

Landscaping Risk in Medical Emergency Dispatch

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Contents

Introduction 1
Aims and points covered 1
The EMD System 2
Questioning: Or the art of asking 3
1.1 Closed Questions 5
Example 1: Successful formulation of a closed question 6
Example 2: Interactional breakdown and cause of negative spiral 7
Example 3: Interactional trouble resulting from disruptive overlapping talk 9
Example 4: Successful confirmation 10
1.2 Open Questions 11
Example 5: Successful elicitation of information 12
Example 6: Unsuccessful elicitation of information 13
Take home message 14
Problem Text: Or the art of highlighting 15
Example 7 and 8: Problem Texts that highlight risk successfully 17
Example 9 and 10: Problem Texts that unsuccessfully highlight any risk 19
Take home message 21
Closing Remarks 22
Appendix 23

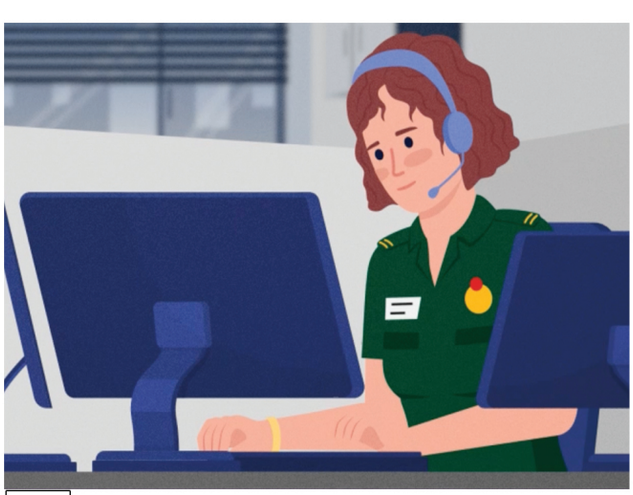




Risk communication in high-stakes or time-pressured situations is complex. An emergency '999' call is one such example of a situation of where someone needs to find a way to explain an unfolding, serious situation and request immediate help. The emergency service needs to quickly and precisely ascertain what has happened, what help is needed and where to send it.

To communicate and signal risk, speakers use a combination of indicators when they interact with other. Some indicators are well documented, such as lexis (the actual words used). Some are more difficult to interpret and record, such as breathing or high-pitched voice or the posture of our body (the way the chosen words are used). This booklet is concerned with risk evaluation in Emergency Medical Dispatch (EMD) decision making. EMD is based on successful assessment of risk indicators in speech and their translation to texts (such as into the dispatch software / the Computer-Assisted Dispatch system (CAD)) for an appropriate response. However, the full circuit of decision making leading to dispatch is not well landscaped. This is a gap our project has addressed.

In the UK, emergency calls are highly structured and operationalised through the 999 call. All call-takers are trained to adhere to internationally standardised triaging protocols which provide scripted questions and speech which call-takers must follow when interrogating an emergency. Although highly structured, the protocol in and by itself is not enough to translate the way callers (lay users of the system), communicate risk to the information the health system needs to decide what resource is required when and how. Figure 1 covers the complex work that call-takers need to do beyond what the structured protocol covers.



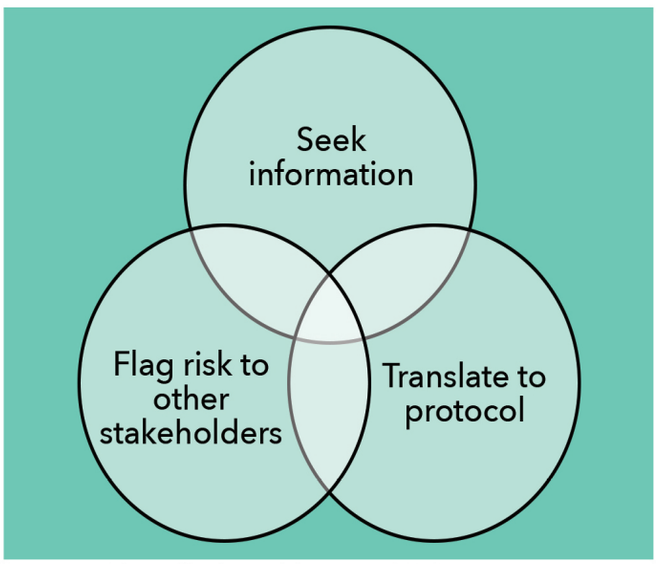


Figure 1: The call-taker (abbreviated CT) action map

The complex work call-takers do is the gateway in the emergency health services for the public, as well as the gateway in resource management for all other stakeholders involved in EMD.

Aim and points covered in this booklet:

This booklet is based on research work and collaboration with the Welsh Ambulance Service and Emergency Medical Retrieval and Transfer Service (EMRTS). Diagrams draw on the local service architecture and are intended to be read as a case study supported by examples through which issues of wider relevance are addressed. It is for key stakeholders involved in EMD. The material seeks to raise awareness among staff performing the call-taking role, as well as strengthening the training provided for these staff and to inform relevant policy to support the work of all teams involved in EMD.

The booklet focuses on two key features in the handling of the emergency call: **Questioning** and the writing/creation of the **Problem Text** in CAD.

The former is a key tool for all health and care professionals to elicit information and the latter of particular significance for highlighting and flagging information to key stakeholders involved in the EMD and response process.

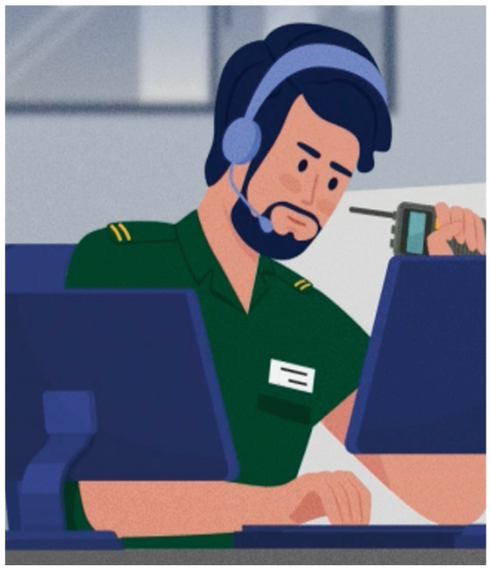
The booklet is designed to provide strategies and share good practices on the act of asking questions and writing the problem text field in the high risk, complex, time-sensitive setting of 999 calls. Through examples from our research data, we show linguistic practices that can help health professionals develop systematic strategies when interacting with the public and in inter-professional teams.

We also show that there is no 'one size fits all' in risk interaction. No linguistic practice is per se beneficial or detrimental to the conversation. Whether a practice is effective in achieving its communicative goal or not is always a contextual judgment. We highlight some examples of where certain techniques may support greater clarity, or where they may complicate the interaction.

When people talk to each other in a 999 call, sometimes things may not go as smoothly as desired. Anything that disrupts the flow of the conversation, like misunderstandings, interruptions, or long pauses are known as interactional trouble. These 'bumps' in the conversation will impact both the quality and content of information as well as the relationship between the two parties talking to each other. We show in this booklet the sophisticated work that is required to make sure we accurately understand each other and keep the conversation going.

In summary, inter-action involves an action and an uptake. Call-takers negotiate a complex choreography with callers: this applies both to the interactional flow and the transfer of risk indicators for others in the decision-making chain (see Figure 2).

The EMD landscape is complex with different actors needing different information to make decisions to fulfil their institutional responsibilities.



Whether a particular choice of words and phrasing (linguistic practice) works or not will depends on:

a) **the stage** of the emergency call it occurs.

b) **the flow** and interactional relationship that has been achieved already between the participants

c) **how the interactional and information flow is handled** in the uptake by both.

