in cardiac arrest resuscitation has traditionally received little attention [12]. Schemes to

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equip general practitioners for OHCA have existed since the 1970′s and 80′s [13,14] and although OHCA is not a frequent occurrence in general practice, over time many GPs are involved in OHCA resuscitation; research from Greece suggests an incidence of OHCA in primary healthcare of 15.3/100,000 per year [15], a nationwide survey from Denmark demonstrated that 29% of GPs had encountered an OHCA at their practice [16], while in Ireland a cohort study of GPs showed that 36% encountered OHCA where resuscitation was attempted within a five year period [8].

Irish Department of Health policy has long emphasised the importance of first responders in addressing OHCA and more recently has highlighted the role of GP responders [17,18]. To date in Ireland, GPs who participate in MERIT have reported incidents which they encounter during their day-to-day practice and have not been formally linked with the 999/112 system of emergency ambulance dispatch. New technology allows real-time ambulance control text message alerts to be sent to 'GP responders' when a nearby OHCA occurs. A novel project termed 'MERIT 3′, examines the feasibility and outcome of recruiting GP volunteers to be alerted to nearby OHCA using text message technology. While a number of papers have recently reported on text alert systems involving lay responders to OHCA, we are not aware of any reports of systems involving volunteer medical networks [19,20] .This paper outlines the initial period of establishment, recruitment and experience of implementation of this project.

Methods

505 General Practices enrolled in the MERIT 1/2 projects continue to prospectively report data on their experience of OHCA in routine general practice. Approximately two thirds of the country's population lives in urban areas [21], which are well served by full-time professional ambulance services and relatively nearby hospitals. MERIT has focused on populations and general practices in rural and other areas in which local GPs may often be the initial contact in a medical emergency. Of the 505 MERIT 1/2 practices, 423 (83.8%) in rural, suburban and mixed locations were therefore identified for potential recruitment to MERIT 3. In MERIT 3, GPs volunteer to be alerted to nearby incidents of OHCA via text message from the Health Services Executive, National Ambulance Service (NAS) control centre. The text alert includes the patient's age, gender and the exact address where the OHCA has occurred. GPs are under no obligation to attend the OHCA, but can do so if circumstances permit; the ambulance service always responds in the standard fashion. GPs indicate the hours during which they wish to receive text alerts and specify a fixed geo-location around which they will receive OHCA text alerts; GPs can define a specified radius of response (usually 10 Km's). If alerted and in a position to attend, GPs are asked to contact a dedicated ambulance dispatch phone line to update ambulance control on their intention to travel to the incident and to obtain additional information if available.

Data on alerts, responses, OHCA clinical care and outcomes are gathered at a number of levels. The NAS notifies the MERIT 3 team of all OHCA text alerts sent to participating GPs on a monthly basis. GPs individually provide reports on text alerts received and clinical anonymised data on individual cases attended using a standardised incident report form. Data is also collected from the Out of Hospital Cardiac Arrest Register (OHCAR) on all cases where GPs have been alerted; OHCAR data provides standardised information on the timings and outcomes of all OHCAs reported to it by all statutory ambulance services in Ireland. It is thus possible to determine what proportion of text alerts are recognised by OHCAR as out of hospital cardiac arrest events where resuscitation is attempted and to record intervention and outcome data on those incidents. Structures to address professional indemnity, clinical governance and data management have been developed and implemented in liaison with NAS and OHCAR. The MERIT 3 project is part-funded by charitable support from Irish Community Rapid Response (ICRR) who subsidise the cost of immediate care training for GPs who participate and also fund a response bag containing basic life support and personal protective equipment. GPs do not receive any additional payments for participating in the scheme or responding to alerts. Ethical approval for the study has been provided by the UCD Human Research Ethics Committee and both OHCAR and the NAS have provided permission for access to data.

Data is reported in this initial study on the 12 month period 1st Oct 2015 to 30th Sept 2016.

Results

423 MERIT 1/2 practices were contacted by letter and invited to participate in MERIT 3. As of September 2016, 100 GPs from 78 MERIT practices and seven new practices had enrolled. An initial 39 GPs went live on the text alert system in April 2015, with the remainder joining in increments over the following months. Fig. 1. Illustrates the geographic distribution of MERIT 3 GPs.

Table 1 presents data on text alerts issued to GPs and the numbers/proportions recognised by OHCAR as cardiac arrests with resuscitation attempts (CARA). Over the twelve-month period GPs were alerted to a total of 781 events. The OHCAR database recognises 222/781 (28.4%) of these incidents to have been CARAs and has no information on the remaining 559/781 (71.6%). Fig. 2. presents data on GP participation and alert frequency, it demonstrates that almost three quarters (74/100) of participating GPs received at least one text alert (range 1–354, median 3) over the study period. Ultimately a quarter of GPs (26%) responded to at least one text alert (range 1–21, median 1) during the study period. Fig. 3. presents data on the distribution of alerts & responses by time of day and shows that the majority of alerts were received after 8am and before 11pm. Alerts and responses were distributed across the days of the week with 200/781 (26%) of alerts and 12/60 (20%) responses occurring at weekends.

Fig. 4. summarises the experience of participants over the study time period. MERIT 3 GPs attended 51 cases, the majority of which (42/51, 82.4%) were at residential locations. In half of the incidents (25/51) GPs arrived in advance of the ambulance service. Of the incidents attended, 45/51 (88.2%) were OHCA and six were other clinical problems (not involving loss of cardiac output) including overdoses (2), alcohol related issues (2), sepsis (1) and a psychiatric presentation(1). Of the 45 OHCAs, eleven were recent deaths where no resuscitation was appropriate, while 34 represented cardiac arrests where resuscitation was attempted (CARA). Of the 34 CARAs, BLS efforts appear to have been ceased promptly after the GPs arrival in seven cases and after a period of resuscitation in 17 cases, while the patient was transferred to hospital in 10 cases. Three patients survived to hospital discharge, representing 8.8% of the 34 cases in which resuscitation was attempted. Of note, OHCAR did not have information on six of the CARA cases in which extended resuscitation occurred.

Discussion

The MERIT 3 project represents a novel, community based, general practice response to OHCA. Although the concept of a rapid-response cardiac arrest scheme for GPs has previously been proposed [22], we are not aware of any published description of a similar scheme in operation elsewhere. GPs in Britain and Ireland are said to be under significant financial, workload and morale pressures [23,24]. It is noteworthy that under such circumstances, a significant number of individuals (representing around a fifth of