
Article:
Brummell, S.P., Seymour, J. orcid.org/0000-0002-9384-2551 and Higginbottom, G. (2016) Cardiopulmonary resuscitation decisions in the emergency department: An ethnography of tacit knowledge in practice. Social Science and Medicine, 156. pp. 47-54. ISSN 0277-9536

https://doi.org/10.1016/j.socscimed.2016.03.022

Accepted Manuscript

Cardiopulmonary resuscitation decisions in the emergency department: an ethnography of tacit knowledge in practice

Stephen P. Brummell, Jane Seymour, Gina Higginbottom

PII: S0277-9536(16)30122-8

DOI: 10.1016/j.socscimed.2016.03.022

Reference: SSM 10568

To appear in: *Social Science & Medicine*

Received Date: 14 August 2015

Revised Date: 11 March 2016

Accepted Date: 14 March 2016

Please cite this article as: Brummell, S.P, Seymour, J., Higginbottom, G., Cardiopulmonary resuscitation decisions in the emergency department: an ethnography of tacit knowledge in practice, *Social Science & Medicine* (2016), doi: 10.1016/j.socscimed.2016.03.022.

Title: Cardiopulmonary resuscitation decisions in the emergency department: an ethnography of tacit knowledge in practice

Author names and affiliations:

Stephen P Brummell,[a] Jane Seymour,[b] and Gina Higginbottom[c]

[a] Centre for Health and Social Care Research, Sheffield Hallam University, Montgomery House, 32 Collegiate Crescent, Collegiate Campus, Sheffield S10 2BP, UK
Tel: 00 44 (0)1142255436
Fax:
Email: S.P.Brummell@shu.ac.uk

[b] Sue Ryder Care Professor in Palliative and End of Life Studies
School of Health Sciences, University of Nottingham, Queen's Medical Centre, Derby Road, Nottingham NG7 2HA, UK
Email: Jane.Seymour@nottingham.ac.uk

[c] Professor and Canada Research Chair in Ethnicity and Health
Faculty of Nursing, University of Alberta, Room 5-021, Edmonton Clinic Health Academy, 11405-87 Avenue, Edmonton, Alberta T6G 1C9, Canada
Email: higginbo@ualberta.ca

Corresponding author:

Stephen P Brummell [a]

Abstract

Despite media images to the contrary, cardiopulmonary resuscitation in emergency departments is often unsuccessful. The purpose of this ethnographic study was to explore how health care professionals working in two emergency departments in the UK, make decisions to commence, continue or stop resuscitation. Data collection involved participant observation of resuscitation attempts and in-depth interviews with nurses, medical staff and paramedics who had taken part in the attempts. Detailed case examples were constructed for comparative analysis. Findings show that emergency department staff use experience and acquired tacit knowledge to construct a typology of cardiac arrest categories that help them navigate decision making. Categorisation is based on `less is more' heuristics which combine explicit and tacit knowledge to facilitate rapid decisions. Staff then work as a team to rapidly assimilate and interpret information drawn from observations of the patient's body and from technical, biomedical monitoring data. The meaning of technical data is negotiated during staff interaction. This analysis was informed by a theory of `bodily' and `technical' trajectory alignment that was first developed from an ethnography of death and dying in intensive care units. The categorisation of cardiac arrest situations and trajectory alignment are the means by which staff achieve consensus decisions and determine the point at which an attempt should be withdrawn. This enables them to construct an acceptable death in highly challenging circumstances.

Key words

United Kingdom; cardiopulmonary resuscitation; emergency care; decision making; tacit knowledge; dying trajectories; end-of-life care; ethnography.

Introduction

Approximately 25,000 to 30,000 cardiopulmonary resuscitations (CPRs) are attempted annually in the UK, usually in an emergency department (ED) (Boucher, 2010).
In the ED, resuscitation attempts involve either patients who suffer cardiac arrest outside hospital and are brought in by emergency paramedics or critically ill patients arresting shortly after arrival. In each case, staff must rapidly decide whether to continue, begin or withdraw CPR—invariably with an incomplete patient history and limited clinical data (Boucher, 2010). Pre-existing 'do not attempt resuscitation' (DNAR) orders are often not readily available and there is little time to establish their validity and applicability even if present. Although providing a trial of CPR when prognosis is uncertain is good clinical practice (General Medical Council, 2013; Iserson, 2010), the Resuscitation Council (UK) (2015) highlights the importance of quickly identifying those patients for whom resuscitation is futile; this is often difficult.

Survival statistics alone are of little value in assessing the best course of action for individual patients. Survival rates for cardiac arrest outside of hospital are around 1% to 8% (Resuscitation Council (UK), 2015; Clarke, Lyon, Short, Crookston, & Clegg 2014; Herlitz et al., 2006) and fewer than 20% of patients arresting in hospital will survive to discharge (Stapleton, Ehlenbach, Deyo, & Curtis, 2014; Resuscitation Council (UK), 2011). Overall survival rates have not significantly changed for decades and are especially poor when associated with advanced chronic disease (British Medical Association (BMA), 2014; Gaieski, Abella, & Goyal, 2012). Factors associated with better outcomes include rapid response

times, early initiation of CPR, younger patient age, the presence of a 'shockable' cardiac rhythm, early defibrillation and Advanced Life Support (ALS) treatments and skilled post cardiac arrest care (Nolan, Hazinski, Aickin & Bhanji, et al., 2015; Hess & White, 2010).

In decision making, when the conditions for using logical and rational approaches, such as statistical probabilities cannot be met, there may be recourse to a model that relies on heuristics; a strategy of decision making that ignores part of the available information but nonetheless allows decisions to be made quickly and accurately (Gigerenzer & Gaissmaier, 2011). Heuristics decision strategies have particular characteristics, they are: simple; neither inherently good or bad; exploitive of learned human capacities and reflective of the way decisions are made naturally, in the environments at hand (Pieterse & de Vries, 2013). One form of heuristics uses the principle of less is more, i.e. where there is an inverse relationship between the level of accuracy and amount of information (Gigerenzer & Gaissmaier, 2011). Heuristic decision making is a consequence of human experience gained over time within a particular context. The ability to view situations within their contexts and as a whole, by drawing on previous experiences, is a characteristic of expertise (Gillespie & Paterson, 2009; Polanyi, 1966). In ED practice, cardiac arrest demands rapid and complex decision making to be effected about the appropriate levels of intervention to be provided without detailed information about that particular patient. Repeated exposure to cardiac arrest situations is likely to lead to decision making approaches in which staff differentiate cardiac arrest situations using `less is more' heuristics to combine explicit and tacit knowledge. This enables rapid intervention in the absence of complete information.