The EMD System

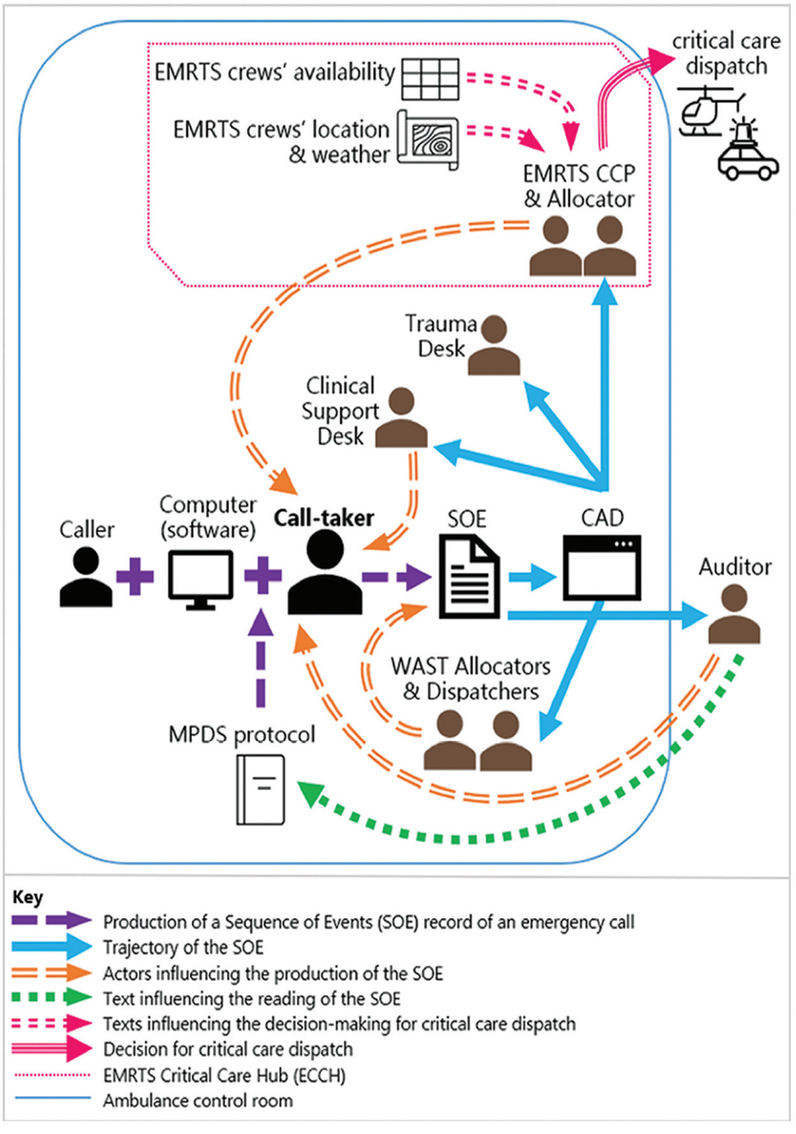


Figure 2: The control room and decision-making flow

Questioning: Or the art of asking



In an emergency call, eliciting information is central to the nature of the encounter. Questioning is a well-established process in all diagnostics.

There are different forms of questions. Some can be formulated/structured in the 'iconic' form of a question (e.g., *'is the patient completely alert?'*). Some other forms may be understood as part of the questioning process in a context (e.g., *'tell me exactly what happened'*, *'Okay sir, so em I want you to say now every single time she takes a breath in okay? starting immediately'*, *'Okay so if you try talking to her now and see if we can get a response from her'*). Questioning involves both collating and seeking information, confirmation of accuracy or clarification of accounts provided.

This section of the booklet includes examples from our data showing different **forms** and **functions** of questions.

Successful questioning involves:

a) **Introducing a question**: this is achieved by 'claiming the interactional floor' typically using a cue that indicates the intention to summarise or extend information provided. These are often small words such as 'okey' and 'so' that summarise what has been said and make interactional space for creating new information.

b) **Verbalising the question**: this is achieved through the structure and lexical choices that make up the question and the context (*is the patient awake?*)

c) **Opening the interactional floor**: for the caller to respond, typically through an intonation cue (tone of voice and rising or falling intonation) and pause.

In a 999 call, questioning often addresses issues requiring knowledge not available to the caller (e.g., on ***whether the patient is conscious*** (see also example 2) or on ***where patient is injured***). This may lead to blocks in the flow of the conversation. The way questions are introduced and a conscious process of reformulation may help to make progress in the conversation.

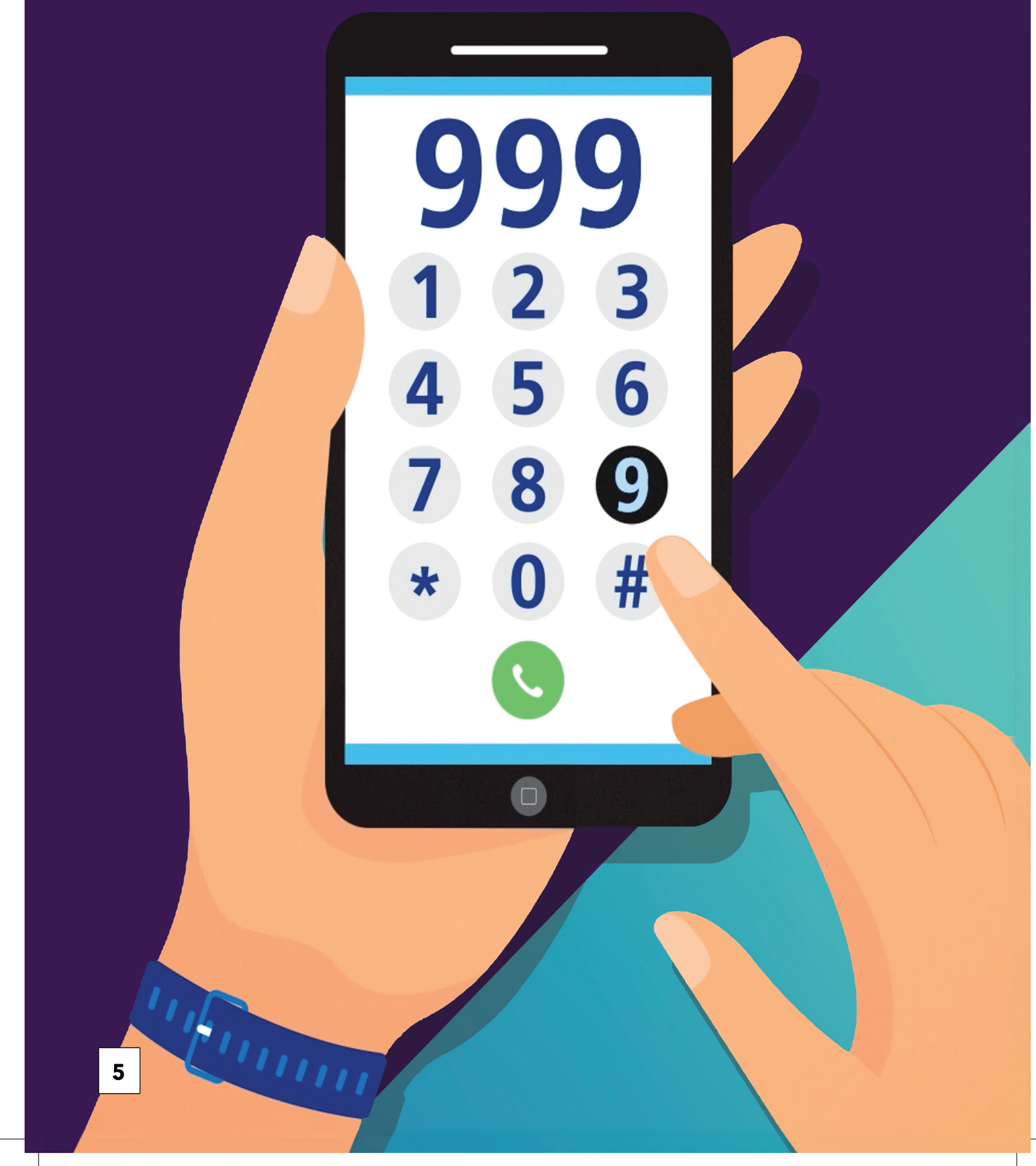
Common questioning designs include: closed questions, inviting a yes/no response, and open questions.

