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## Language barriers in emergency ambulance calls for cardiac arrest: Cases of missing vital information

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### ABSTRACT

In medical emergencies, phoning the ambulance service constitutes a high-stakes interaction. Call-takers rely on callers to provide information about the patient so they can promptly recognise the medical problem and take swift action to remedy it. When a language barrier exists between the call-taker and caller, this can add a further challenge, given that third-party interpreters are rarely engaged, especially for time-critical conditions such as cardiac arrest. Research in cardiac arrest calls has found that language barrier calls experience longer delays to critical points such as recognition of cardiac arrest and commencement of resuscitation. This study aimed to understand, in the absence of interpreters, the interactional challenges that emerged in language barrier emergency calls, as parties worked to communicate the nature of the medical problem. Based on a critical conversation analysis approach, we conducted fine-grained analysis of interactions in audio recordings and transcripts of 33 language barrier calls from an Australian ambulance service in 2019. We found that call takers regularly failed to recognise that the patient had a cardiac arrest. Non-fluent-English callers often provided vital information about the patient, which could have led to cardiac arrest recognition by the call-taker, however such information was missed if it was delivered in an unsolicited or atypical way. Opportunities to recognise cardiac arrest were also missed when call-takers did not probe further after such information was provided or did not provide enough interactional space for callers to complete their turns. We found that the main reason for delays in recognising cardiac arrest was a lack of mutual understanding, which most of the time seemed to remain unbeknownst to participants. The study makes recommendations for emergency medical dispatch centres to cater for language barrier calls, with the goal of fostering a more inclusive prehospital care system and addressing health disparities for non-fluent-English speakers.

### 1. Introduction

Health disparities, based on minority ethnic status, exist in the pre-hospital care or emergency medical context in Anglophone countries (Dicker et al., 2019; Ghobrial et al., 2016; Toy et al., 2023). Such disparities manifest during calls to the emergency telephone number when there are communication problems due to language barriers. We use the term “language barrier” to refer to cases where English is the sole language used by caller and call-taker during their interaction, but where

the caller speaks English as an additional language (LX) or uses a non-standard variety of English. In addition to language proficiency issues pertaining to lexicon, grammar or phonology described by Garcia (2022), a language barrier in emergency calls may mean that the call-takers and lay callers do not share the same norms for interaction (Roberts, 2000), and this opens up the possibility for miscomprehension of verbal cues and messages. Such situations are what tend to make non-fluent English speakers reluctant to use emergency medical services (EMS) altogether (Nuño et al., 2017; Ong et al., 2012).

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Focusing on language barriers in Australia is particularly important since it is a multilingual and multicultural society where English is the sole lingua franca in most public services (Piller, 2016). In Western Australia (WA), where our study was based, the number and proportion of the population who use another language in addition to English is 489,043 (18.4%) with 12% of this figure having low or no proficiency in English (Australian Bureau of Statistics, 2021).

For this study of language barriers in emergency calls, we focus exclusively on calls for patients in out-of-hospital cardiac arrest (OHCA). OHCA is considered the ultimate life-threatening emergency because there is only a short window of time in which to respond (Rea et al., 2021). When a patient is in cardiac arrest, their heart has stopped pumping and they are therefore unconscious and not breathing. Prompt recognition of OHCA by call-takers is essential (Hardeland et al., 2021) in order to dispatch an ambulance at the highest priority (“lights and sirens”) and immediately guide callers to commence the life-saving intervention of cardiopulmonary resuscitation (CPR) before the ambulance arrives. Without a resuscitation attempt, a patient’s chance of survival decreases by up to 10% every minute (Larsen et al., 1993).

Language and communication have particular pertinence in OHCA ambulance calls because these are high-stakes calls where the call-taker’s imperative is to determine the presence of cardiac arrest as quickly as possible. Due to the time-sensitive nature of the cardiac arrest call, the option of using a third-party interpreter is rarely feasible in language barrier calls (Case et al., 2018; Perera et al., 2021). Studies have noted that a lower proportion of “Limited English Proficiency” cases receive bystander CPR (Sanko et al., 2021) and survive to hospital discharge (Bradley et al., 2011) or there are significant delays in initiating CPR during the call (Nuño et al., 2017). There is a need for culturally sensitive pre-hospital emergency care (Kietzmann et al., 2015) which focuses on, among other improvements, developing effective verbal and non-verbal communication skills (see also Meischke et al., 2010; Tate et al., 2016).

Previous conversation analytical work on emergency calls (Fele, 2016; Riou, 2024) noted that thinking in terms of “language barriers” can be reductive, in part because of the variety of situations it encompasses. For this study, we adopt the term “language barrier” nonetheless so as to resonate with the existing literature, and in particular, studies published in medical journals. We did not opt for “Limited English Proficiency” (or another term related to language proficiency) to signify that the issue is not solely about the proficiency of one party, but the conditions (including systemic) of the healthcare context that create communication problems for language minority people (see Showstack, 2019).

Despite the building evidence that language barrier calls present a specific challenge for EMS, there is a lack of research that explores exactly how communication unfolds in these calls, and what creates delays in the call-taker identifying that the patient is in cardiac arrest (“OHCA recognition”). We aim to address this knowledge gap via a qualitative analysis of audio recordings and transcripts of OHCA language barrier calls using the methodology of conversation analysis (e.g. Schegloff, 2007). Our previous study (Perera et al., 2021) identified statistically significant delays in OHCA calls with a language barrier: median time to OHCA recognition was 18 seconds longer and median time to CPR was 38 seconds longer than calls that did not have a language barrier. We found no significant difference in rates of OHCA recognition between calls with language barriers and calls without language barriers. This means that call-takers identified just as well that the patient was unconscious and not breathing (indicators of cardiac arrest), but that it took them significantly longer to arrive at this conclusion. The present study aims to analyse the trajectories of such calls, in a context where call-takers use a scripted dispatch protocol and therefore have limited options to adapt their speech to suit callers.

## 2. Background

### 2.1. The context of emergency (medical) calls and language barriers

Emergency ambulance calls belong to what is known as institutional talk (Heritage and Clayman, 2010). Compared to ordinary telephone conversations, the sequential structure of emergency calls is reduced and specialised (Wakin and Zimmerman, 2010; M. R. Whalen and Zimmerman, 1987), and organised around an interrogative series (Zimmerman, 1984), i.e. a series of question-answer sequences initiated by the call-taker. This kind of structure imposes tasks, affordances and constraints on interactions that take place within institutions (Heritage, 2004). As J. Whalen et al. (1988) and Tracy (1997) pointed out, this can create tension between the two interacting parties, call-takers and callers in our context, who may have different understandings and expectations about how the emergency call should unfold.