The complexity of decision making is revealed by existing research which shows that CPR attempts in the ED vary in length from very brief to prolonged (Bailey, Murphy, & Porock, 2010; Chan, 2011; Larkin, 2002; Lockey & Hardern, 2001; Timmermans, 1999). A greater understanding of how practitioners use tacit knowledge may reveal how decision making occurs in resuscitation situations. This paper draws on data from an ethnographic study of health care professionals working in two EDs to examine how they use tacit knowledge to reach decisions to commence, continue or stop resuscitation.

Background

In their seminal ethnographies, Glaser and Strauss (1965, 1968) showed that health care staff develop ways of determining expected pathways—known as 'trajectories'—for dying patients and that staff use a range of strategies to manage the inherent uncertainties associated with transitions between different trajectories. Dealing with uncertainty is part of the everyday work of health care professionals and represents the 'messiness' of clinical practice (Schon, 1983). Under the guise of evidence-based medicine, efforts have been made to devolve the uncertainty of clinical decision making to algorithms—logical and highly rational approaches that break decision making down into a series of interlinked steps. Algorithms for ALS management are published by the Resuscitation Council (UK) based on the recommendations of the International Liaison Committee on Resuscitation (Nolan, Hazinski, Aickin & Bhanji, et al., 2015). However, a long tradition of social research in health care has also shown the importance of 'tacit' or 'gestalt' knowledge in decision making.

Tacit knowledge, as opposed to explicit, scientific knowledge, is hidden; described by Polanyi (1966:4) as `we can know more than we can tell'. This type of knowledge is based on

acquired expertise or habitual practices that the expert practitioner may find difficult not only to articulate, but even to recognise at all; such knowledge becomes taken for granted, although often shared in a particular subculture (Insch, McIntyre, & Dawley, 2008; Spradley, 1979).

The use of tacit knowledge in a wide variety of health care settings has been explored. Beckstead, Pezzo, Beckie & Shahraki et al (2014) investigated disparities in physicians' referral for cardiac rehabilitation. They found a systematic gender bias where women were judged less likely to benefit from referral but 1 in 3 physicians were unaware of their bias. In public health, Higgins, Strange, Scarr, & Pennock et al (2011) explored how practitioners use evidence in practice and found the lack of transferability of statistically based evidence to local communities meant that professional judgements were dependent on a mix of knowledge of the evidence based literature and tacit knowledge based on professional experiences and observations thus building cumulative and shared wisdom. In occupational therapy Metzler & Metz (2010) show how therapists synthesise research based evidence with experiential knowledge when exercising clinical judgement and that the high value placed on research knowledge may result in tacit knowledge being driven underground.

Some insights into how tacit knowledge and habitual practices influence the management of resuscitation and non treatment decisions in the ED and other clinical care areas have been provided by a small body of ethnographic research (Chan, 2011; Bailey et al., 2011; Page & Komaromy, 2005; Seymour, 2000; Timmermans, 1999).

In the ED, Chan (2011) shows that the time available to make the transition from active intervention to end of life care in the ED is short and thus hard to manage for staff. Decision making depends on the perception and understanding of the clinician in an inherently stressful and fast paced situation. Habits and routines relating to the use of algorithmic principles can sometimes overshadow more subtle communication practices or disguise the ethical complexities of decision making. Past experiences are crucial in helping clinicians deal with such situations.

Examining the everyday practices of emergency staff in the USA, Timmermans (1999) identifies four characteristic patterns or categories of cardiac arrest—'legal', 'elite', 'temporary stabilisation' and 'stabilisation'—that are tacitly assigned according to the circumstances of the arrest, the clinical viability of the patient's recovery and perceptions of the social worth of the patient within the ED culture. The role of tacitly assigned social worth in the management of death in the ED is illustrated by Bailey et al. (2011) in a description of 'spectacular' and 'subtacular' deaths. Spectacular deaths involve active resuscitation and are regarded as priorities by ED staff because they fit with the life-saving ethos of the ED. In contrast, the care needs of patients with 'subtacular' deaths, who are often older people with long term conditions, are relegated by staff to a lower level of priority. In a comparison of unexpected deaths following CPR in emergency care versus expected deaths occurring in care homes for older people in the UK, Page and Komaromy (2005) show how tacit expectations shape professional practice and reinforce both professional and team identities.

Seymour's (2000) ethnography of death and dying in the intensive care unit- an area of fast paced clinical action with some similarities to the ED- shows how staff synthesise explicit and tacit knowledge to try to achieve alignment of two potentially divergent trajectories of dying: 'technical dying', based on evidence gleaned from bio-monitoring and the results of biomedical investigations and 'bodily dying' based on expertise acquired from prior experience of similar clinical situations. When intensive care staff successfully align these trajectories they are able to describe the process of withdrawing life support as 'nature taking its course'. The present study examines the transferability of one the author's insights into trajectory alignment since we anticipated it may be transferable to the ED and the resuscitation practices of emergency practitioners within the UK (Seymour, 2000). This notion informed the aims and objectives for this study with a particular focus on trying to understand how staff determine an appropriate point for resuscitative efforts to be withdrawn

Methods

Location and ethical concerns

The study was undertaken in two EDs in the North of England, one a suburban unit (General: 65,000 new patients annually) and the other serving a large metropolitan city (City: 110,000 new patients annually). Research ethical committee approval was gained from the Derbyshire Research Ethics Committee (04/Q2401/70). As the patient would be incapacitated when observed, their consent could not be obtained, however the research did not alter treatment, confidentiality was assured and the potential benefits of

understanding decision making were acknowledged by the ethics committee. Access was negotiated with the relevant medical and nursing managers within the EDs concerned.

