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Question design in Nurse and GP-Led Telephone Triage for Same-Day Appointment Requests: A Comparative Investigation

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Abstract

Objective: To compare doctors' and nurses' communication with patients in primary care telephone triage consultations.

Design: Qualitative comparative study of content and form of questions in 51 telephone triage encounters between practitioners (GPs= 29; nurses=22) and patients requesting a same-day appointment in primary care. Audio-recordings of nurse-led calls were synchronised with video recordings of nurse's use of computer decision support software (CDSS) during triage.

Setting: Two GP practices in Devon and Warwickshire, UK.

Participants: Four GPs and 29 patients; and four nurses and 22 patients requesting a same-day face-to-face appointment with a GP.

Main outcome measure: Form and content of practitioner-initiated questions and patient responses during clinical assessment.

Results: A total of 484 question-response sequences were coded (160 GP; 324 N). Despite average call lengths being similar (GP=4mins, 37secs, (SD=1mins, 26secs); N=4mins, 39secs, (SD=2mins, 22secs)), GPs and nurses differed in the average number (GP=5.51, (SD=4.66); N=14.72, (SD=6.42)), the content and form of questions asked. A higher frequency of questioning in nurse-led triage was found to be due to nurses' use of CDSS to guide telephone triage. Eighty-nine per cent of nurse questions were oriented to asking patients about their reported complaint or to wider-information gathering, compared to 54% of GP questions. Forty-three percent of GP questions involved eliciting patient concerns or expectations, and obtaining details of past medical history, compared to 11% of nurse questions. Nurses using CDSS frequently delivered questions designed as declarative statements requesting confirmation and which typically preferred a 'no problem' response.

In contrast, GPs asked a higher proportion of interrogative questions designed to request information.

Conclusions: Nurses and GPs emphasise different aspects of the clinical assessment process during telephone triage. These different styles of triage have implications for the type of information available following nurse or doctor-led triage, and for how patients experience triage.

ARTICLE SUMMARY

Strengths and limitations of this study

- Strengths of this study are that it is the first study to provide naturally occurring audio and video data directly comparing nurse-led and GP-led triage. It provides clear evidence that computer decision support software (CDSS) organises nurse questioning, creating very different triage interactions to GPs not using CDSS.
- This study was limited by the inclusion of only two GP practices. Given further training in the use of CDSS, the nurses in this study might also have conducted triage differently.
- The different styles of triage we observed have implications for the type of information collected from patients, and for how patients experience triage.

INTRODUCTION

The use of the telephone to triage patients requesting same-day appointments represents one strategy to manage the increasing workload taking place in primary care[1]. Whilst there is some evidence that telephone triage may reduce GP workload[2,3], there is equivocal evidence that telephone triage is a safe[4-7] and satisfactory means of delivering care to patients[3,8].

Research comparing how GPs and nurses communicate with patients within face-to-face consultations has identified patterned differences in the process of assessing patients and in the opportunities afforded to patients to explain their presenting problems[9]. Richards et al.[10] used GPs and nurses to retrospectively assess audio-taped nurse-led telephone triage, and found that GPs and nurses had only moderate levels of agreement on the level of information sought by nurses and on the appropriateness of triage outcome. A recent study using conversation analytic methods to compare doctor-patient consultations conducted face-to-face and on the telephone[11] found little difference in consultation styles between the two methods of delivering care, but found that patients differed in the number and complexity of topics introduced on the telephone compared with face-to-face consultations.

The role of computer decision support software (CDSS) and the professionals who use it is central to assessing the safety and effectiveness of telephone triage. In primary care, CDSS is promoted as supporting the clinical expertise of nurses to conduct triage[12], representing a substitute for the expertise provided by GPs who do not use CDSS to triage patients. Whilst there is evidence that using CDSS to support clinical decisions is a safe and effective means of triaging patients[13], other research suggests that nurses orientate to potential dissonance

between CDSS question-prompts and the specific circumstances of the caller's concern[14]; interact with both the patient and the CDSS in 'purposive interaction chains'[15]; or regularly deviate from and modify CDSS prompted questions, potentially leading to a divergence rather than standardisation in triage outcomes[16].

A recent retrospective case review of closed malpractice claims regarding telephone-related consultations in the United States[17] found that 38% of litigation cases were because of problems with communication. Reporting on cases involving clinicians from a range of professional disciplines, Katz et al suggested that as workload increases, clinicians may rush through triage and in some cases patients may be doing the triage rather than the clinician. If nurse/GP triage is to be widely used within primary care in the UK there is a need for greater insight into patient-clinician telephone communication that is both safe and acceptable to patients. To date there has been no research that has directly compared telephone triage communication of nurses using CDSS with GPs conducting telephone triage without the additional support of CDSS.