Question form	Question function	Question initiation
Closed yes/no **Open - in the form of a sentence**	**Eliciting information** **Clarifying information** **Confirming information**	**Okay** **And** **But** **So** **Pause**

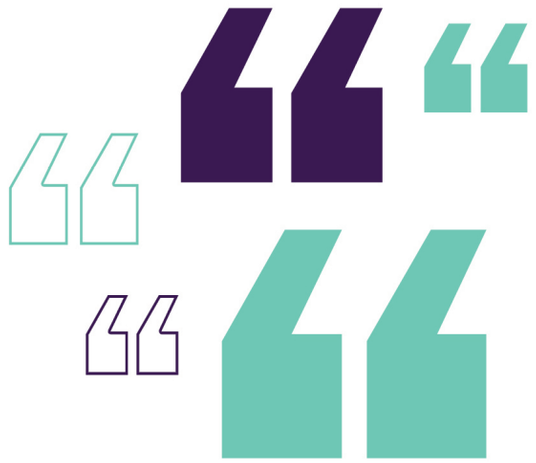
Table 1: Summary of questioning mechanisms



(1.1) Closed questions



Closed questions often require the caller to give a yes/no answer. Closed questions could be straightforward for the caller to respond. They increase efficiency in seeking new information and moving forward in the scripted/structured interrogation series, which is essential in a time-critical setting.



Example 1: Successful formulation of a closed question

69	C-T:	→	But is he- is he completely ↑a↓lerth
70	C:		Yeah he is_
71	C-T:		=okay. (1) .hh right. and- (.) you mentioned the leg
72		→	there, >is there any other part of the body< that's
73			in↑jured?
74			#N:↓o#.

The example shows the design of a questioning mechanism that invites a direct confirmation/rebuttal through a yes/no format. Here the call-taker initiates a questioning formulation with the use of a cue that signals opposition to what has already been said. Note here the use of 'but', typically used to juxtapose an opposition to information provided earlier. The caller's response indicates a successful transition.

Following the first question, the call-taker initiates a second using two verbal cues, 'okay' and 'right', followed by a falling intonation (drop in the tone of voice) cue to indicate that the caller's response was heard and recognised. Using 'and' (line 71) to initiate the second question prepares the caller to receive the question coming up. As was the case earlier, the response shows a smooth flow between the caller and the call-taker.

Despite their straightforward and easy design, there are also limitations with closed questions. First, callers may not always provide an accurate response; sometimes because they are not equipped with the knowledge to do so. A case in point is patient's consciousness, which is a significant risk indicator. In that case reformulating (using different phrasing) is a useful strategy to progress the interaction.

Example 2: Interactional breakdown and cause of negative spiral between caller (C) and call-taker (CT)

140	C-T:	→	>Is he conscious at the moment?<
141	C:		<#er:m#> he's <#going#> in and out basically_
142	C-T:	→	>okay.< so (.) >if you look at him< closely right now is
143			he conscious?
144			(3)
145			(2) ((indistinct voice talking in the background))
146	C-T:		is that him talking,
147	C:		Yeah_ (.) No he's not talking_
148	C-T:	→	>okay_< (.) so is he conscious at the moment?
149			(2) ((indistinct voices talking in the background))
150	C:		<erm> (.) he's going in and out_
151	C-T:		>Okay.<
152			=((indistinct voice talking in background))
153	C-T:	→	=>so I need to know if he's conscious or unconscious<
154			↓now.
155	C:		He's <unconscious at the moment_>
156	C-T:	→	=Okay. (2) °#alright#.° (.) so if you talk to him (.) can
157			you see if you can- (.) try and get a response from him?
163	C-T:		He said yeah.
164			(1)
165	C:		<Yeah.>
166	C-T:		=right. okay. so that means he is conscious okay, (1) if
167			he's responding to you,

Example 2 begins with a question presented to the caller in a conventional form with a rising intonation. The hesitation in the caller's response, as indicated by the slowing down in speech and the creaky voice, and the caller's word choice suggests that the caller struggle to give a definite answer to the question. The call-taker then responds to the caller with a cue, okay (line 142), that typically summarises what has been said and moves the conversation forward, before repeating the same question.

In the following part of the conversation, the long pause (line 144-145) and other hesitations (line 150, 156) shows the caller struggles to evaluate the information. The call-taker does not respond to this trouble signalled by the caller and repeats the same closed question varying only for the time indication alternating between 'at the moment' and 'now' (line 142, 148, 154).

This strategy does not lead to a successful outcome and creates a negative interactional dynamic between the caller and call-taker. In the 999 context, building a synergetic interactional relationship is fundamental for the success of the encounter.

The repetition of the question format, and the 'failure' of the caller consumes time, break down the conversational flow and is only resolved when the CT reformulates the question indexing – 'a response from the patient' as a marker for whether the patient is conscious or not.

The reformulation fills of gap of the caller's lack of knowledge so the conversation can progress.

To sum up, asking questions successfully often entails changing the structure/format of a question to help **move out of a negative spiral** such as the one observed in this example.

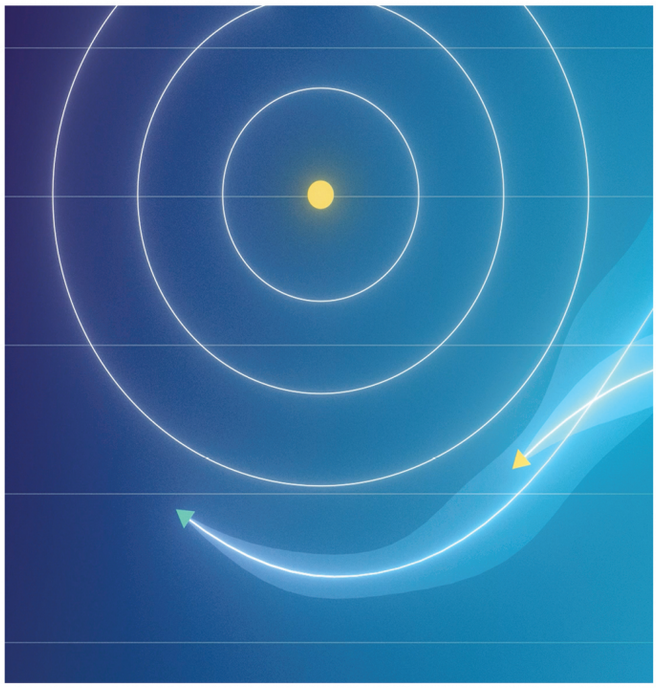
(Another example: '***keep talking to her see if we can get any sort of response from her***')

NOTE: Small words, such as okay and so, are particularly useful in summarising. They can be used to invite confirmation of accuracy and reassure the caller that their account has been registered.

Limitations of closed questions:

Closed questions are typically chosen for economy of time, but they can also have the opposite result as they require a definite response which is often beyond what the caller can answer in the heat of the moment. This can lead to interactionally negative results, either inaccurate accounts of the situation or pressure to commit to a definite response.

NOTE: Yes/no questions are often followed by a longer account when the speakers want to deviate and take ownership of the story telling (challenge the question design). Despite the need to proceed to the following question as per the protocol, these accounts are often useful, and interrupting may cause a breakdown in the interactional flow and delay or loss of information.



Example 3: Interactional trouble resulting from disruptive overlapping talk

34	C-T:		=O:kay (.) is the patient awake?
35	C:		Yes he is [he's in pain though.]
36	C-T:	→	[Is the patient breathing?]
37	C:		Yes he is [he's broken his leg] come (.) come-
38	C-T:	→	[Tell me exactly what happened]
39	C:		=pardon?
40	C-T:		<Tell me exactly what happened>

Closed questions may also have the opposite result if they are posed to the caller 'at the wrong time.'

In this example, the caller gives an elaboration that is beyond the scope of the original yes/no question. Despite so, the information offered could nonetheless be valuable for other stakeholders to evaluate the risk of the emergency.

Here the call-taker does not acknowledge the caller's report which can lead to information loss or delay. Since the caller cannot hear the call-taker's overlapping speech, the caller also needs the call-taker to repeat (line 38-40). This breaks the interactional flow and potentially 'cut off' an account useful for the call-taker to flag.

In closing, closed questions are a very useful tool which however needs to be **framed** and **designed** to support the caller. Apart from eliciting and extending information given, they are also useful tools for confirming the issues reported and recording them for other stakeholders involved in the decision making. This function of questions is often signalled with a different form, that of a statement (declarative).