Sampling, recruitment, data collection tools and analysis

Initially, time within the General ED was used to gain the trust of staff and create a researcher presence as part of the team, albeit with a non clinical role. Given the emotive nature of resuscitation work, explaining the study aims to staff and obtaining consent was achieved over several months using a phased approach. This involved the use of a poster to publicise the aims of the research, providing information sheets and setting up pre-project meetings. However individual face-to-face contact was most effective, if considerably more time consuming; an essential step but meant that observation was restricted to the General ED. Separate information sheets and written consent was obtained for all interviews.

The central staff-base proved to be the best place to observe daily tasks and be informed about possible resuscitations. Observation in the resuscitation area was undertaken by SB during day shifts over a two-year period of fieldwork (June 2005 to July 2007). Observational fieldwork was episodic, amounting to 350 hours over the data collection period. Decision making surrounding a convenience sample of 11 patients who had resuscitation decisions was observed with salient observational data recorded in detailed field notes.

Complimenting observational data, thirty seven in-depth interviews were undertaken with a purposive sample of staff. In the General ED selection was based on their roles in association with the 11 resuscitation decisions (Hammersley & Atkinson, 1995). These interviews involved the following staff: nursing (*n* = 13), medical (*n* = 12) and paramedic (*n* = 2). In the

City unit, only interviews were undertaken to corroborate findings revealed by data collection in the General unit. In the City ED, these were with nursing (*n* = 6) and medical (*n* = 4) staff.

Interviews explored the staff member's involvement in resuscitations, how decisions were made and their thoughts and feelings about these. Interviews normally lasted about 30 minutes or less so not to disrupt normal activity. Participants wanted to share their stories and none refused to be involved. Interviews were interactive in approach, i.e. the interview was a form of social interaction between SB and the interviewee, with the resultant data seen as a mutual production (Emerson, Fretz, & Shaw, 2002). Interviews were digitally recorded and transcribed. Data from observations, interviews and field notes collected in the General unit were amalgamated to construct qualitative case studies, each focused on a resuscitation decision to achieve 'thick' descriptions. `Thick' description sees beyond surface meanings to identify unexplored social phenomena and propose new theoretical explanations, insights and understandings (Boyle, 1994). Interview data from the City unit were used to check the transferability of these thick descriptions.

SB, a lecturer at the time, had worked in the General ED unit some years earlier as a nurse and resuscitation trainer and drew on previous clinical experiences reflexively throughout the study (Hammersley and Atkinson, 1995). A diary and memos were used to aid achieving balance between `outsider' and `insider' perspectives (Morse, 1994). Emergent analytical issues were discussed with the ED staff and amongst the authors, as the desire was to seek, rather than impose structure (Spradley, 1979).

Findings

During the study, decisions surrounding the use of resuscitation for eleven patients were used to construct `cases'. Seven patients arrived at the ED already in cardiac arrest. Of these, five were certified dead in the ambulance and received no further resuscitation. The remaining two patients were brought into the ED, but further resuscitation proved to be unsuccessful and their deaths were certified. Three further patients arrested shortly after arriving in the ED: two of these died following unsuccessful resuscitation attempts and the third was transferred to a High Dependency Unit (HDU) following treatment for a respiratory arrest and septic shock, although cardiac arrest occurred later, in the HDU. The last of the eleven patients had a DNAR order assigned in the ED but did not subsequently suffer a cardiac arrest and was transferred to an Emergency Medical Unit (EMU); an important inclusion as an example of pre-emptive decision making.

Early observation and interviews revealed different patterns of activity: sometimes resuscitation was withheld altogether, sometimes it was started but withdrawn very quickly, and occasionally resuscitation was more protracted. As the study progressed, SB shared provisional ideas with staff about how to explain this variation. Over the course of a number of discussions a typology of categories was developed which staff greed reflected the rapid differentiations they perceived to apply to resuscitation situations and which they regarded as 'capturing' this aspect of their practice:

- Arrested and died (A & D);
- Arrested and will die (A & will D);
- Arrested and may die; (A & may D) and

- Arrested and should live (A & should L).

Table 1 summarises the 11 study cases and their categorisation using this typology. (Pseudonyms are used).

Arrested and died

This category accounts for those patients who are resuscitated by paramedics in the prehospital setting, but do not receive continued resuscitation within the ED. In this group of patients, the 'bodily' signs of dying associated with cardiac arrest are present alongside limited but immediately overwhelming evidence that irreversible 'technical' dying has

occurred—a combination that enables staff to rapidly establish that further resuscitation is futile and certification of death is appropriate.

The first patient observed, Mr Thomas, is used to illustrate this category. Mr Thomas, age 68, had collapsed in a cardiac rehabilitation unit. The paramedics commenced resuscitation and contacted the ED to warn of their imminent arrival. They provided the ED staff with essential 'technical' information about the patient's cardiac arrest rhythm, which was pulseless electrical activity (PEA); that is, a cardiac rhythm normally associated with a cardiac output was visible on the monitor, but no palpable pulse was present. A non shockable rhythm such as PEA with no reversible cause has poorer outcomes (Resuscitation Council (UK), 2015). The following exchange between the senior doctor, junior doctor and other ED staff as they awaited Mr Thomas's arrival indicated that they already assumed that his condition was irreversible.

> **Senior doctor B:** *They've been in PEA for 30 minutes, so we won't be doing much.*
>
> **Staff nurse C** (to senior doctor B): *You're doing airway;* (to junior doctor A) *you do drugs? I'll do CPR.*
>
> **Senior doctor B:** *They've got access* (intravenous) *and had full drug protocol.*
>
> **Junior doctor A** (to staff nurse C): *Get a med student to do CPR.*
>
> **Staff nurse C:** *Oh lovely!*
>
> (From field notes.)

Mr Thomas was assessed in the ambulance outside the ED. SB accompanied the senior doctor, who decided to cease the resuscitation attempt following a discussion with the

paramedics and a quick physical examination of the patient. They revealed that Mr Thomas had suffered an acute myocardial infarction (heart attack) two years previously. During CPR the original arrest rhythm of ventricular fibrillation (VF) had converted to asytole ('flatline') and then PEA. (Ventricular fibrillation is a cardiac arrest rhythm in which the muscle fibres of the ventricles contract in an uncoordinated way and treatment is by electric shock—defibrillation—which attempts to restore sinus rhythm and cardiac output).

After returning to the ED, a discussion then took place between the senior doctor and his junior colleague.