We compared communication between GP-led and nurse-led computer-supported telephone triage in primary care. We proposed to contribute an understanding of the 'real-time' use of telephone triage in primary care by both nurses and GPs. In this article, we focus on a key element of telephone triage – the interrogative series driving the process of clinical assessment, - a crucial source of information to support decision-making about triage outcomes.

PARTICIPANTS AND METHODS

The research was a sub-study, and formed part of the recruitment process for the ESTEEM trial[18], the first multi-centre randomised controlled trial to compare GP-led vs. nurse-led telephone triage vs. usual care for UK patients requesting same-day appointments. Five intervention practices were approached (2 Nurse, 3 GP), from whom two were successfully recruited (1 Nurse, 1 GP). Four Nurses and four GPs participated. Participating practices were not systematically triaging patients prior to their inclusion in ESTEEM and therefore nurses had to be trained in the use of CDSS prior to commencing the trial. However, data for the sub-study were not collected until practices were in their final week (average 8 weeks post training in CDSS) of participation in ESTEEM. Patients (or their proxy) who phoned their surgery requesting a same-day, face-to-face appointment with a GP were eligible for participation. Patients were excluded from the sub-study if they did not fulfill the criteria for inclusion to the main ESTEEM trial[18], including:

- Patients who were (i) too ill to participate; (ii) unable to speak English; (iii) temporary residents.
- Young people aged 12.0-15.9 years.
- Children under 12 years unless a proxy phoned on their behalf.

Over a two-day period in each practice, 81 audio-recordings of telephone triage (47 Nurse, 34 GP) and 35 video-recordings of Nurses' use of Odyssey CDSS were made. Written consent was given by patients to analyse 51 complete recorded calls (22 Nurse, 29 GP) including 10 video-recordings. Video-recordings were synchronized with audio-recordings to enable analysis of how nurses used Odyssey during triage. Demographic data collected as part of the ESTEEM trial were also extracted for consented patients. Call length was determined by length of recording which began as soon as the patient picked up the telephone and ended

at the call close. Forty females (17 Nurse, 23 GP) and 11 males participated, with an average age of 44 years (SD= 25) – see Table 1. In addition, triage outcome was collected for all consenting patients – see Table 2.

Analysis

All calls were transcribed in detail according to standard conversation analytic conventions[19] (see Box 2 for transcription key). Call lengths were measured from audio-recordings. We adapted an established conversation-analytic coding scheme for analysis of question-response sequences[20]. Inclusion criteria for the coding scheme were:

- Questions had to be either (or both) a formal question (i.e., it had to rely on lexico-morpho-syntactic or prosodic interrogative marking) or a functional question (i.e., it had to effectively seek to elicit information, confirmation or agreement whether or not they made use of an interrogative sentence type);
- Questions seeking acknowledgment were **not** coded because they sought not neither confirmation nor affirmation;
- Repair questions ("Pardon") as well as partial repeats (''He went where?'') were **not** coded;
- Questions that suggest, propose, or offer something to another as well as questions that request something from another were **not** coded (e.g. ''Can I just confirm your date of birth before we go any further" or "Just bear with a moment we'll see what we can have a look at for you").

The scheme included 12 coding categories (see Box 1), including question design, the action they performed and the responses elicited. We also coded for an additional dimension of

the broader activity questions were oriented towards. Working from the inclusion criteria with audio-recordings and transcripts, all eligible questions were identified and agreed by JM, RB and JP (n=484). Two raters (JM, RB) then each independently coded 10% of questions to determine inter-rater reliability. Kappa scores were calculated for all coding categories revealing moderate to high levels of agreement (0.67-1.00). JM coded the remaining data and ambiguous cases were discussed in order to reach a consensus on the final code. JM, RB and JP then closely examined prototypical cases identified in the coding of question-response sequences and which demonstrated recurrent patterns of interaction across the consultations.