Example 4: Successful confirmation

147	C-T:		Okay, (.) and he's taken: erm (1.5) a lot.
148	C:		Yeah, he has taken a lot love yeah.
149	C-T:		°=okay so I've just put taken: (.) a lot °
150	C:		>(Nothing but empty packets) ( ) (where we are)<
151	C-T:		Okay, er:*mhh* (1.5) I'll just put lots of empty packets,
152			(1) surrounding patient
153			(6.5)
154		→	And he's also been drinking with those.
155	C:		Yeah.

When such closed questions are used to ask about what is happening currently, they can help call-takers seek the most updated information and, if needed, to flag risk to other stakeholders according to the latest changes.

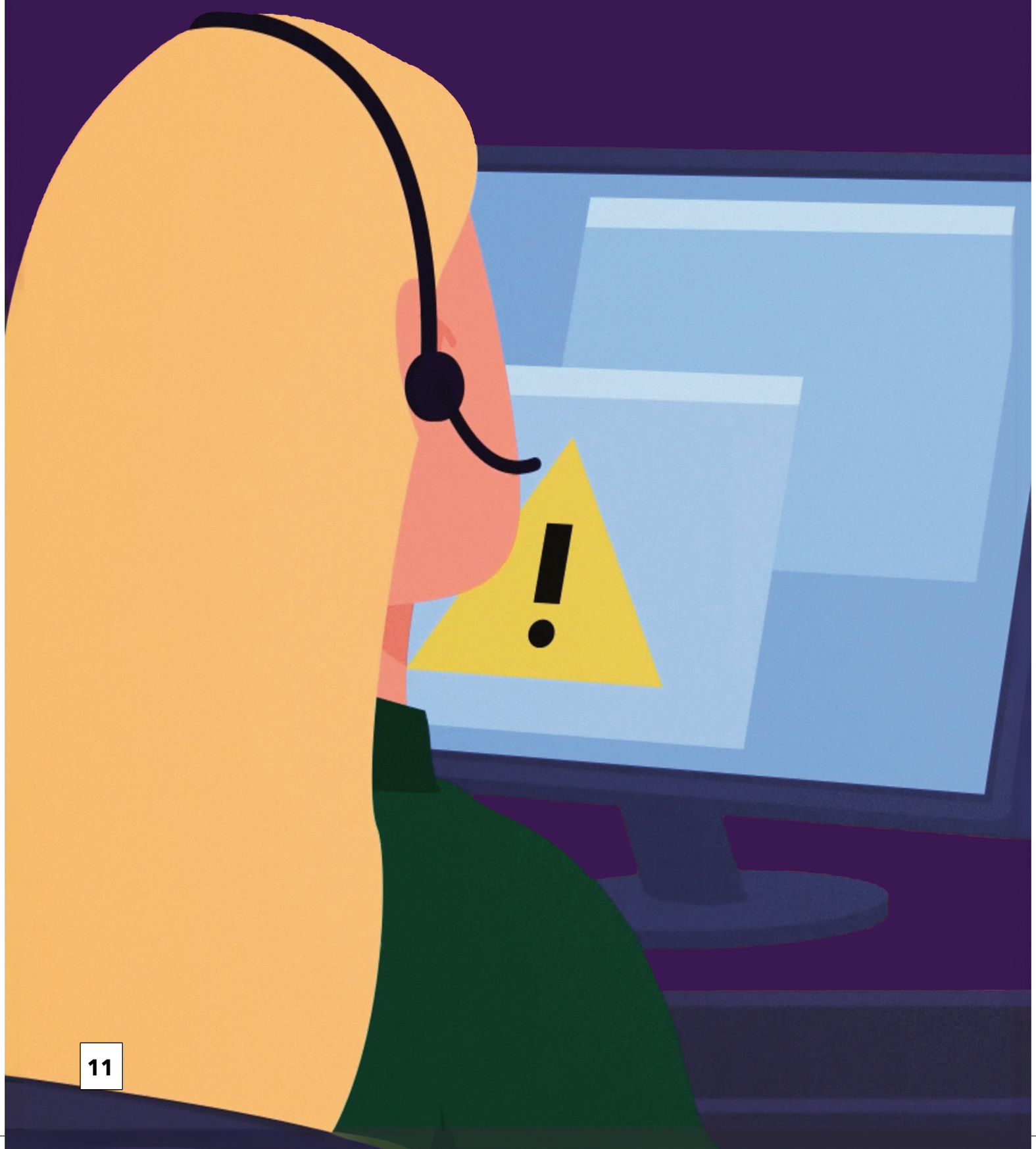
As in example 4, closed questions can be used to recap what has already been reported by the caller. In the example, the call-taker and the caller are co-constructing the formulation of the emergency (possibly via adding a free text). The call-taker recycles not only information that has just been given (line 150) they also add information that was reported before (line 154). The statement design of the questions invites the caller to confirm the accuracy of this information recapped.

Overall, then, when used to talk about what has already been reported, closed questions can help call-takers confirm the risk they are about to report to the system.

NOTE: Taking the initiative to formulate these close questions can help call-takers speed up to seek, confirm, or update a particular detail that they need or that the call-takers perceive to be critical for risk indication. This improves the efficiency of the emergency call.



(1.2) Open questions



Open questions are questions that cannot be responded with a yes or no or predetermined choices. They allow callers to give information with less restraint (compared to closed questions), but they also offer little support to the caller to formulate their response.

In this material pack, we focus on the prompt 'tell me exactly what happened', which does the work of a question even though its form is that of a command or instruction (an imperative). It is the last question asked in case entry. The question is aimed to seek information from the caller to form an overview of the risk involved in the emergency. The content of the caller's response would be used to form the Problem Text, an unstructured text that the call-taker type to highlight risk of an emergency (see 'Problem Text').

Without structure provided to the caller, there is significant variability in how callers answer the question. Some callers' response encompasses the context and/or the mechanism of injury, which offers enough material for the call-takers to construct a Problem Text that translates the risk of the emergency to the system.

Example 5: Successful elicitation of information

This example shows how the design of an open question can give space to the caller to freely narrate the emergency. In the caller's free-narration, the call-taker makes a repetition to confirm her hearing/understanding (line 32). The call-taker also utters 'okay' not in a falling tone and not with any more verbal response (line 35). Both function as signals to the caller to take the interactional floor to continue their elaboration in reporting the risk involved in the emergency. Without interruption, the caller 'successfully' supplies information that describes the context, the mechanism of injury, as well as highlights specific risk.

However, some callers did not respond to the question accurately or with relevant risk indicators. Information provided is of little use to the system, defeating the intended purpose of the question.

27	C-T:		Exactly what happened?
28	C2:		>I don't know what happened_< (.) >I wasn't there*h*< (.)
29			er (.) >we just came across her< (.) she's with <her>
30		→	(.) son-in-law (and) she's fall on the rocks and hit her
31			head
32	C-T:		Fall on the [rocks.]
33	C2:	→	[>Quite a big] gash on the back of her
34			head,<
35	C-T:		#Okay_#
36	C2:		>And I don't know whether< she's damaged h*h*er (.)
37		→	#<a#n>kle or her knee or something >as well she can't
38			get up<

Example 6: Unsuccessful elicitation of information

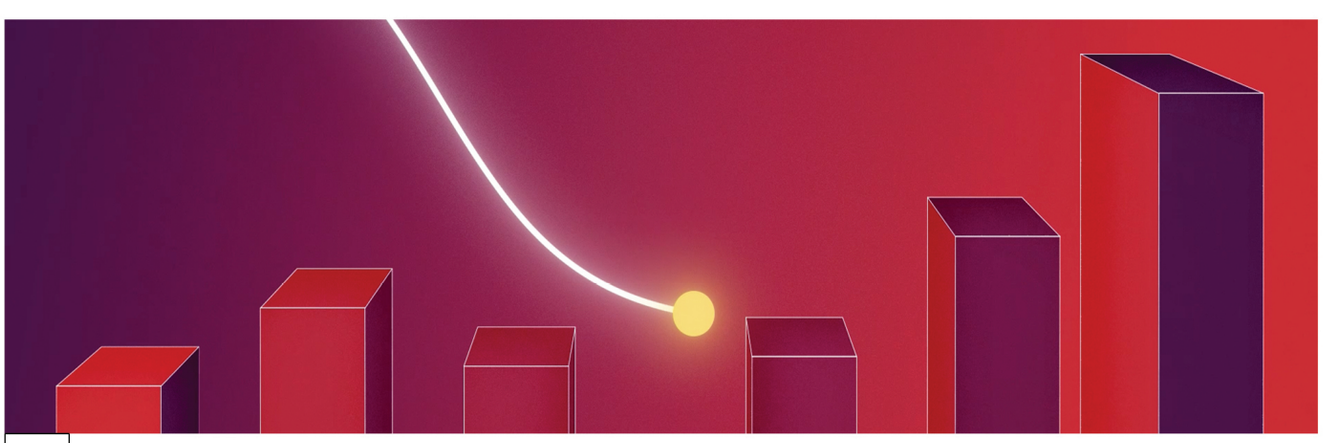
24	C-T:		=Okay (.) tell me exactly what happened_
25	C:	→	<Er:m he:: was> (1.5) ↑o:n the ladder (.) >all of a
26			sudden< (.) he just decided to come down (.) without
27			assistance (.) <#and# erm:> (.) the ladder slipped, and he
28			fell.