Two recent literature reviews (Kevoe-Feldman, 2019; Riou, 2024) noted that many emergency dispatch organisations worldwide have implemented more systematic – and sometimes entirely scripted – dispatch protocols since the seminal conversation analytic research on emergency calls conducted in the 1980s and 1990s. Navigating the script can be an interactional challenge of its own, especially since emergency callers may not realise the extent to which some aspects of the interaction are pre-determined by the institution (Laforest, 2011), and call-takers may need to engage in specific interactional work to remain within the bounds of this partly hidden sequential structure (Riou et al., 2018). This was highlighted by the work of Maynard and Schaeffer (2006) on standardised interaction, particularly in the context of telephone surveys (e.g. national census). Heritage (2004) posited that interactants still have agency within these contexts to make specific interactional choices based on individual ideologies and beliefs.

Due to the distressing nature of what typically occasions an emergency call, callers often display emotions which can complicate the interactional projects for which call-takers need callers’ cooperation (Garcia, 2022; Kevoe Feldman, 2021; J. Whalen and Zimmerman, 1998), such as assessing the patient’s consciousness and breathing (Ngo et al., 2022). An important focus of conversation-analytic research on emergency calls has been the misunderstandings, misalignment, and disaffiliation which can arise and have fatal consequences (Garcia and Parmer, 1999; Svennevig, 2012; J. Whalen et al., 1988). Such issues of intersubjectivity can be compounded in calls with a language barrier.

Garcia (2022) outlined the challenges of attempting or achieving intersubjectivity in language barrier calls. Her case study of an emergency call for childbirth identified “hidden disjunctures” (Garcia and Parmer, 1999) when mutual understanding failed without caller and call-taker realising it. This included repair sequences that remained unresolved; and confirmation checks where the call-taker had difficulties determining what exactly the caller confirmed in their answers, and therefore repeatedly requested confirmation (Garcia, 2022). As Gerwing and Indseth (2016, p. 176) pointed out, misunderstandings can “get buried in the flow of new information, making them difficult to sort out later and distorting the picture that the operator is developing”. Osvaldsson et al. (2013) identified the pre-emptive management of mutual understanding by Swedish call-takers through overt checking, displaying of one’s understanding and conversational repair. The authors emphasised that, in language barrier calls, problems of comprehension were mutual, that is, not a direct result of one party being a non-native speaker. Therefore, both parties needed to engage in mutually oriented interactional work in order to achieve intersubjectivity.

As our previous study (Perera et al., 2021) of language barrier calls found, third-party interpreters were not engaged despite the service being available. For EMS calls, callers and call-takers tend to resort to strategies other than telephone interpreting to negotiate language barriers. Callers’ perception of their level of entitlement to using the ambulance service is another potential factor at play, as it may be tied to callers’ level of language proficiency and familiarity with the

interactional norms in this setting. As Roberts (2000) highlights, callers have to prove that their case is worthy of emergency attention and call-takers play the role of gatekeepers to their access of the service. While it cannot be generalised that limited English callers *all* display a low level of entitlement when they call the EMS (Raymond, 2014), they may lack confidence in negotiating their right to the service with a fluent English-speaking call-taker. In language barrier calls, it is likely that the two parties, say a limited-English caller and a fluent call-taker, have different interactional conventions and communicative styles including varied prosody, ways of making requests, and interpreting silence (Roberts, 2000). Under these conditions, vital information pertaining to the status of the patient could be presented or phrased in atypical ways which the call-taker may find challenging.

### 3. Data and methods

We undertook a qualitative study of language barrier OHCA calls received over a six-month period in 2019 by St John WA, the EMS in Western Australia. The study was approved by the Curtin University Human Research Ethics Committee (HR128/2013) and St John WA Research Governance Committee. In Australia, 000 (triple zero) is the main number for all emergency calls and is managed by the telecommunication company known as Telstra. The Telstra call-taker asks the caller which kind of service (fire, police and ambulance) they require and transfers the call to the relevant service call centre in each state or territory.

Our methodology was based on conversation analysis (CA) (see Clift, 2016 *inter alia* for an overview; Schegloff, 2007), a type of inductive, fine-grained analysis that interrogates the sequential organisation of turn-taking (that is, the step-by-step dialogue between parties). We also draw from recent scholarship on “critical conversation analysis” (Zhang Waring and Tadic, 2024) which attempts to marry critical analysis of social issues with CA’s emic approach. We engaged in “motivated” CA (Zhang Waring and Tadic, 2024, p.8) – by contrast with the standard tenet of “unmotivated examination” in traditional CA (Sacks, 1984, p.27) – in a collection of data specifically assembled to address an issue of health inequity. The starting point of our study is the finding that language barriers lead to statistically significant delays in cardiac arrest calls. This impacts patient outcomes and constitutes a real-world problem faced by practitioners. Our aim is not to demonstrate that language barriers negatively impact emergency calls for cardiac arrest, but rather, to understand the trajectories of such calls and how these delays can be explained.

Our challenge was to balance the concern of language barriers (supported by the findings of our prior quantitative study, (Perera et al., 2021) with the CA requirement to treat the interactional event as the primary focus of analysis. We were attuned to Schegloff’s (1992) notion of procedural consequentiality in trying to demonstrate, in our application of CA, how the language barrier issue was relevant for the parties and that they were oriented to that particular characterisation in the interaction. Without access to the audio recordings, and based on short transcripts alone, we recognise that the language barriers in our data may not always be readily apparent to the reader. This is due in part to our efforts to protect anonymity in this sensitive context and to reduce risk of reidentification if we provided longer extracts.