> **Senior doctor B** (reviewing history with junior doctor A): *Cardiac arrest in rehab, fine VF, shocked into asystole, CPR for 30 minutes. I certified him in the ambulance as he had been hypoxic and asystolic for over 30 minutes.*
>
> **Junior doctor A** (to senior doctor B): *Would you have brought him in if the relatives had been present?*
>
> **Senior doctor B** (after a moment's consideration): *Probably.*
>
> (From field notes.)

The doctors learned later that the paramedics had given Mr Thomas seven cycles of the ALS treatment algorithm for asystole, with no response. In addition, the paramedics had been unable to intubate him (securing the airway by inserting a tube into the trachea) because of his short and broad neck; ventilation was attempted using a bag and mask, which had been of limited effectiveness.

This case illustrates how three features of Mr Thomas's immediate resuscitation history permitted the senior doctor to determine that death had already occurred and enabled him to withdraw resuscitation readily: the length of time without a cardiac output; the type of cardiac arrest rhythm and the persistence of this arrest rhythm despite an appropriate trial of treatment. The doctor was able to apply his theoretical knowledge and, by also drawing on prior experience, he was able to categorise the patient appropriately, although this was not explicitly articulated. This tacit process of categorisation was based on the range of technical features which were most significant and sufficient for the senior doctor to confirm that the evidence for technical death was overwhelming. His duty then shifted towards physical examination of the patient to confirm that evidence for bodily death was also present. Auscultation (listening for sounds) of the lungs and heart indicated that cardio-respiratory signs of life were absent and thus confirmation of bodily death was rapidly established.

This provides an understanding of how experiential, tacit knowledge is used to guide a decision to withdraw resuscitation; by the process of aligning technical with bodily evidence of dying, death is constructed. In this patient, this is relatively straightforward and although not specifically alluded to, Mr Thomas's age (68) was known to staff and is likely to have been an enabling factor. In addition, the discussion between the doctors indicates that resuscitation may have been continued in the ED if Mr Thomas's relatives had been in attendance, which suggests that social circumstances are an integral part of decision making and may disrupt an otherwise straightforward alignment of technical with bodily dying trajectories. In the next category below, the significance of the person's age and whether or not the person is perceived as 'elderly' is shown to be especially important.

Arrested and will die

Most patients brought into the ED in cardiac arrest receive only a short period of resuscitation, with staff appearing to know at the outset that the patient will not survive. Undertaking a period of resuscitation enables staff to fulfil their sense of professional duty and permits the opportunity for information gathering. During this time, the interactional work between staff centres on how the presenting cardiac arrest rhythm may be interpreted in light of other circumstances, such as the patient's age and any associated significant concomitant illness. This consideration of a combination of factors facilitates a rapid alignment of bodily with technical dying, so that staff can confirm that further action is futile and can withdraw the resuscitation attempt.

The case of Mrs Craven demonstrates this category. Mrs Craven, age 87, had been found on the floor of her sheltered accommodation by her care supervisor, who had then called the ambulance. On arrival at the ED, Mrs Craven was semiconscious with profound right-sided weakness, hypertension (high blood pressure) and loss of all speech. She experienced a cardiac arrest as she was being transferred to the ED trolley. Her initial cardiac arrest rhythm was PEA, although some palpable output returned after chest compressions. Her cardiac rhythm then degenerated into asystole and two cycles of the ALS algorithm were followed. The initial conversation amongst the staff was recorded in SB's field notes.

Consultant M: *Have we managed to get an output? She's trying to breathe.*

Senior sister N: *How old is she?*

Consultant M: *She's 87.*

An unknown voice: *Last BP was 187/107 before she arrested.*

Senior sister N: *I think that's PEA.*

Consultant M: *Can you feel a femoral output?*

Senior sister N: *It's very weak.*

Consultant M: *She's had adrenaline.*

Senior sister N: *How old?*

Paramedic LT: *She's 87.*

(From field notes.)

SB noted that the monitor showed only occasional cardiac complexes, indicative of technical dying. Staff activity quickly became more controlled: the initial flurry subsided and one of the nurses left the resuscitation room after checking that all was in order. Throughout the incident, the attendant anaesthetist FR stood watching near consultant M and made no attempt to become actively involved. As noted above, Mrs Craven's age was mentioned twice during the initial conversation. There then ensued a discussion amongst the staff about whether they should persist with the resuscitation attempt. Paramedic LT joined the discussion.

Paramedic LT: *We got the job at 10.50.*

Anaesthetist FR: *That's nearly an hour ago!*

Staff nurse O: *Oh yes! But she arrested in the ED.*

Consultant M: *How many cycles have we done?*

Senior sister N: *That's the second.*

Anaesthetist FR: *She keeps stopping.*

Consultant M: *Shall we make a decision?*

(From field notes.)

By now the complexes on the monitor were only occasional and no pulse could be felt by the staff nurse. Chest compression had ceased. The consultant had stopped 'bagging' the patient (using a device for artificial ventilation) and active resuscitation effectively ended. The resuscitation attempt had lasted about fifteen minutes. SB later discussed the brevity of this attempt with the senior sister who was the team leader during the resuscitation.

SB: *At what point did you feel that resuscitation was appropriate to stop?*

Senior sister N: *At the point it did, really, because it was quite a short arrest. But I think the fact that she'd collapsed in an environment where all the equipment was there, and despite giving drugs and all the other advanced life support that we give, we weren't in a rhythm that was potentially reversible. And that mixed with the rest of the picture made us believe that the arrest attempt was fairly futile.*

SB: *With your lady, would you say that having two cycles was a short resuscitation?*

Senior sister N: *Definitely, yeah.*

SB: *And that was based on?*

Senior sister N: *Presentation, where age again I would say had a big deciding factor in it. And the presenting rhythm, she was never in what we term a shockable rhythm.*

(From an interview with senior sister N (General).)

The senior sister went on to explain the distinction between chronological old age and the state of being 'elderly' due to illness or extreme frailty.

SB: *Okay, might there be a difference between old and elderly?*

Senior sister N: *I suppose, yes, in that if somebody was old, they are by age old, whereas often somebody who is elderly is perceived to be somebody that's got quite a lot of illness. Somebody that's got a lot of, I don't know, cardiac illness or has had a lot of strokes, I might perceive them as elderly despite them being fairly young in age.*

(From an interview with senior sister N (General).)