This example shows open questions can be ineffective in eliciting useful information. Exactly because of the open design, the caller in this example is not provided with support to fill their narration with content that is 'appropriate'/needed for emergency medical services.

Since a call-taker is not allowed to ask the caller for more information which will be sought later in the scripted protocol, even when the caller's response lacks specifics and the caller may show hesitation/struggle to formulate the narration (line 25), the call-taker cannot add follow up questions to elicit new information. The open question thus becomes unsuccessful in flagging risk to other stakeholders.

The impact of this variability in callers' responses connects with the timing of when the question is posed, and the institutional constraints faced by the call-takers. The response to the question will form the Problem Text – the first textual record to inform other stakeholders about an emergency. When the caller cannot provide an answer that include the context and/or a mechanism of injury, the Problem Text is vague or lacks the necessary evaluation that the CT can provide based on the experience of the call. This delays efficient flagging of risk to other stakeholders, and, in turn, triaging and dispatch decision making (see 'Problem Text').

At the same time, even when a caller's response lacks specifics, a call-taker is not allowed to ask the caller for more information which will be sought later in the scripted protocol. As such, open questions are quite restrictive for call takers and can lead to a difficult interactional context where the callers cannot be supported to articulate the nuance of the emergency- which further adds to the difficulty of lacking specialised knowledge.



Take home message

When questioning succeeds in its interactional function, it is a powerful mechanism for organising the encounter. The framing, the use of cues to index that a question is about to follow, and the design of the structure are critical for the caller to be empowered to fully contribute to the encounter.

However, questioning does not achieve its intended results when

(a) the structure or content is being unknown or difficult for the caller.

(b) the interactional timing of questioning is disruptive to the flow.

(c) the questions may create negative impact on the relationship between the call-taker and the caller.

It will become challenging to elicit accurate and reliable information from the caller and/or to transfer the information to the EMS system.

NOTE: Each type of question has interactional benefits and costs. They can be used to seek the information necessary to indicate risk. But users should be aware of the interactional and knowledge-based difficulties that callers may encounter for each type of question and how the use of different questions may impact the conversation, so as to facilitate the conversation to flow and the transfer of risk.

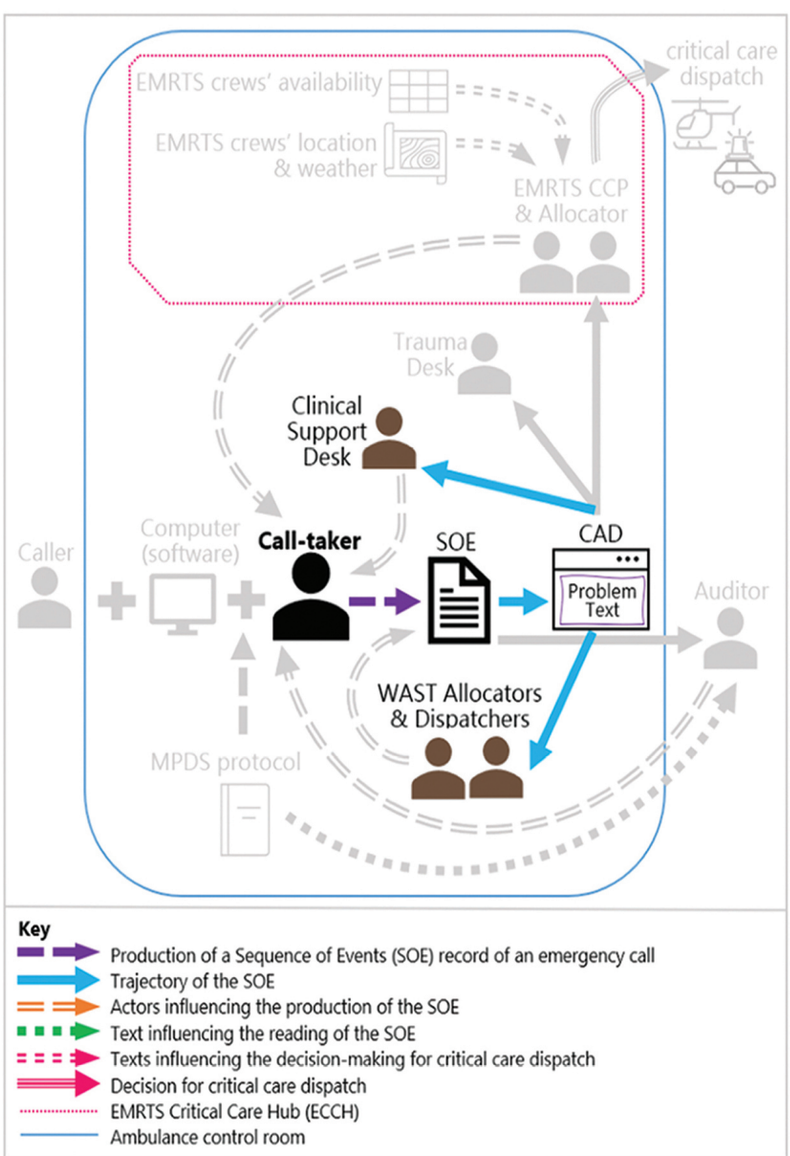
When significant bumps (interactional trouble) occur in working with the caller, a practical way out of it for call takers may be to vary the formulation of the question to try and unblock the road. This needs to be compliant with the constraints of the scripted triage system. Our material seeks to provide input to trainers and auditors to work with caller takers using the aforementioned approaches.



Problem Text: Or the art of highlighting

In every emergency call, call-takers must create one Problem Text – which is often seen as leaving a permanent record once entered the computer system – before they proceed to the scripted Key Questions in the interrogation protocol.

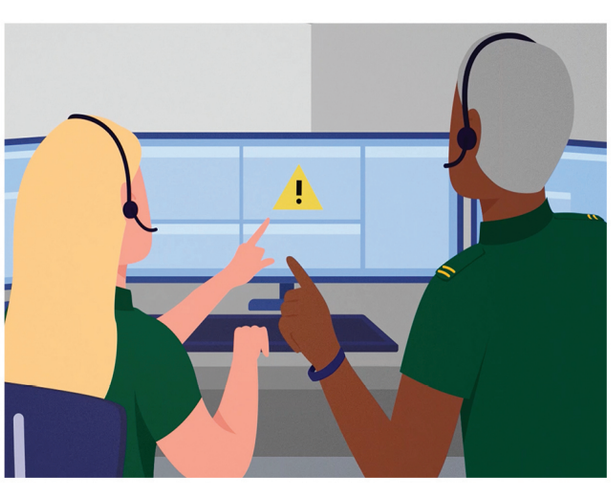
Problem texts play an important role in flagging risk to other stakeholders in the response chain in a glance. They are one of the first pieces, if not the first piece, of information that different stakeholders in the control room utilise to make decision on what actions to take next for triaging or dispatch of resource / whether to further interrogate the call, among all the calls that are constantly added onto the EMS system.