The collection of cases comprised audio recordings of emergency calls and corresponding case records, sourced from our previous study of 353 OHCA calls (Perera et al., 2021). For that study, two authors independently identified 50 calls (14%) as containing a language barrier, based on a set of three possible criteria found in the literature (Perera et al., 2021). OHCA was recognised in 47/50 of the language

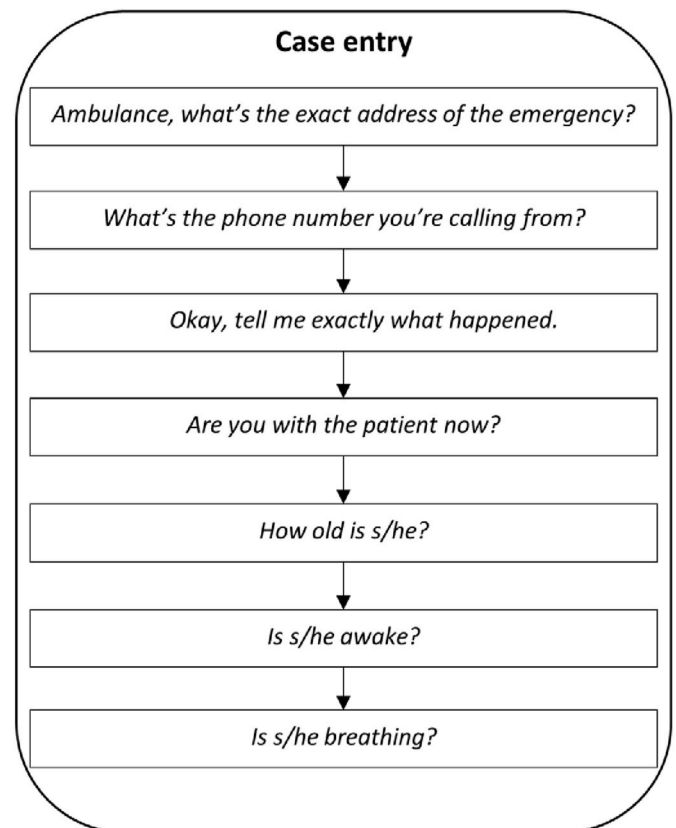


Fig. 1. The Medical Priority Dispatch System™ (MPDS) call protocol for case entry.

barrier calls however 33/47 (70%) calls did not meet the American Heart Association standard time interval for OHCA recognition within 90 seconds of call commencement (Kurz et al., 2020). These 33 calls form the collection for the present study.

We listened to call recordings and created transcripts employing Jefferson’s (2004) notation system (see appendix). In the transcript extracts, initials are used to represent caller (C), call-taker (CT), bystander (BYS), patient (P) and sounds in the caller’s background environment (ENV). Analysis focused on the first part of the calls, comprising call opening sequence (initial questions to acquire an address and telephone number), the first topic slot or reason for the call (M. R. Whalen and Zimmerman, 1987), and questions to determine whether the patient is conscious and breathing. This first phase is known as “case entry” (Fig. 1) in the systematic dispatch protocol used by the EMS, the Medical Priority Dispatch System™ (MPDS) (MPDS). For this study we paid close attention to the sequences that serve to identify an OHCA i.e. where the call-taker says “tell me exactly what happened”; “is s/he awake?”; and “is s/he breathing?”. However in cases where the call-taker does not suspect OHCA, but checks for other problems such as stroke or chest pain, then further scripted questions are asked including “is s/he completely alert?” and “is s/he breathing normally?”

### 4. Findings

Our examination of 33 transcripts found cases of missed vital information, misinterpretation of callers’ mitigated answers and call-takers not providing sufficient interactional space. The extracts below come

from six different calls. Before we explore the challenges, we first present an example of a language barrier call where there were no “hidden disjunctures” (Garcia and Parmer, 1999) or unnoticed repairables (Fig. 2). While it took 91 seconds before OHCA was recognised, the

parties were able to achieve mutual understanding without missing any vital information (that is, relevant details about the patient’s absence of breathing and unconsciousness).

Even though CT has to initiate repair (line 41) and ask C to answer

37 CT: .hh okay tell me exactly what happened  
 38 C: uh: she's sitting on the bed now  
 39 he's he's he's just (  
 40 he made a noise  
 41 CT: he what sorry?  
 42 I can't understand you when you're crying like that on the  
 43 phone  
 44 (1.0)  
 45 C: um:: (.) now what would you like me to do please  
 46 CT: tell me exactly what happened  
 47 take a deep breath  
 48 and try and tell me clearly  
 49 (1.0)  
 50 C: he's sleepy and then he's  
 51 he- he make a noise  
 52 big noise  
 53 and now he- he fully unconcious  
 54 he- he won't mo::ve  
 55 CT: he's unconcious?  
 56 C: ye::s  
 57 CT: is he [breathing ]  
 58 C: [and- ]  
 59 no:: he's no:t breathe  
 60 CT: he's not breathing  
 61 C: yeah::  
 62 CT: okay I'm organising help for you now  
 63 stay on the line

Fig. 2. Transcript 1626.

34 CT: okay (.) tell me exactly what happened  
 35 C: mumma::  
 36 she::'s a diabetic  
 37 and uh she can't breathe  
 38 she's sitting on the toilet?  
 39 she was carffing ((coughing)) for two days  
 40 now she has one (dose)  
 41 so one eighty  
 42 and uh:  
 43 but sh:e just a feel like a something  
 44 m- m- please: I can't (tell) anything please c[ome ]  
 45 CT: [okay ]  
 46 alright I need you to calm down  
 47 so I can understand exactly what's happening  
 48 so: w- w- are you [calling because she can't breathe?]  
 49 C: [((crying)) ]  
 50 CT: or is she having a diabetic proble:m  
 51 C: no she can't breathe now:  
 52 I- I [just= ]  
 53 CT: [(I) ]  
 54 C: =give- breathe to her  
 55 CT: are you  
 56 C: [( ) ]  
 57 CT: [is- okay is- ]  
 58 alright are you with her at the moment?  
 59 C: yeah  
 60 CT: how [old= ]  
 61 C: [yes ]

Fig. 3. Transcript 1456.

the reason-for-the-call prompt again (line 46), they arrive at mutual understanding about P's consciousness (line 56) and breathing status (line 61) to enable the CT to recognise OHCA, as signalled by their statement in line 62.

#### 4.1. Missing vital information provided by callers

In comparison to Fig. 2, we also found that crucial information suggesting the patient was not conscious and not breathing was often missed the first few times it was provided by callers. This could be due to the call-taker not hearing a caller's contribution when it was delivered in a non-standard way, in an inapposite turn as in Fig. 3.