Conversely, she went on to explain that chronological age would be ignored if serious illness was not concomitant.

Senior sister N: *Yes, so likewise we had a lady in a few weeks back now who was 90 something, I can't remember, 92, 93, who was normally fit and well, had been driving a car up until a couple of years ago, no medical history, very little medications and she'd suddenly collapsed and arrested. And rightly or wrongly so, I perceived that she had a chance of a better outcome.*

SB: *So she was old, not elderly?*

Senior sister N: *Yes.*

(From an interview with senior sister N (General).)

In decision making, the reasons for locating Mrs Craven in the *arrested and will die* category revolved around how interactions amongst staff and perceptions of her age gave meaning to the associated clinical presentation, albeit tacitly and permitted this patient to be considered as 'elderly'. Combining explicit knowledge, the `technical' presentation, with perceptions of this patient as an 'elderly' person more readily facilitate the interpretation of biomedical data as evidence of technical dying and the tacit alignment of technical with bodily dying trajectories. This helps staff to quickly agree that the resuscitation attempt should be

withdrawn. However, other factors such as whether relatives are present and the need to promote team working may also be important. A short resuscitation attempt may be undertaken for many reasons, and the example presented cannot claim to be a representative picture. Sometimes assigning a patient to this category provides a holding strategy to help the team gain time to gather information and to satisfy a professional sense of duty to do everything possible.

Arrested and may die

Although most resuscitation attempts either cease on arrival or last no more than a few minutes within the ED (the categories of *arrested and died* and *arrested and will die*), some resuscitation attempts are more prolonged. Such attempts are typically observed when treatments elicit some response but a patient's condition is unstable and unpredictable. In these cases, significantly more interactional work is required by the team to effect the alignment of the technical and bodily dying trajectories. This category will be illustrated by the case of Mrs Wilson, age 65, who had been seen by her doctor at home with 'flu-like' symptoms. The following day, she had been found by a care worker on the floor of her home in a collapsed state and transferred to the ED where she suffered two cardiac arrests. SB's field notes captured the essential details.

> When I entered the resuscitation room, seven staff were around the trolley. As I arrived, so did the senior doctor for medicine (senior doctor M).
>
> **Senior doctor M:** *Hi there! Is she brady?* (Bradycardic: presenting a slow pulse rate.)
>
> **Consultant U:** *She's had 500.* (She had 500 mcg atropine.)
>
> **Senior doctor M:** *Any blood results?*

Consultant U: *We've got a potassium.*

(From field notes.)

Mrs Wilson then experienced a PEA arrest and CPR commenced.

Senior doctor M: *What's she got on the monitor? Has she an output?*

Consultant U: *Yes! . . . She's vomiting. Pop her on her side. How much fluid has she had? That's four litres altogether.*

Senior doctor M: *Can we have some obs* (observations) *on her?*

(From field notes.)

The consultant was able to palpate a pulse; `bodily' evidence indicative of life. An instant sense of relief was felt by the team, because survival of the patient now seemed possible. However, Mrs Wilson's condition remained precarious and resuscitation with fluids and drugs continued for about thirty minutes. She then experienced another cardiac arrest, prompting recommencement of CPR. The medical staff rapidly began a case conference to review the situation.

Senior doctor M: *Draw a line and start again; it's a new arrest. Shall we see if there's a pulse? Thirty-three a minute! Shall we try a BP? It's got to be sepsis or something. Shall we give her adrenaline in a big vein? She's got flipped T waves in V3* (an abnormal ECG finding)*, urine OK, white cell count OK, potassium OK.*

(To anaesthetist RT): *I can't think of anything else. Can you?*

Anaesthetist RT: *Check the pH again. Has she had a chest x-ray?*

Senior doctor M: *Yes.*

Anaesthetist RT: *Oh! She's got an output.*

At this point the anaesthetist signalled to the medical student to stop chest compressions, who then awaited further instructions from the more experienced medical staff.

Senior doctor M: *We shouldn't give adrenaline if she's got an output. Has it gone again? It's inadequate so we'll have to start again.* (Indicates for the medical student to recommence chest compressions.) *Can anyone think of anything else to add?*

Anaesthetist RT: *The question is, should we use adrenaline if she gets an output?*

Senior doctor M: *We've got another pH: it's 6.8! We're not going to get her back from that!*

Anaesthetist RT (palpates a femoral pulse): *What shall we do? It's still there.*

Senior doctor M: *It's fading. The volume is going.*

Anaesthetist RT: *She's running on neat adrenaline!*

Senior doctor M: *She's making our decision for us: her output is going.*

Anaesthetist RT: *Shall we stop?*

Senior doctor M: *I think we should. All in agreement?*

Anaesthetist RT: *I've never seen an arrest at 6.8 get better.*

(From field notes.)

Following a period of resuscitation lasting over thirty minutes, the attempt was withdrawn. For this patient, the tacit allocation to the category of *arrested and may die* was quickly achieved, as there were significant responses to treatment and the clinical outcome was uncertain. The dynamic situation required highly detailed technical evidence to confirm that

dying was transforming into death. However, participants were able to use experiential knowledge to focus on specific features; ignoring less relevant information to guide their decisions. Biomedical evidence was constantly compared to the bodily evidence of a palpable pulse that, to the surprise and concern of the team, persisted in spite of various data suggesting that technical dying was inevitable. Here, the trajectories of bodily dying and technical dying were misaligned and protracted staff interaction during a longer resuscitation attempt was required to effect alignment.

Arrested and should live

The *arrested and should live* category was not witnessed by SB during the period of observational fieldwork but was explored in interviews. In the adult patient, the tacit ascription to this rare category could be rapidly achieved with limited information; when cardiac arrest is seen as a treatable consequence of injury or an acute cardiac event in the absence of associated severe chronic illness. This category also accounts for cardiac arrest in childhood; effecting the alignment of technical and bodily dying trajectories becomes less important and the exceptional social value placed on children dictates extended resuscitation times.