For example, when a Problem Text appears on the Computer-Assisted Dispatch system (CAD) even when the emergency phone call is still in progress, Dispatchers and Allocators will read it to estimate the likelihood for the call to be a high priority (red) call, and start to plan how they would need to allocate/re-task existing resources for that call.

When the emergency call becomes a red call, the clinician at Clinical Support Desk (CSD) responsible for reviewing all red calls for their 'appropriateness' will start by reading the Problem Text. The content of the Problem Text becomes the centre of the reviewing process.

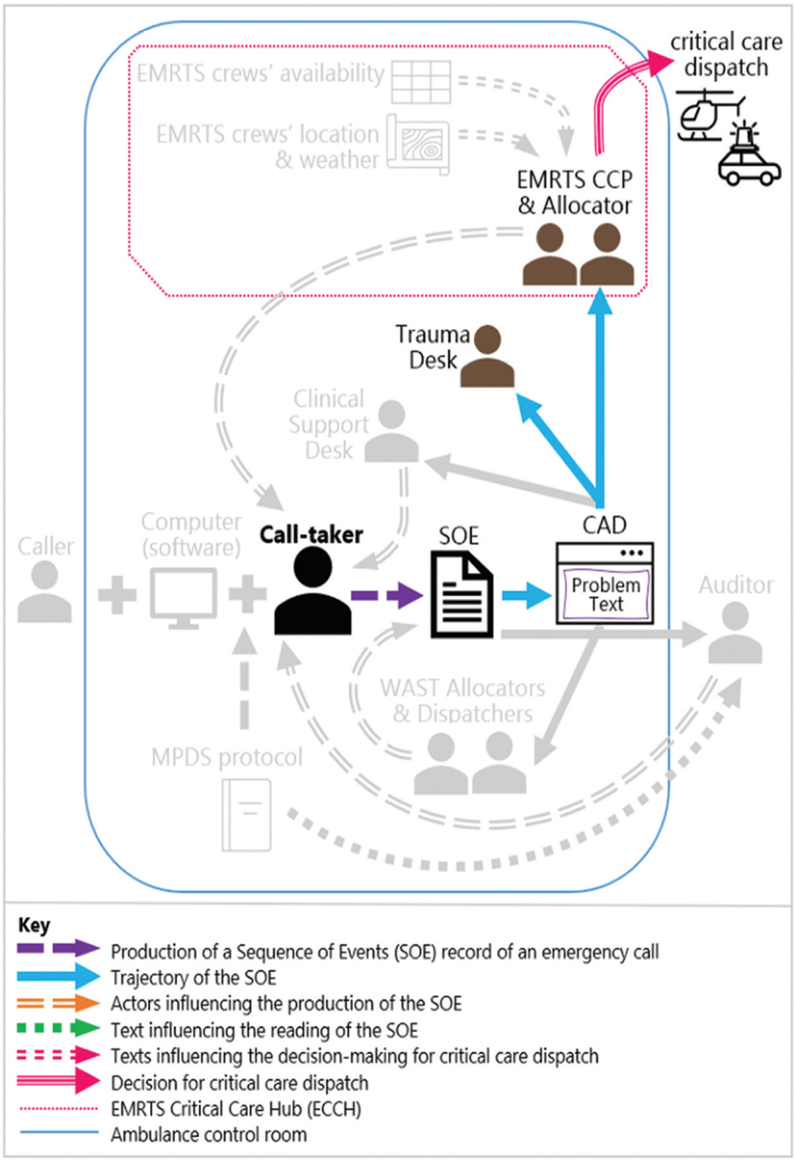
Likewise, other clinicians at CSD who need to follow up and/or call back the caller from calls of other priority levels would begin their interrogation process by reading the Problem Text. They would see if the Problem Text highlights any risk and context of the emergency/injury, which, in turn, paints an overall picture about the emergency for them, helps them anticipate what information they should see from the Sequence of Events record (SOE), and prepares them to know what specifics to look for before they go further to the interrogation process. This is crucial for an efficient interrogation process.

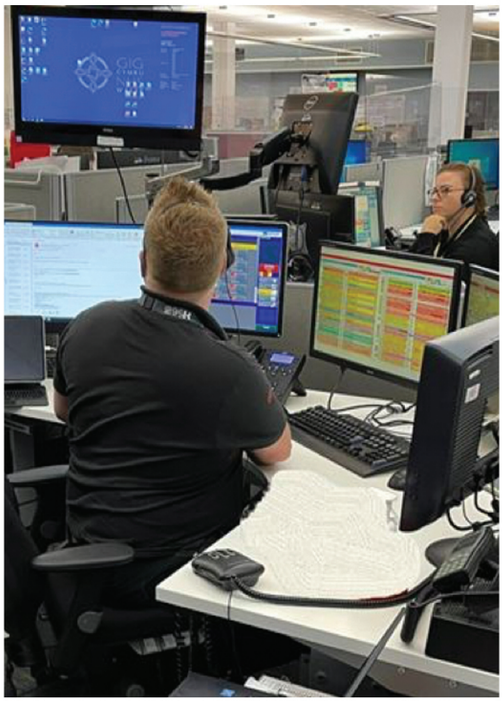


Other stakeholder groups relying on the Problem Text from the CAD are the clinicians from Trauma Desk and EMRTS the critical care desk. They need to get from the Problem Text an initial idea of level of severity from trauma and/or in need of critical care for life-threatening or limb threatening emergencies.

The Problem Text is again essential in immediately helping the clinicians from Trauma Desk and EMRTS visualise the emergency and, in combination of their expertise and experience, informing their triage or dispatch decision making.

NOTE: The more ambiguous the content the more difficult for the different stakeholder groups to 'translate' the message for their own needs. The same applies when the information load (how much detail) is not appropriate for the purpose of this text. Noting verbatim what a caller said may be equally ineffective as some disparate words. The examples in this section provide some insight.





Problem Texts that are written with clear, well-defined mechanism of injury and/or context of the emergency efficiently flag risk to other stakeholders by making risk instantly visible and other associate risks 'predictable'. They facilitate stakeholders to make timely informed decision-making.

Example 7 and 8: Problem Texts that highlight risk successfully



Example 7

What's The Problem:

SINGLE CAR CRASH , PT IN CAR , HIT TREE , TREE IS IN CAR WITH PT

185	C:		Yes
186		→	(>hang on<) there's a ca:r crash_
187		→	A single car_a white car,
188		→	A young male (0.2) in the car,
189			(0.2)
190			Er he's obviously lost control,
191		→	=He's collided and he's hit a tree,
192			(0.2)
193		→	The TREE*h* (0.2) is in the driver's seat of the car
194			(0.2)
195			He's got leaves all around him_

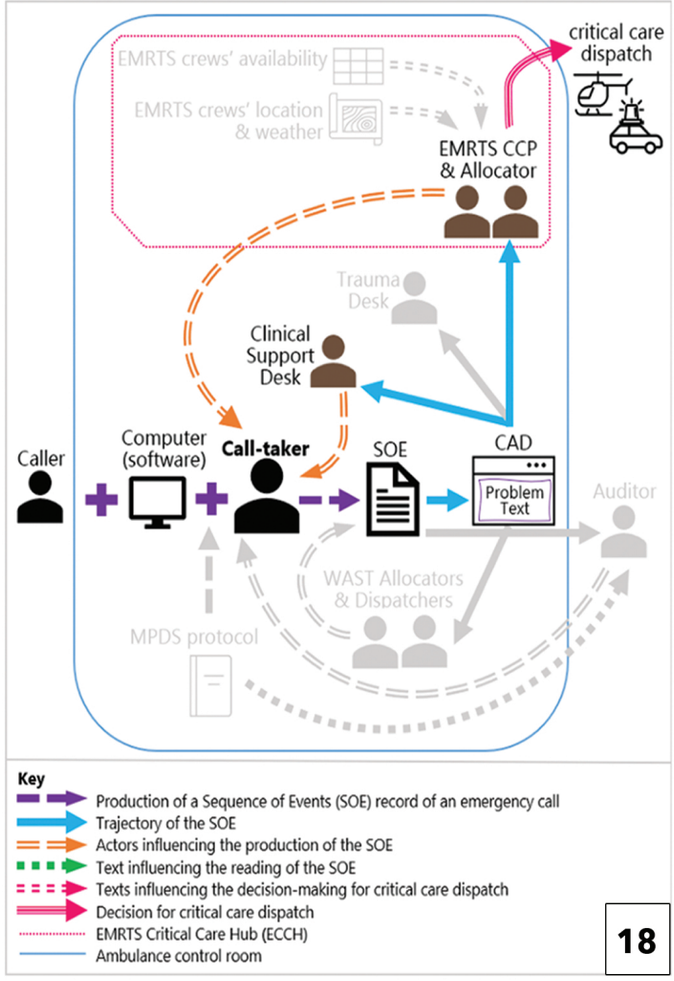
Example 8
What's The Problem:
JUMPED OUT OF THE WINDOW, LOOKS LIKE THE LOWER LEG IS BROKEN