In response to CT's reason-for-the-call prompt (line 34), C provides a number of observations and symptoms including P being a diabetic (line 36) and "she can't breathe" (line 37). These caller descriptions are known as "informings" (J. Whalen et al., 1988). There is evidence of C's non-standard accent in the pronunciation of "carffing ((coughing))" (line 39) and lines 40–41 suggest that C is trying to offer a reading of the P's vital signs, perhaps the blood sugar reading, but it is unclear. Line 43, C is struggling to find the appropriate English words to describe her mother's condition. This is confirmed in her plea (line 44) with "I can't (tell) anything" implying difficulty in relaying symptoms in English. The CT provides a minimal token (line 45) and tries to calm the C down so she can answer the questions (lines 46–47). This suggests that CT has not fully understood C's display of practical epistemology i.e. what C has actually seen or heard (M. R. Whalen and Zimmerman, 1990), as evidenced by line 47.

In lines 48 and 50, CT seeks clarification about the problem that C is reporting. She indicates uptake (Schegloff, 1999; Svennevig, 2004) of C's problem description through reformulating the key information into a confirmation check, i.e., whether it is the absence of breathing or the diabetes that needs attention. It is unclear why CT seeks this clarification since call-takers at the EMS are trained to act immediately and initiate CPR when there is a report of not breathing (as a critical signifier of cardiac arrest). Even though C is crying, and this overlaps with part of CT's question (line 48), C is able to give a clear response disconfirming breathing (line 51). Line 52, C attempts to expand on her answer but there is some overlap with CT's utterance (line 53). C continues with her statement to say she " = give-breathe to her" (line 54). While it is not conveyed in a standard English form (using the verb "breathe" instead of the noun "breath") the message is that she has just given the patient mouth-to-mouth resuscitation. There is truncated and overlapping speech (lines 55–57) as each party tries to take the floor. In line 58 CT proceeds with the interrogative series. There is no indication from CT of uptake of the breathing problem or the resuscitation attempt and further on in the sequence, not presented in this excerpt, CT asks the breathing question again. This lack of uptake could be due to the use of the non-standard statement in line 54 although this comes after the C has disconfirmed breathing in line 51.

In this interaction, the CT has missed vital information to recognise a cardiac arrest which delayed the dispatch of an ambulance. This raises the issue of the vulnerability of the C's report in that it can become subject to doubt if it is not assembled in a way that convinces the CT that it requires action (M. R. Whalen and Zimmerman, 1990). We posit that the multiple instances of overlapping speech, the rapid speed of the interaction, the emotion or non-standard accent and language of the caller may have contributed to the CT's doubt and need for further questioning about the P. While there is no clear evidence of procedural consequentiality of the language barrier, we turn to the critical CA approach to assert that the language barrier is relevant to this interaction.

The next excerpt (Fig. 4) is centred around four question-answer sequences that follow the reason-for-the-call question, as shown in Fig. 1. The CT enquires about the patient's awake status (line 57), breathing (line 66), alertness (lines 73, 76), and quality of breathing (line 79). The fact that CT asks the last two scripted questions about

alertness ("is he <completely alert>") and quality of breathing ("is he <breathing normally>") retroactively shows that he interpreted C's prior answers as confirmations that P was conscious and breathing. By the end of this excerpt the CT has not yet recognised cardiac arrest.

The CT's awake question (line 57) is followed by a second's silence and then an open-class repair initiation ("huh?") from C. In unison CT (line 60) and BYS (line 61) deliver the repair solution by repetition of the trouble source ("is he awake") (cf. Kitzinger, 2013 for CA terminology on repair). As an expansion of the repair solution, CT offers an alternative term to awake ("is he conscious" line 62). At the same time, C indicates uptake by repeating the trouble source ("AWAKE AWAKE") at increased volume. After a 1.5 second silence (line 64), she provides confirmation (line 65). At this point in the call, there was no reason to suspect that the patient was unconscious.

However, close inspection of C's next turns shows that she provides more nuanced information about the patient's state. In line 66 CT asks the next critical question, slowing down his speech for the word "<breathing>". This adjustment indicates procedural consequentiality (Schegloff, 1992) – an orientation to C's level of English fluency in order to assist comprehension, based on the repair for the previous question. After a one-second silence, C delivers a confirming answer (line 68), followed, after a micropause, by a qualifying conjunction "but" which overlaps with CT's confirmation check (line 69). C completes her qualification with "but hardly" (line 70), then provides an alternative statement ("yeah he's (.) having a hard (.) time" line 71). We note that she switched from "hardly" to "hard" and this slight variation has a subtle difference in meaning (that is, "a little bit" for the former and "with difficulty" for the latter). For English LX speakers, "hardly" is a common source of error because of this difference. It is inconclusive whether C meant that P was "hardly breathing" and/or "breathing with difficulty", however CT orients to the second meaning, as he reformulates C's statement ("he's having a HARD time breathing" line 72) to signal uptake, with increased volume for "HARD". Despite C's confirming "yes" (line 68) and "yeah" (line 71), her expansions in these turns indicate problematic breathing which should be investigated further (Riou et al., 2018).

The CT's next question ("is he <completely alert>" line 73) also indicates their orientation to the C's level of English fluency, slowing down speech for the key words. C's response ("he cannot move" line 74) does not directly address the terms of CT's question but may be the first sign that the patient is unconscious. CT reprimands C for her inapposite answer ("I UNDERSTAND that" line 75), then repeats the question, raising volume on the key word "ALERT" (line 76). However it is feasible that C sees her answer as relevant, using the body's stillness as an indirect sign of the patient not being alert.

Line 78, after a micropause, C provides a confirming answer more aligned with the question ("yes he is alert"). C's answer combines an interjection ("yes") and a partial repetition of the polar question's proposition, leaving out the adverb "completely". This can be seen as a downgraded (Pomerantz, 1984) or transformative answer, which Stivers (2022) argued are the least aligning answer types to polar questions, due to the autonomy they display. CT acknowledges receipt (line 79) and then asks the next question ("is he <breathing normally>"), again slowing his speech for the key words. There is a one-second silence, then hesitation and an audible exhalation as C delivers an elongated consonant 'n' indicating a false start for the word 'no' ("n: hh no no") and the qualification "hardly" (line 81). The delay in responding and false starts in stating "no" show that C is reconsidering the qualified "yes (.) [but]" answer given in line 68. The "no" (line 81) is emphasised through repetition, however CT does not follow up on this crucial information.