An experienced staff nurse identified that some patients 'should' live and that these were usually those who arrested in the ED and could be instantly defibrillated:

Staff nurse L: *Yeah. He went unconscious, doctor was with him. Went unconscious. I was just getting morphine, and doctor shouted 'Can I have some help please quick!' So I went around and I looked on the monitor: VF arrest. Got the monitor on him anyway. So I just put some pads on and gave 200 joules and looked at the monitor, and he was back in sinus rhythm. And that was it, come up fighting.*

SB: *Right, and what was said before then is, at that time, you still didn't think he was going to die from that?*

Staff nurse L: *Oh no, not at all. He was too well.*

(From an interview with staff nurse L (General).)

A senior doctor indicated other clinical, 'technical' circumstances when survival was also more likely:

Senior doctor AJ: *Yes, and in general those patients may be for example immediately post-MI* (myocardial infarction). *So some, a patient has come in with something which is acute in onset, so it's not a terminal event like airways disease or a terminal event of another chronic illness. But it's, ah, of course they may have assumed heart disease and an MI in that sense is eventually, on a continuum. But if they have a sudden acute treatable event, such as MI, and then they arrest, then yes they are alive and should live.*

SB: *Okay, but is that rare or common would you say?*

Senior doctor AJ: *No, that's rare.*

(From an interview with senior doctor AJ (General).)

The 'technical' evidence of short duration VF should be reversible—a trajectory suggestive of living. However, survival is never certain and in all arrests a degree of pessimism is almost a prerequisite.

Importantly, a senior sister confirmed that within the *arrested and should live* category, it was expected that resuscitation would continue for a longer time. She introduced the issue of age, particularly when dealing with 'young' adults.

> **Senior sister DB:** *It would go on, again. The story that we were given when the patient first came in, and without being awful but, and age does come into it. Because if you've got like a young person who's taken an overdose that you find out, you would definitely continue their resuscitation for a lot longer. Or somebody who was cold. . . . Like if somebody had just had a VF arrest who was 35, I would continue for 40 minutes plus if we were getting anything back. Or I would expect because it's not for my decision as such, it's a joint decision with the other team members, but in those circumstances I would expect to continue longer.*

The sister further considered how the length of resuscitation attempts may be affected if it was being performed on a child.

> **Senior sister DB:** *Well, from experience, we had a paediatric come in on my shift, and I went into the resuscitation, who had drowned, so the resuscitation went on for about an hour and 20 minutes. Now, for an elderly chap, like we had today, who had already been down for 25 minutes with no output, et cetera, the chances of him surviving against the chances of the child surviving, the chance of the child surviving were still quite good in my experience, yes.*

(From an interview with senior sister DB (General).)

Participant's identified that the way they categorised children was different from that of the adult. They were much more likely to locate a child within the category of *arrested and should live,* even if their knowledge and understanding of the clinical evidence suggested that survival was not feasible and thus a decision was often made to continue resuscitation:

Consultant Y: *No, they should live basically, I would say. Unless they've been down for a long time in a rhythm that is, I think, to me, it's not about age to start with it's about the history, what the rhythm is and how long they've been down. Those are probably, because even if it's a child, and they've been down for an hour, I know that child's going to die.*

SB: *Right. So your expectation would still be the same?*

Consultant Y: *It would be the same, yes. But I think sometimes you continue, in a younger person you might continue resuscitation longer. My expectation is the same, but everybody else's might not be. And the family's might not be. And so you might carry on resuscitation a bit longer, until expectation is realistic.*

(From an interview with consultant Y (General).)

Participants identified those technical features that experience had enabled them to associate with the category of *arrested and should live;* reserved for those adults with a shockable rhythm as a consequence of an acute condition rather than a severe chronic illness. However, in the context of the 'younger' adult or paediatric cardiac arrest, decision making is driven by a complex admixture of factors that represent the desire to save life at all cost. In these cases, irrefutable evidence of technical and bodily dying may be outweighed

by the perceived social worth of the 'younger' adult or child, leading ED staff to continue resuscitation for extended periods of time.

Discussion

In exploring resuscitation decision making by ED staff, analysis of the data was undertaken in collaboration with participants, to reveal a perceptual map or typology of tacitly allocated resuscitation categories: *arrested and died; arrested and will die; arrested and may die;* and *arrested and should live.* This is an example of how tacitly acquired experiential knowledge enables practitioners to place complex resuscitation situations within a structure that facilitates their rapid decision making. We investigated how interactions amongst ED staff are influenced by this typology, applying the notion of trajectory alignment first developed in the context of end-of-life decision making in intensive care units (Seymour, 2000). Whilst the alignment of technical and bodily dying trajectories becomes progressively more problematic across the categories, we have shown that in the ED, as in intensive care units, that staff work is directed at the synthesis of explicit and tacit evidence from a variety of technical monitoring and bodily observational sources to enable trajectory alignment and is the means both by which further intervention is established as futile and an appropriate death is constructed. The degree of difficulty staff experience in aligning technical and bodily trajectories reflected the category within which they allocated the particular resuscitation situation at hand and determined the length of the resuscitation attempt. For example, in the *arrested and died* category (typically involving an unaccompanied 'elderly' adult patient whose cardiac rhythm showed prolonged PEA or asystole), alignment of the trajectories was straightforward. When chronic and terminal illnesses exist, these are associated with much poorer outcomes (Stapleton et al., 2014: Cadogen, 2010) and persistent asystole for over

twenty minutes despite ongoing ALS, in the absence of a reversible cause is considered reasonable grounds to stop resuscitation (Resuscitation Council (UK), 2015). These `subtacular' deaths were not preventable by the application of advanced medical technology and as noted by Bailey et al (2011), do not fit with the ethos of emergency care. Thus it is possible to quickly establish the attempt as futile.

In contrast, the most troublesome process of alignment occurred in the *arrested and should live* category where long resuscitation attempts occurred. Longer resuscitative efforts for some patients do have an empirical evidence base and explicit clinical justification if specific circumstances exist. In children, the cause of arrest is usually hypoxemia and hypotension and prolonged resuscitation may be successful (National Confidential Enquiry into Patient Outcome and Death, 2009). In adults, survival after a prolonged attempt may be achieved where primary myocardial ischaemia is the cause of the arrest, VF is present on the monitor and the arrest witnessed allowing delivery of immediate defibrillation (Resuscitation Council (UK), 2011; Hess & White, 2010; Walker, 2008). These `technical' elements often only become clear `post-hoc'; staff in ED must therefore apply tacit knowledge to determine the most appropriate categorisation of any adult cardiac arrest situation before they are in possession of this level of detail.