44	C-T:		(Can you) tell me exactly what's happened?
45			(1)
46	C:	→	He's jumped out of a window, (.) o:f a::: >house,< (.)
47			er:m >on the concrete_< (.) and his leg's quite badly (.)
48			m:aybe perhaps broken,
49	C-T:		=[right]
50	C:		=[erm] we're supporting it now on a cushion, (.) so
51			he's getting a lot of pain (.) here >(in the) minute,<
52		→	.hh er:m (0.5) so it's like the lower leg looks like
53			it's (1) broken.

Problem Texts appear on the SOE following the heading and prompt '***What's The Problem***'. Successful Problem Texts depict the problem of the emergency as shown in examples 7 and 8. This is not achieved through standard (full) sentence structure, which is not necessary in this context. It is achieved through the call-taker's skill to identify and select, from the caller's speech, information that can be of significance to other stakeholders in EMS; as well as record these ***risk indicators*** in the Problem Text even when parts of the sentence are missing (elliptical constructions) since full sentence structure is not necessary. It is so that other stakeholders, especially clinicians, can promptly 'estimate' the intervention they or other stakeholders can offer to the patient or other services. An efficiently constructed Problem Text or helps project what further information is necessary to make decision on intervention and dispatch. On a computer screen, where new Problems Texts are constantly appearing adding to the attention span of all involved, successful Problem Texts attract attention ('***by making themselves stand out***') and enable quick decision for further action.

In terms of timing, a Problem Text appears on the CAD typically at the end of the case entry and at the beginning of interrogation series with the Key Questions. 'Successful' Problem Texts can swiftly attract the attention of other stakeholders and enable them to decide whether to listen to the interrogation live while the emergency call is still in progress. Stakeholders can then directly pose questions beyond the scope of the Key Questions for the call-takers to ask the caller. They can also listen to the risk indicators reported by the caller instantaneously. This means risk indicators enter/are transferred to the system directly, increasing the overall efficiency of dispatch decision making.

However there are Problem Texts written with little information beyond the Chief Complaint. The problem of the emergency then is too ambiguous for immediate action. No specific problem or risk indicator is flagged to the other stakeholders. More work and time are then required from the stakeholders to make sense of the unfolding interaction between the caller and call-taker and understand the emergency. Problem Texts with incomplete information hence may decrease the efficiency of dispatch decision making.



Example 9 and 10: Problem Texts that unsuccessfully highlight any risk



Example 9
What's The Problem:
FALLEN OFF THE MOTORBIKE

40	C-T:		<Tell me exactly what happened>
41	C:	→	So he was on his motorbike? and he did a- He was doing a
42			wheelie? (.) and erm (.) he was >going up< (.) you know
43			(.) on one- one wheel >(at) the< back and he's (.)
44		→	fallen off and he (.) he's a compound fracture like a
45			real (.) real bad leg (.) leg (1) ((indistinct voice
46			screaming in the background)) fracture
47			(2)
48			He's in a lot of pain.
49	C-T:		O:kay_

Additional information: Around 1 hour 45 minutes after the call had started. Information from a duplicated call came in from a caller who identified as an off-duty paramedic. The Problem Text from that call states that '[…] poss spinal injury injured tor right leg, open lower compound, circulatory compromise'. The content of this Problem Text contrasts with the content of example 10 where there is no mentioning of the broken leg.

Examples 9 and 10 do not succeed in highlighting risk. In such cases, acquiring the necessary information becomes complex. Stakeholders at times may be able to obtain content from within the control room, such as any other textual remarks left by the call-taker in the SOE.
At times stakeholders may need to rely on other stakeholders outside the control room, such as from another call taken (example 9) or the crew attending scene (after they have arrived) (example 10). This may result in negative impact on the system's ability to provide effective and fast response.

Example 9 showcases the significance for the call-taker to identity, select, and report information to put in the Problem Text to highlight risk when it is given by the caller.

The variability in the writing of the Problem Text (e.g., in 9; 7 and 8) provides an opportunity for training which can both achieve awareness raising and disseminate shared linguistic strategies for capturing adequate information value for all stakeholders in the response chain.

Example 10
What's The Problem:
FALL FROM LADDER

1	C-T:		Ambulance service what's the full address of the
2			emergency_
3	C:	→	<Er:> hi there (.) er: I've a guy >fell from a ladder?<
4			(.) at-
24	C-T:		=Okay (.) tell me exactly what happened_
25	C:	→	<Er:m he:: was> (1.5) ↑o:n the ladder (.) >all of a
26			sudden< (.) he just decided to come down (.) without
27			assistance (.) <#and# erm:> (.) the ladder slipped, and he
28		→	fell.

Additional information: Around 1 hour 50 minutes after the call had started, Trauma Desk updated with information from crew on scene that the patient had a closed femur fracture with deformity and a wrist injury. The injuries are important information that is not mentioned by the caller.

Example 10 showcases a challenge faced by the call-taker when writing the Problem Text. As mentioned in subsection 'Open Questions', call-takers are not allowed to ask for more/new information from the caller if the caller does not specify any risk when answering 'tell me exactly what happened'. The call-taker then will have no other option but to leave the Problem Text as one that is unsuccessful in highlighting risk. This stresses the callers' role – not just the call-takers' role – in the (co-)creation of the Problem Text.

This challenge also linked to the scripted question posed to the caller. The caller is invited to '***tell [me] what happened***'. The caller is not (explicitly) asked 'what's the problem'. In example 9, the caller responded to the instruction with an organised narrative that presents a clear order in which events happened. Despite complying with the instruction, the caller did not specify the problem, which is needed in the EMS context.

In contrast, although the caller from example 8 (a police officer) did report the problem, their response is indeed not answering/narrating '***exactly what happened***'.

In summary, there is a discrepancy between what the scripted question '***tell me exactly what happened***' invites and may lead to a narration of part of the whole story, and what information the system indeed seeks, namely the specifics of '***what's the problem***'.

NOTE: The mismatch between global narrative and specific issue needs to be translated as it is processed through the system. The call-takers are expected to take this role (see Figure 1) which however also comes with the constraints imposed on them by the need to follow a scripted system and also not trained to follow their interactional initiative, rather the opposite. The challenges involved in managing this conflicting reality is evident.

Take home message

Crucial to facilitating (seamless) decision making in a multi-actor system is to understand how one's action would impact the work of the other actors/stakeholders. In our setting, the Problem Texts construction is of central significance for the system's ability to operate.

They allow key stakeholders to complete their work and meet their institutional responsibilities. The nuanced process of: identifying, selecting, translating and recoding critical information to the system is essential for timely, informed decision making for triage and dispatch. This is a multilayered process which the call takers perform.

Further support can be provided – such as through revised training and guidelines – to help systematising the notating in this context, which could give substantial benefits across the chain of EMD decision making.



Closing remarks

When people describe stressful, complex and unpredictable situations, there is no 'one size fits all'. No linguistic practice per se is beneficial or detrimental to the conversation. This is always a contextual judgment. Good practices in questioning and using Problem Texts facilitate call-takers to seek information from the caller and to highlight risk to other stakeholders more efficiently. Both are important in communicating risk by connecting the lay-users' world to other stakeholders in the EMS system. But to effectively do so, users need to be aware of the limitations of the practices and potential challenges that other stakeholders – including both the lay-users and other staff – may face in the EMS context. Good communication practice balances: a) the management of information flow between the caller and call taker and b) the management of information load between teams involved in the EMD decision making. This complex process is at the heart of the EMD system; our booklet is intended to support this highly impactful and nuanced work of all involved and to create a set of resources for internal and external audiences to the control room.