Instead, CT provides an acknowledgement receipt "yeah" after a long pause (line 83) followed by reassurance, "that's okay". More reassuring statements, "that's fine", are offered in lines 84–85. Since these turns also include minimal tokens, the filler "u:m" and audible inhalations it appears the CT is filling time to transition to the next topic. The CT then refers to a previous statement (not shown in this excerpt) that the patient

57 CT: is he awake  
 58 (1.0)  
 59 C: huh?  
 60 CT: [is he awake ]  
 61 BYS: [is he awake]  
 62 CT: [is he conscious ]  
 63 C: [AWAKE AWAKE ]  
 64 (1.5)  
 65 C: he is awake  
 66 CT: okay that's alright is he <breathing>  
 67 (1.0)  
 68 C: yes (.) [but ]  
 69 CT: [yeah? ]  
 70 C: but hardly  
 71 yeah he's (.) having a hard (.) time=  
 72 CT: =he's having a HARD time breathing I understand that  
 73 is he <completely alert>  
 74 C: he cannot mo:ve  
 75 CT: I UNDERSTAND that  
 76 is he completely ALERT  
 77 (.)  
 78 C: yes he is alert  
 79 CT: okay is he <breathing normally>  
 80 (1.0)  
 81 C: n::: hh no no hardly  
 82 (1.0)  
 83 CT: yeah that's okay  
 84 .hh alright that's fine  
 85 u:m .hh °okay° alright that's fine  
 86 now you said that he- and he's numb is he alright  
 87 EXACTLY WHAT TIME DID [THESE SYMPTOMS STA-]

Fig. 4. Transcript 637.

is numb (line 86). The conclusion we can draw from this is that CT does not orient to the C's report as adequate or sufficient to determine OHCA, so he continues with the interrogative series. The subtle but vital information that C provided about P's breathing was an opportunity to recognise OHCA. Call-takers in this EMS are trained to treat uncertainty about breathing as a sign of ineffective breathing and to probe further to rule out the possibility of OHCA. C's equivocal, sometimes inapposite, assessments and the CT's responses to them, suggests the parties' differing expectations of what constituted a reliable report for action initiation.

#### 4.2. Interpreting callers' mitigated answers

The next excerpt (Fig. 5) shows how a caller provides vital information for OHCA recognition but delivers it with hedging, hesitation, and mitigation markers.

In this case the patient is not known to C and is found on the ground in a public area. When C describes the problem (lines 29–31, 33), there is a second's silence before CT initiates repair (line 35) to check for potential mishearing, likely resulting from C's non-standard accent. Her repair initiation provides two candidates ("breathing or bleeding"), and C offers a repair solution ("breathing" line 36) with the adverb "heavily". CT requests confirmation with a repetition ("breathing heavily?" line 37) and C confirms (line 39). C offers two potential problems, seizure or heart attack (lines 41–42), which are prefaced and followed with hedging statements of uncertainty ("not sure if it is uh:" line 40; "I'm not sure what it is" line 43).

Line 44, CT asks the first question to check for symptoms of OHCA and C gives a mitigated answer (lines 45–47). The "mmm" and "little

bit" (line 45) indicate some hesitation and the *but*-prefaced clause (line 46) suggests that whether P is awake is uncertain. Line 47, C mentions "pants" which could be in reference to short breaths, "(uh fants)" appears to be a mis-speak (a jumbling of words "pant" and "faint"), but "getting fainter" conveys that the patient may be becoming unconscious. Line 48, CT accepts this answer with an acknowledgement receipt ("okay") and moves on to the next question.

A few seconds later, CT's turn ("and you said that he's awake" line 53) retroactively shows that she interpreted C's utterance (lines 45–47) as confirmation that the patient was conscious, even though C's answer was not definitively affirmative. Line 54, CT asks the breathing question, and after a pause (line 55), it appears that C starts to provide a confirming response ("y-", line 56) but then hesitates. He begins to say "little-" as in "breathing a little", but then self-repairs and says, "very heavily". This is a repetition of the answer given in line 33 and is further evidence that the breathing could not be effective and needs further investigation.

Within the confines of the dispatch system, CT has processed the answers to the breathing and awake questions as affirmative, so cardiac arrest is not recognised at this point. However signs of problematic consciousness and breathing are evident in C's turns, explicitly and implicitly, albeit in between hedging, hesitation and mitigation markers. We found such mitigation to be a common feature of language barrier calls, and we argue that, as in this excerpt, they can make it more challenging for call-takers to seize on vital information provided by callers.

28 CT: that matches what I have okay tell me exactly what happened  
 29 C: I- I got an old man actually  
 30 probably be around sixty to between seventy?  
 31 he's lying on the ground  
 32 CT: yep  
 33 C: bre- breathing very heavily  
 34 (1.0)  
 35 CT: breathing or bleeding  
 36 C: breathing heavily  
 37 CT: breathing heavily?  
 38 (0.5)  
 39 C: yes  
 40 not sure if it is uh:  
 41 he's got a- a: seizure or  
 42 or heart attack  
 43 I'm not sure what it is  
 44 CT: okay is he awake?  
 45 C: mmm yeah he's little bit awake  
 46 but he's very uh:  
 47 pants (uh fants) he's getting fainter  
 48 CT: okay  
 49 how old is the patient  
 50 C: probably between sixty to seventy  
 51 I would say  
 52 CT: okay  
 53 and you said that he's awake  
 54 and is he breathing?  
 55 (0.5)  
 56 C: y- uh: little- very heavily  
 57 CT: okay  
 58 and is he completely alert

Fig. 5. Transcript 1542.

#### 4.3. Not providing sufficient interactional space

Our analysis identified cases where callers with limited English needed more time to interpret and form utterances than other callers. We determined that not providing these callers with enough interactional space,<sup>1</sup> that is, taking care to minimise interruptions, overlaps or topic shifts until the caller is finished, could lead to missing vital information, as in the following excerpt (Fig. 6).

Before this excerpt begins, C has already answered the-reason-for-the-call prompt with the symptoms “heart attack”, “vomiting” and “eyes are turning”. Line 41, C initially answers CT’s awake question (line 40) with confirmation but adds a qualifying clause (“[but I think he’s ()]”), which is partly inaudible due to overlap with CT’s next question (line 42). Line 43, C has a false start with “he-”, an elongation of “still” and a hesitation marker “[uh]” which suggests she is trying to find the words to expand her answer from line 41, rather than giving an answer to the breathing question from line 42. The CT provides a minimal token of acknowledgement (line 44) which overlaps with the end of C’s utterance from line 43. Line 45, C tries to speak but has a false start “I’m-”, repeats “I’m very”, and again, does not find the words to complete her statement. The CT does not pursue completion of C’s utterance and instead provides reassurance that help is being organised and that the questions are not interfering with the dispatch of the ambulance (lines 46–47). This utterance may be offered as an acknowledgement that C’s incomplete statements are not obstructing the service she is receiving.