In the context of end of life caring practices in the ED, Timmermans (2005) contends that resuscitation also takes on a significant role as a social ritual in the creation of an acceptable and culturally appropriate death. Resuscitation acts as a rite of passage, softening the abruptness of sudden death (Tercier, 2005). The ability to integrate social circumstances into decision making is an essential component of tacit knowledge and significantly impacts on

resuscitation practices. For example, if relatives are present, the status of the patient as a social being becomes a key factor in continuing resuscitation and may drive a public display; a `spectacular' death requires that everything is seen to be done and allows time for relatives to come to terms with the difficult process of dying (Bailey et al., 2011; Timmermans, 1999). This may overrule `technical' and `bodily' definitions of death even when it is considered that these dying trajectories are aligned, resulting in a continuation of the resuscitation attempt. Chan (2005) has shown how end of life care practices in the ED, are shaped by societal expectations and shared with other practitioners (praxis) but also refined by individual experiences and knowledge that becomes embedded in practice (phronesis); reinforcing the value of tacit knowledge to decision making.

In decision making about the continuation and withdrawal of resuscitative efforts we have illustrated how the tacit ascription to a resuscitation category and subsequent interactional work to align dying trajectories is based on the rapid assimilation of details about the length of the arrest, the arrest rhythm, response to treatments and other factors such as perceptions of `elderly'. In the ED, we propose that the ascription of patients to tacitly applied resuscitation categories draws on heuristics to create a fast and frugal decision-making tree (Gigerenzer and Gaissmaier, 2011) constructed through experience.

Conclusion

In this paper, we have shown that ED staff's decisions regarding the use of resuscitation involve the tacit ascription of resuscitation situations to four resuscitation categories. The

application of categories is indicative of how skilled practitioners develop strategies to cope with the moral uncertainties of balancing intervention and withdrawal of treatment in critical life-and-death situations. These categories are constructed rapidly for each patient using 'fast and frugal' heuristic decision-making approaches that enable staff to ignore less important information, focus on the combination of 'technical' and 'bodily' information indicative of dying and take into account the social context.

Decision making in complex situations draws on various sources of information. Specialist, explicit knowledge is applied through the conduit of tacit know-how. Tacit knowledge is accrued though experience and is not easily codified or expressed. However, tacit know-how is an essential part of professional practice and should be revealed and valued. The lack of debate regarding the nature of tacit knowledge may result in discrepancies in behaviour, as personal biases remain concealed and unchallenged. An over emphasis on research based knowledge may devalue expertise and the experiential tacit knowledge that often underpins clinical judgement; judgement based on the ability to combine sources of knowledge to produce the cumulative wisdom necessary for its practical application.

References

Bailey, C., Murphy, R., Porock, D. (2011). Trajectories of end of life care in the emergency department. *Annals of Emergency Medicine*, 57, 362-369. doi: 10.1016/j.annemergmed.2010.10.010.

Beckstead, J., Pezzo, M., Beckie, T., & Shahraki, F. et al. (2014). Physicians' Tacit and Stated Policies for Determining Patient Benefit and Referral to Cardiac Rehabilitation. *Medical Decision Making*, 34, 63–74. doi: 10.1177/0272989X13492017.

Boucher, M. (2010). Family witnessed resuscitation. *Emergency Nurse,* 18(5), 10-14.

Boyle, J. (1994). Styles of ethnography. In Morse, J. (ed.). *Critical issues in qualitative research methods.* Newbury Park, CA: Sage Publications.

British Medical Association. (2014.) 3rd Ed. Decisions relating to cardiopulmonary resuscitation. Guidance from the British Medical Association, the Resuscitation Council (UK) and the Royal College of Nursing. London: British Medical Association. Internet resource at:

https://www.resus.org.uk/dnacpr/decisions-relating-to-cpr/

Cadogan, M. P. (2010). CPR decision making and older adults: clinical implications. *Journal of Gerontological Nursing,* 36(12), 10-15. doi: 10.3928/00989134-20101109-01.

Chan, G. (2011). Trajectories of approaching death in the emergency department: clinician narratives of patient transitions to the end of life. *Journal of Pain and Symptom Management,* 42(6), 864-881. doi: 10.1016/j.jpainsymman.2011.02.023.

Chan, G. (2005). Understanding end-of-life caring practices in the emergency department: developing Merleau-Ponty's notions of intentional arc and maximum grip through praxis and phronesis. *Nursing Philosophy,* (6), 19–32.

Clarke, S., Lyon, R., Short, S., Crookston, C., Clegg, G. (2014). A specialist, second-tier response to out-of-hospital cardiac arrest: setting up TOPCAT2. *Emergency Medical Journal,* 31, 405-407. doi: 10.1136/emermed-2012-202232.

Emerson, R., Fretz, R., Shaw, L. (2001). Participant observation and field notes. In Atkinson, P., Coffey, A., Delamont, S., Lofland, J., Lofland, L. *Handbook of ethnography.* Thousand Oaks, CA: Sage Publications.

Gaieski, D., Abella, B., Goyal, M. (2012). CPR and postarrest care. Overview, documentation, and databases. *Chest,* 141(4), 1082-1089. doi: 10.1378/chest.11-2130.

General Medical Council. (2013). End of life care: when to consider making a Do Not Attempt CPR (DNACPR) decision. Internet resource at http://www.gmc-uk.org/guidance/ethical_guidance/end_of_life_DNACPR_decision.asp.

Gigerenzer, G., Gaissmaier, W. (2011). Heuristic decision making. *Annual Review of Psychology,* 62, 451-482. doi: 10.1146/annurev-psych-120709-145346.

Gillespie, M., Paterson, B. (2009). Helping novice nurses make effective clinical decisions: the situated clinical decision-making framework. *Nursing Education Perspectives,* 30(30), 164-170.

Glaser, B. G., Strauss, A. L. (1968). *Time for dying.* Chicago: Aldine.

Glaser, B. G., Strauss, A. L. (1965*). Awareness of dying.* London: Weidenfeld & Nicolson.

Hammersley, M., Atkinson, P. (1995). *Ethnography: principles in practice.* (2nd ed.). London: Routledge.