Acknowledgement

We would like to acknowledge and thank all the health professionals who participated in this study; without their input, this research would not have been possible.

To find out more about our project and support out work, please see **https://warwick.ac.uk/fac/soc/al/research/999respond/** and contact Professor Jo Angouri (**j.angouri@warwick.ac.uk**) or Professor Nigel Rees (**nigel.rees5@wales.nhs.uk**)

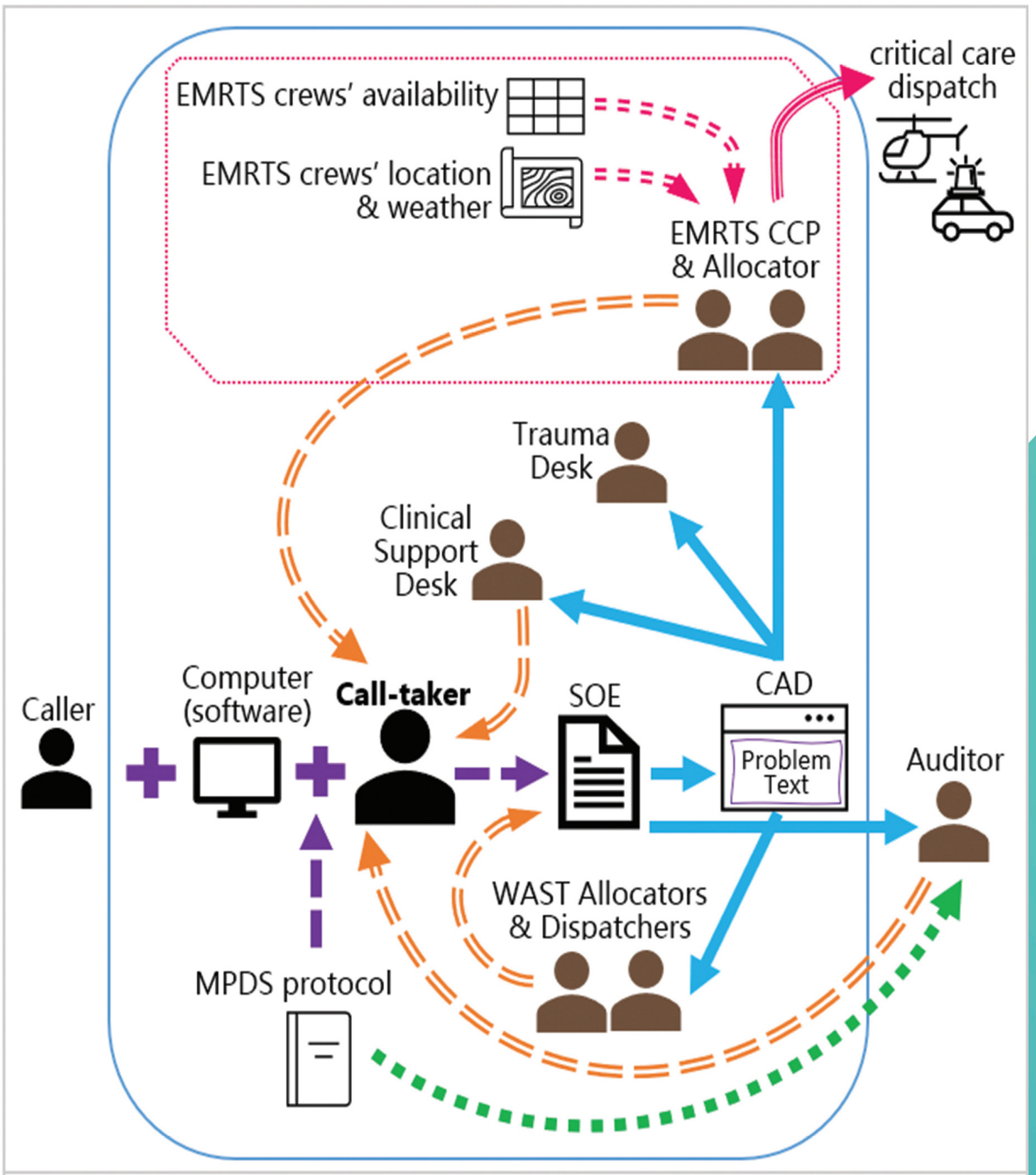


Appendix

The extracts shown in this booklet are transcribed according to conventions established in Social Sciences. The symbols used in the transcripts signal the different paralinguistic, non-lexical elements in speech, such as intonation, speed, pause, etc. They help us understand how the speakers talk to one another, such as in terms of pitch, tone, emotions and intensity. The list below shows the meaning of the symbols used in the extracts in this booklet

[ ]	overlapping talk
=	latching with no obvious gap or break
(3)	length of pause in number of seconds
(.)	very short pause within an utterance
word	stress, typically with emphasis
:	prolonged sound
↑↓	shifts into high or low pitch
?	rising intonation
¿	medium falling then rising intonation
_	flat intonation
,	slight rising intonation
.	final falling intonation
°word°	sound softer than surrounding talk
h	sound produced with extra aspiration or breathiness
#word#	creaky voice
< >	sounds spoken more slowly; slowed down
> <	sounds spoken more quickly; speeded up
.hhh	audible inhalation; breathing in
hhh	audible exhalation; breathing out
(word)	uncertain transcription
((word))	researchers' comments or descriptions of non-verbal elements

The EMD System






CV02 FVG

999RESPOND booklet glossary

The terms below are established in research traditions that underpin our work. They can afford multiple meanings and are associated with different theories and methods. We provide simplified, non-technical working definitions which reflect the context of this booklet and are not attempting to convey all possible meanings of the terms OR their specialised use.

Interaction	The act of communicating in and through verbal and body cues
interactional trouble	Any issue that negatively impacts the flow of conversation e.g., difficulties in understanding the meaning of certain words used in a particular context, difficulties in responding, difficulties in continuing speaking, etc. These 'bumps' are common when people communicate, often they are easy to mitigate but they can also have serious consequences to the overall encounter
Declarative	A statement *(e.g., I can just put it in the notes for the crew; everything has been noted; bear with me I'm just making a note of that])*
Imperative	A command
Elliptical construction	A sentence or utterance that is not complete in structure. The overall meaning is often clear, supported by the context. In this case, ellipsis - *leaving words out* - helps avoid redundancy. However, at times the risk of miscommunication is much higher *(e.g., single car crash, pt in car, hit tree, tree is in car with pt)*
Interrogation / interrogative series	A series of questions that a call-taker needs to ask a caller according to the scripted system, so as to get information about the emergency.
Interactional floor	The notional space or opportunity for participating in a conversation. *E.g., in a 999 call each person takes turns to speak, the call taker 'holds' the floor through the questioning process*
Lexis / lexical choices	The words we use and the words we choose to use in specialised contexts.
Lay user	A non-specialised user of the system - the public
Linguistic practice	The way we communicate in our daily lives and its consequences. *E.g., the way a question is asked has immediate implications for the quality and quantity of information that will follow.* Linguistic practice is systematic and known to those socialised in a professional setting.
Recycling (of information)	Recapping or mentioning information that was told earlier, either by repeating exactly what was said or by rephrasing what was said
Reformulation (of questions)	Asking for the same information by changing the structure or lexis of a question or replacing the original question with a new question asked from a different angle.
Risk indicators	Verbal and nonverbal cues that could signal urgency and severity of an emergency, e.g., lexical choices, stress, breathing of the speaker.
Sentence	A chunk of text organised in a written text.
Utterance	A chunk of talk - term used to indicate what a sentence does for written communication

Abbreviations

CAD	**C**omputer-**A**ssisted **D**ispatch – in our context a browser/software from which stakeholders can see and access information of emergency calls, including the SOE
CSD	**C**linical **S**upport **D**esk
EMD	the **E**mergency **M**edical **D**ispatch system
EMRTS	**E**mergency **M**edical **R**etrieval and **T**ransfer **S**ervice – a pre-hospital critical care service in Wales
SOE	**S**equence **o**f **E**vents – a textual record showing all the actions, decisions, and changes made both by the computer and the human stakeholders in an emergency call




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