Instead of answering CT’s next question in the interrogative series

(line 48), C states that she thinks P is dying (line 49). After hearing snoring sounds coming from P in the background (presumably agonal breathing which is ineffective and an indication of cardiac arrest), CT changes his questioning to ask if P is conscious, which C disconfirms (line 57). Line 61 (“but you said he was awake okay.”), CT makes a statement to indicate that he thought C had misinformed him about P’s consciousness status and it appears to be a subtle reprimand. However if we look back at lines 41 and 43, C was in fact trying to convey some qualification to CT that could have pointed to uncertain consciousness or agonal breathing. C was not given the interactional space to do this in lines 41, 43 or 45, and is likely a sign that the call-taker was focussed on progressing the call rather than facilitating mutual understanding (Perera et al., 2020). Combined, the reprimand (line 61) and the question about “normal” breathing (line 50) retroactively indicate that CT considered P to be conscious and breathing based on C’s equivocal answers and incomplete turns. However OHCA is recognised thanks to audible agonal breathing (line 53), and this is signalled when CT states that he is updating the crew (line 62).

The final extract (Fig. 7) highlights the tension for EMS in adhering to a one-size-fits-all system for call-taking that may not do well to service callers with limited English. Between lines 69 and 73, CT follows the case entry question sequence. The C confirms that the patient is awake (line 71) and breathing (line 73). In addition to providing the response particles “yes” or “yeah” to such questions, the C offers expansions, repeating key phrases to indicate uptake of CT’s questions. Note that CT asks the next question (lines 72, 74) right after the caller produces these response particles “yes he’s” (line 71) or “yeah he’s” (line 73), in overlap with C’s expansions. This shows the pattern of CT searching for an interjection answer (‘yes’ or ‘no’) and then moving on to the next question without providing more interactional space for C’s response. This enables CT to stay in control of the interaction and to progress the interrogative series as efficiently as possible, and evidences their orientation to following the scripted protocol.

<sup>1</sup> We use “interactional space” metaphorically to refer to the sequential opportunities provided to co-participants, as in [Szczepek Reed \(2017\)](#). Though the two concepts can be connected, this is not to be confused with how [Mondada \(2009\)](#) used “interactional space” to describe the spatial arrangements and copresence of participants during a face-to-face interaction.



40 CT: okay is he a↑wake  
 41 C: yeah he's awake [but I think he's () ]  
 42 CT: [and is he breathing? ]  
 43 C: he- he's still:: [uh ]  
 44 CT: [o:kay ]  
 45 C: no: I'm- I'm very I'm very (g) .hh  
 46 CT: .hh that's fine love we're organising help for you  
 47 'kay these questions are not slowing it down  
 48 now is he breathing completely normal  
 49 C: so that I think he's dying I: I don't [( ) ]  
 50 CT: [okay ] is his  
 breathing completely normal  
 51 C: no::  
 52 o:kay  
 53 ENV: ((patient breathing))  
 54 CT: is that him in the background?  
 55 C: yes  
 56 CT: so is he conscious?  
 57 C: he no:: not conscious [no: ]  
 58 CT: [he's ] not [conscious ]  
 59 C: [you hear ] him?  
 60 CT: yeah: I can hear him  
 61 but you said he was awake okay.  
 62 one moment (.) I'm just updating this crew o↑kay

Fig. 6. Transcript 718.

Because C has answered in the affirmative to the awake and breathing questions there is no indication of an OHCA occurring and so CT follows with further questions (lines 74, 77) to help determine the problem. C adjusts the constraints of the question imposed on him (“okay is he breathing normally?” line 77) through his transformative answer (Stivers and Hayashi, 2010), “he’s just feeling a bit faint” (line 79) following a second’s pause. After overlapping speech (line 80–81), CT attempts to repeat the breathing normally question (searching for a yes/no answer, line 82) however this overlaps with C’s turn where C is in the middle of reporting on symptoms “[yeah I think he’s-”. C self-repairs and moves to request that the ambulance hurries, indicated by the insertion of “(better)”, line 83. After a false start (line 84), C completes the directive, “[I think you better hurry up]” in line 85. This overlaps with CT’s response (line 86) so she repeats it (line 87), stating that the ambulance has been organised, a line commonly adopted by CTs to help keep Cs on track.

Line 89, CT returns to the question attempted in lines 77 and 82. This overlaps with C’s response (line 90) indicating compliance with CT’s command from line 88. After CT completes her question (line 91) and a two-second silence, C relays the question to the bystanders (line 93), repeating it in line 94. BYs responds with three rapidly uttered “>no no no<”, indicating urgency, plus the declaration that P is not breathing (line 95). C relays this information to CT with the same fast pace, self-repairs, and repeats “not breathing” in line 96. Even though the key words “not breathing” in BYs’ turn (line 95) are audible, and repeated by C (line 96), CT does not display uptake and continues with the sequence of questions (line 97). In lines 98–100, C relays that P is collapsing in real time. CT confirms uptake of this information through a reformulation “he’s collapsed is he,” and minimal token “alright” (line 101). Line 102, C provides confirmation.

Line 103, CT tries to keep control of the interaction by commanding C’s attention but self-repairs and follows with another question (line 104). There is an inhalation, silence and minimal tokens from C (lines 105–106). It appears that C is distracted and talking to BYs which is why the CT tries to keep him engaged (lines 107–108). The CT’s message from lines 108 and 110 is for C to say “don’t know” if he does not know the answer, attempting to minimise delays in progressivity of the

interrogative series. In return, there are minimal responses from C (lines 109, 111) which overlap with CT’s directions.

CT’s subtle reprimand (line 110) could explain C’s response in line 113 as an attempt to comply with her order. This overlaps with the beginning of CT’s question (line 112). Line 118, C delivers an unsolicited statement that CPR has commenced. CT responds with an “okay” (line 119) acknowledgement receipt, but appears to not have understood the prior utterance because CT asks the next question in the interrogative series. If CT had understood C’s turn in line 118, this would lead to immediate OHCA recognition. Only part-way through line 119 does CT register what has been uttered and reorients to this new information by reformulating the statement and seeking confirmation (line 120). C provides it (line 121) and CT acknowledges this informing (line 122).