Herlitz, J., Svensson, L., Silfverstolpe, J., Ängquist, K.-A., Wisten, A., Engdahl, J., Holmberg, S. (2006). Characteristics and outcome amongst young adults suffering from out-of-hospital cardiac arrest in whom cardiopulmonary resuscitation is attempted. *Journal of Internal Medicine,* 260, 435-441. doi: 10.1111/j.1365-2796.2006.01705.x.

Hess, E., White, R. (2010). Optimizing survival from out-of-hospital cardiac arrest. *Journal of Cardiovascular Electrophysiology,* 21(5), 590-595. doi: 10.1111/j.1540-8167.2009.01706.x.

Higgins J., Strange, K, Scarr, J., & Pennock, M., et al. (2011). ‘‘It’s a Feel. That’s What a Lot of Our Evidence Would Consist of ’’: Public Health Practitioners’ Perspectives on Evidence. *Evaluation and the Health Professions*, 34, (3), 278-296. doi: 10.1177/0163278710393954

Insch G., McIntyre N., Dawley D. (2008). Tacit knowledge: a refinement and empirical test of the Academic Tacit Knowledge Scale. *The Journal of Psychology: Interdisciplinary and Applied,* 142(6), 561-579. doi: 10.3200/JRLP.142.6.561-580.

Iserson, K. V. (2010). Resuscitation strategies in the United States: realities of hospital and prehospital treatment. *The American Journal of Bioethics,* January, 10(1), 72-73. doi: 10.1080/15265160903441053.

Larkin, G. (2002). Termination of resuscitation: the art of clinical decision making. *Current Opinion in Critical Care,* 8(3), 224-229. doi: 10.1097/00075198-200206000-00005.

Lockey, A., Hardern, R. (2001). Decision making by emergency physicians when assessing cardiac arrest patients on arrival at hospital. *Resuscitation,* 50(1), 51-56. doi: 10.1016/S0300-9572(01)00318-5.

Metzler, M., Metz, G. (2010). Translating knowledge to practice: An occupational therapy perspective. *Australian Occupational Therapy Journal*, 57, 373–379. doi: 10.1111/j.1440-1630.2010.00873.x.

Morse, J., (1994). (ed). *Critical issues in qualitative research methods.*Sage Publications.

National Confidential Enquiry into Patient Outcome and Death. (2009). *Caring to the end? A review of the care of patients who died in hospital within four days of admission.* London: National Confidential Enquiry into Patient Outcome and Death. Internet resource at http://www.ncepod.org.uk/2009dah.htm.

Nolan, J P., Hazinski, M F., Aickin, F., Bhanji, F., et al. (2015). Part 1: Executive summary. 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Resuscitation*, 95. Internet resource at http://dx.doi.org/10.1016/j.resuscitation.2015.07.039.

Page, S., Komaromy, C. (2005). Professional performance: the case of unexpected and expected deaths. *Mortality,* 10(4), 294-307. doi: 10.1080/13576270500321910.

Pieterse, A., De Vries, M. (2013). On the suitability of fast and frugal heuristics for designing values clarification methods in patient decision aids: a critical analysis. *Health Expectation,* 16, e73-e79. doi: 10.1111/j.1369-7625.2011.00720.x.

Polanyi, M. (1966). *The tacit dimension.* Garden City, NJ: Doubleday.

Resuscitation Council (UK). (2015). *2015 Resuscitation Guidelines.* London: Resuscitation Council (UK). Internet resource at https://www.resus.org.uk/resuscitation-guidelines/.

Resuscitation Council (UK). (2011). *Immediate life support.* (3rd ed.). London: Resuscitation Council (UK).

Schon, D. (1983). *The reflective practitioner.* London: Temple Smith.

Seymour, J. E. (2000). Negotiating natural death in intensive care. *Social Science & Medicine,* 51, 1241-1252. doi: 10.1016/S0277-9536(00)00042-3.

Spradley, J., (1979). *The ethnographic interview*. Belmont, CA. Wadsworth Thomson Learning.

Stapleton, R., Ehlenbach, W., Deyo, R., Curtis, J. (2014). Long-term outcomes after in-hospital CPR in older adults with chronic illness. *Chest,* 146(5), 1214-1225. doi: 10.1378/chest.13-2110.

Tercier, J. (2005). *The contemporary deathbed: the ultimate rush.* Palgrave Macmillen.

Timmermans, S. (2005). Death brokering: constructing culturally appropriate deaths. *Sociology of Health and Illness,* 27(7), 993-1009. doi: 10.1111/j.1467-9566.2005.00467.x

Timmermans, S. (1999). *Sudden death and the myth of CPR.* Philadelphia, PA: Temple University Press.

Walker, W. M. (2008). Dying, sudden cardiac death and resuscitation technology. *International Emergency Nursing.* 16, 119-126. doi: 10.1016/j.ienj.2008.01.007.

Table 1

Table 1: **Cases and categories** (PEA = pulseless electrical activity: RA = respiratory arrest)

Case	Gender	Age	Presenting rhythm at ED	Resuscitation category	Length of attempt	Outcome
Mr Thomas	Male	68	Asystole	A & D	n/a	Died
Mr Devlin	Male	82	Asystole	A & D	n/a	Died
Mrs Fisher	Female	82	n/a	n/a: DNAR order	n/a	Transferred to EMU
Ms Johnson	Female	60	Asystole	A & D	55 min (prehospital)	Died
Mrs Craven	Female	87	PEA	A & will D	13 min	Died
Mrs Martin	Female	61	n/a (RA)	A & may D	n/a	Transferred to HDU, died later
Mr Taylor	Male	80	Asystole	A & D	1 h (prehospital)	Died
Mrs Wilson	Female	84	Slow PEA	A & may D	10 min (arrest 1) 20 min (arrest 2)	Died
Mr Price	Male	70	Asystole	A & D	1 hour (prehospital)	Died
Mr Jones	Male	72	Asystole	A & will D	15 min (prehospital) 10 min (ED)	Died
Mr Green	Male	38	Asystole	A & may D	25 min (prehospital) 30 min (ED)	Died

Highlights

Research highlights

- In EDs tacit categorisation of cardiac arrest patients guides resuscitation decisions.
- Aligning dying trajectories aids consensus to withdraw resuscitation.
- Simple ‘fast and frugal’ approaches are used to make decisions on resuscitation.