The utterance of “o:kay well that’s a bit different okay” (line 122) is curious. It suggests that C’s and BYs’ previous turns concerning “not breathing” (line 96) and “collapsing now” (line 100) were either unheard or considered invalid or insufficient somehow. Even though ‘collapsing now’ is not explicitly stating ‘unconsciousness’, the use of the temporal marker does suggest that P’s status is changing in real time. The fact that this occurs after C and BYs indicate that breathing is non-existent and not normal should have piqued the interest of the CT as signs of a possible OHCA. If OHCA had been recognised at this point, then CPR could have commenced earlier on, potentially increasing the patient’s chance of survival. Instead, it appears the CT was intent on following the scripted protocol – as indicated by the lack of interactional space given to C to reply (lines 72, 74), the apparent lack of hearing vital information (lines 95–96), and the directions to answer her questions (lines 88, 107). We see evidence of C trying to conform to the CT’s interactional norms, providing unequivocal yes/no responses to her questions. However, at lines 83 and 85, in retrospect, there is an indication that the situation has become more urgent, which leads C to become distracted and less attuned to the CT’s interactional requirements.

## 5. Discussion

Following on from a previous finding that cardiac arrest emergency

69 CT: is he: okay is he awake  
70 (.)  
71 C: yes he's [awake]  
72 CT: [is he] breathing  
73 C: yeah he's [breathing yeah ]  
74 CT: [is he ] completely alert  
75 (.)  
76 C: yeah he is yeah  
77 CT: okay is he breathing normally?  
78 (1.0)  
79 C: he's just feeling a bit faint  
80 CT: [okay ]  
81 C: [() ]  
82 CT: is he [breathing norma- ]  
83 C: [yeah I think he's- (better) ]  
84 I think uh-  
85 yeah [I think you better hurry up]  
86 CT: [yeah the ambulance has been]  
87 no the ambulance has been organised  
88 they'll need to ask you these questions  
89 is [he breathing= ]  
90 C: [yeah okay ]  
91 CT: =normally  
92 (2.0)  
93 C: is he breathing normally?  
94 is he breathing normally?  
95 BYS: >no no no< he's not breathing  
96 C: >he's not- he's not breathing ()< he's not breathing  
normal  
97 CT: okay (.) does he have difficulty speaking between breaths  
98 C: oh he's on the floor now  
99 hold on a second now  
100 he's on the- he's collapsing now  
101 CT: he's collapsed is he, [alright ]  
102 C: [yep ]  
103 CT: hey listen do- if you don't know you just t-  
104 ah is he changing colour?  
105 C: .hh (1.0) oh:  
106 yeah yeah (.) [yeah ]  
107 CT: [has he] changed sorry sir you need to answer  
my questions  
108 if you [don't know you= ]  
109 C: [>yeah yeah< ]  
110 CT: say you [don't know ]  
111 C: [oh ]  
112 CT: [is he changing= ]  
113 C: [yeah we don't know ]  
114 CT: =colour  
115 C: no no no  
116 (.)  
117 CT: no o:kay  
118 C: yeah we're- we're doing CPR at the moment  
119 CT: okay is he clammy or have-  
120 you're doing CP↑R  
121 C: yeah yeah  
122 CT: o:kay well that's a bit different okay

Fig. 7. Transcript 1003.

calls with language barriers were characterised by significant delays (compared to 'non-language barrier' calls), this paper investigated the interactional challenges in reaching the critical point of OHCA recognition. We found that callers in language barrier calls often provided vital information about the patient's questionable consciousness and breathing, which could have led to OHCA recognition by the call-taker. However, such information could be missed when it was delivered in an atypical way, in inapposite turns (not conforming to the sequentiality of

the scripted protocol), or surrounded with hedges, hesitations or mitigation markers. Opportunities to recognise OHCA were also missed when call-takers did not probe further after such information or did not provide sufficient interactional space for callers to complete their turns. Therefore, our main finding is that delays resulted from issues of intersubjectivity, not progressivity. In other words, the delays cannot easily be explained by saying that it took callers and call-takers longer to move from one sequence to the next in language barrier calls. Instead,

our data suggests that the main reason for delays in OHCA recognition is a lack of mutual understanding, which most of the time seemed to remain unbeknownst to participants (cf. “hidden disjunctures” (Garcia and Parmer, 1999).

In language barrier calls, clues about the callers’ limited English should act as prompts for call-takers to adjust their approach to assist in mutual comprehension between both parties (Garcia, 2022). To assist in achieving intersubjectivity, call-takers could adopt more indicators of uptake in language barrier calls (Gerwing and Indseth, 2016; Meischke et al., 2010; Osvaldsson et al., 2013). Our data showed common use of minimal tokens such as ‘okay’ or ‘alright’ to indicate uptake but these were to signal hearing, not necessarily understanding, of the prior utterance. A sense that the call-taker is hearing *and* understanding the caller might help to instil assuredness that they are ‘doing the right thing’ in terms of, not only helping the patient, but meeting the expectations of the service. Such a sense could be more strongly instilled if the call-taker was able to overtly display understanding (Gerwing and Indseth, 2016), and repeat and rephrase callers’ contributions (Gerwing and Indseth, 2016; Meischke et al., 2010). Speed in emergency calls is critical which is why call-takers move through the interrogative series at a fast pace; and why they sometimes abandon opportunities to repair misunderstandings in favour of progressing the call, i.e. prioritising progressivity over intersubjectivity (Perera et al., 2020). However, for language barrier calls, inclusion of these additional steps could be warranted. Being mindful of intersubjectivity in these calls, by giving more time to accommodate callers with limited English, could help reach the milestone of OHCA recognition sooner in the call. The extracts did indeed show some evidence of call-takers orienting to the language barrier, doing extra interactional work such as slowing or reformulating critical phrases to assist understanding, and other call-taker strategies have been highlighted by previous studies (see Gerwing and Indseth, 2016; Meischke et al., 2010). It is worth stressing again that our data comes from an EMS which uses a scripted dispatch protocol, therefore call-takers do not have much latitude to adapt their speech to the language proficiency of the caller.

Related to the need for call-takers’ indications of understanding is the consideration of interactional space in a language barrier call. The excerpts showed evidence of overlapping talk initiated by callers, generally indicating a panic or emotional response to the patient’s status. For the call-takers, overlapping talk was usually a result of their drive to efficiently move through the script and not waste time, reflecting the limited affordances available to call-takers when the interaction is standardised with a script. The use of a script (such as the MPDS) means that the EMS places specific controls on when and which persons may speak and the type of contribution they may make (Antaki, 2011; Heritage, 2004). Call-takers are invested in preserving the routine organisation of the emergency call and averse to disruption (J. Whalen et al., 1988) which could be caused by a caller who does not conform to the local linguistic or interactional norms. When the sharing of interactional norms comes into question in language barrier calls, we cannot assume that callers are oriented to the specifics of the speech exchange system and understand the conventional practices of the protocol (Schegloff, 1999, p. 409). This could explain why unsolicited or inapposite caller turns containing vital information appeared to be missed by call-takers.

When speaking an additional language with low or medium proficiency, it is understandable that speech planning and production require more time. Such callers may take seconds longer to find the appropriate English words and could use more ‘floor time’ to provide qualifying clauses that include important information. If callers feel that they cannot get their message across because the call-taker keeps talking over them or moving to the next question, this sense of being hurried could be damaging in terms of missing critical information and instilling confidence and a sense of collaboration in the caller. Given that our previous study (Perera et al., 2021) found that language barrier calls typically take 18 seconds longer to recognise OHCA, spending a few more seconds

on achieving intersubjectivity could end up saving time.

A study compared the effectiveness of the MPDS protocol with the newly developed Los Angeles Tiered Dispatch System (LA-TDS), and found a significantly higher rate of telephone-assisted CPR among callers with Limited English when using the LA-TDS (Sanko et al., 2021). One reason for this improvement was that the LA-TDS treated vague descriptions of breathing and consciousness as suggestive of agonal breathing and grounds for OHCA recognition (Sanko et al., 2021). The excerpts in our study showed that callers sometimes gave ambiguous descriptions of the patients’ breathing (e.g. “hardly”, “pants”, “dying”) which would have benefited from further call-taker probing to understand what was happening. Current MPDS scripting can mean that opportunities for probing further and orienting to the nuance of what the caller says are not sought since call-takers pursue an unequivocal yes/no answer (Riou et al., 2018). While we acknowledge that the dispatch protocol is designed to save time, we propose that callers cannot be expected to conform exactly, and that space must be given for non-conforming responses to be taken into account. The alternative is that call-takers continue to seek a yes/no answer which may not in fact be accurate.

This has been a small-scale qualitative study of the interactions around problem description in language barrier OHCA calls. Our call-screening approach captured a broad subset of OHCA calls so we cannot assume that language barrier callers are a homogeneous group. For example, limited-English callers have different characteristics that impact on the call such as amount of time spent in Australia and familiarity with societal interactional norms. Such caller data was not available to allow for investigation along these variables.

Overall, this study advocates that EMS in English-centric societies could adapt to cater for language barriers, especially in a time-critical emergency such as OHCA where accessing an interpreter is not considered viable by practitioners. We make the following recommendations for emergency medical dispatch centres:

1. Develop call-takers’ skills to manage language barrier calls such as recognising signs of language barriers, specific questioning and probing, listening to unsolicited information, and allowing callers extra interactional space.
2. Explore what allowances can be given to call-takers to divert from script in a language barrier call. This can provide space for indicating uptake including reformulation, repetition, acknowledgement receipts and displays of affiliation.
3. As suggested by Garcia (2022), call-takers could be educated about the different communication styles and accents of English LX users. Such training should be mindful that English LX callers can display variation in terms of accuracy, fluency, and structuring of information during the call (Roberts et al., 2005). By understanding key differences between the dominant English variety and the most common languages spoken in the EMS catchment area, call-takers can learn to pre-empt certain potential misunderstandings (Garcia, 2022).

## 6. Conclusion

Language barriers in emergency calls can mean that the time taken to recognise cardiac arrest is delayed due to communication problems. This study responds to the call for more research on best practices for handling language barrier calls (Meischke et al., 2010). We used conversation analysis to understand the interactional challenges in language barrier calls. We found that delays were due to issues of intersubjectivity rather than call progressivity. In other words, there was a lack of mutual understanding which went unnoticed by either party. These findings resonate with Garcia’s (2022) work on “hidden disjunctures” in emergency calls with a language barrier.

We argued that certain communication issues, which are a challenge for all OHCA calls, are heightened when there is a language barrier,

including when the call-taker: misses vital information provided by callers; misinterprets callers' mitigated answers; and does not provide sufficient interactional space for the callers to interpret or formulate speech. To address such issues, call-takers could listen out for nuances in the callers' utterances and then probe callers to expand or clarify their meaning. Indicating uptake and initiating repair would also assist in achieving intersubjectivity. Due to the lack of time available to engage a third-party interpreter, call-takers need a toolkit of skills and strategies plus allowance to employ these, and divert from script, in the event of a language barrier. We appreciate that the call-takers are already working within a complex system that requires their compliance to a scripted protocol, however, having such a toolkit could empower them to manage language barriers more effectively which could positively impact OHCA recognition and patient survival. The improved intersubjectivity between call-taker and caller would help to work towards a more inclusive prehospital care system.

**CRedit authorship contribution statement**

**Nirukshi Perera:** Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Marine Riou:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Tanya Birnie:** Writing – review & editing, Project administration, Data curation. **Austin Whiteside:** Writing – review & editing,

Resources. **Stephen Ball:** Writing – review & editing, Data curation. **Judith Finn:** Writing – review & editing, Supervision, Resources, Funding acquisition.

**Ethical statement**

The study was approved by the Curtin University Human Research Ethics Committee (HR128/2013) and St John WA Research Governance Committee.

**Conflicts of interest**

AW is employed by St John Western Australia (SJ-WA); JF and SB hold adjunct appointments with SJ-WA and JF receives research project funding from SJ-WA.

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**Appendix**

Speech	self-interruption/truncation	-
	overlapping talk begins	[ or [
	overlapping talk ends	] or ]
Tone	sharp rise in intonation	↑
	rising intonation	?
	continuing intonation	,
Voice	increased volume	CAPITALS
	stress/emphasis	_____ (underline)
	exclamation	!
Tempo	drawn out/slow speech	< >
	hurried/fast speech	> <
	vowel/consonant elongation	:
Breath	inhalation	.hh
	exhalation	hh
Pause/Silence	pause (in seconds)	(1.0)
	micropause (< 0.5 second)	(.)
	no pause/latching	=
Transcriber's notes	uncertain hearing	()
	comments	(( ))

**Fig. 8.** Transcription conventions

**Data availability**

The data that has been used is confidential.

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