Box 1: Question-Response coding scheme (adapted from Stivers & Enfield 2010)

- Semantic structure
- Through-produced multi-questions
- Polar questions –turn-final element; negative marking; declarative
- Type of Q-word in content Wh- questions
- Social action of question
- Response type
- Response timing
- Confirming or disconfirming answer to polar question
- Form of answer to polar question

Added for analysis of triage interactions:

- Question activity – reported complaint; wider-information gathering; eliciting patient explanations, views; past medical history

Box 2: Transcription conventions[19]

(.)	A micropause, hearable but too short to measure.
>he said<	'greater than' and 'lesser than' signs enclose speeded-up talk. Occasionally they are used the other way round for slower talk.
Underlining	indicates emphasis; the extent of underlining within individual words locates emphasis and also indicates how heavy it is.
↑ ↓	Vertical arrows precede marked pitch movement, over and above normal rhythms of speech. They are used for notable changes in pitch beyond those represented by stops, commas and question marks.
she wa::nted	Colons show degrees of elongation of the prior sound; the more colons, the more elongation.
[ ]	Square brackets mark the start and end of overlapping speech. They are aligned to mark the precise position of overlap as in the example below.
°↑I know it,°	'degree' signs enclose hearably quieter speech.

RESULTS

Question Activity

Average call length (minutes:seconds – mean, standard deviation, range) was similar across both arms, (Nurse-led = 4:39, 2:22, 1:45-10:46; GP-led = 4:37, 1:26, 1:29-8:14). However, nurses asked patients an average of 14.7 (SD = 6.4, range = 4-28) questions to assess the problem during telephone triage consultations, in contrast to only 5.5 (SD = 4.6, range = 0-17) asked by GPs. Nurses were predominantly oriented towards two types of question activity (Table 3) – the assessment of the patient's reported complaint (Nurse 32.1%; GP 21.9%) and wider information gathering around the reported complaint (Nurse 56.8%; GP 32.5%). In contrast, GP questions were more evenly distributed across four types of question activity, including eliciting patient's own explanations for their symptoms (Nurse 2.5%; GP 13.1%) - e.g. *There's no obvious explanation for that?* and seeking a more detailed

past medical history from the patient (Nurse 8.6%; GP 30.0%) – e.g. *What do you attend the hospital for?*

Table 1: Call Sample

Call Sample Descriptors	Nurse-Led	GP-Led
Male	5	6
Female	17	23
Mean patient age (years)	45.2	44.7
Patient age range (years)	1.4-88.4	0.2-80.6
Calling on own behalf	17	22
Calling on behalf of other	5	7
Unknown problem	18	18
Known problem	5	11
Single-issue problem	22	23
Multiple problems	0	6

Table 2: Triage Outcome

Triage Outcome	Nurse-Led	GP-Led
Same Day with nurse	10	2
Same Day with GP	6	18
Nurse or GP next day	3	0
Nurse or GP 3-7 days	1	1
Self-Care	2	3
Nurse or GP >7 days	0	5

Question Design and Action

Over three-quarters of questions deployed by GPs and Nurses (Nurse 82.1% GP 76.3%) were polar questions. A key feature of polar questions is that they are designed for either a yes or no response[21]. Secondly, polar questions are commonly employed in medical history-taking where they are frequently designed to prefer a 'no problem' response. For example the inclusion of the negative polarity item 'at all' tilts, *Has she a temperature at all?* to prefer a *no* and therefore the absence of fever (an optimal state of affairs). In contrast *And you're breathing normally?* prefers a *yes* response and therefore the absence of breathing problems (again an optimal state of affairs). GPs used a higher proportion of polar questions with an interrogative design (Nurse 29.94% GP 46.25%) – e.g. *Have you vomited at all?* whilst over half of the nurses' polar questions were designed as declarative statements (Nurse 52.16% GP 30%) with a presupposed answer embodied within the question for confirmation or disconfirmation – e.g. *passing urine okay?* The proportion of polar,

declarative questions used by nurses is also reflected in the proportion of questions that nurses asked that requested caller confirmation (Nurse 53.7% GP 31.87%). This stood out in contrast to GPs predominantly asking questions that requested information rather than confirmation (Nurse 45.99% GP 68.13%).

Nurses using CDSS, were therefore deploying a higher proportion of declarative questions about the patient's reported complaint or wider-information gathering than GPs, designed to optimise the report of the patient's situation by ruling out a variety of medical problems (Nurse 45.37% GP 12.51%). In contrast, GPs, not using CDSS and therefore more able to self-determine their questions, employed questions more evenly distributed across the four different activities, typically designed as interrogatives aimed at requesting information from the caller. In order to reveal the implications of these different distributions for how GPs and Nurses, using CDSS, conducted telephone triage in our sample it is necessary to examine how these differences in question number, activity, design and action are consequential within the triage interactions themselves.

Table 3: Interrogative Series – Coding for Question Activity, Design and Action

	Nurse	GP
Activity		
Reported Complaint	32.1%	21.9%
E.g. *Is he getting more breathless?*		
Wider information gathering	56.8%	32.5%
E.g. *and have you got a temperature at all do you feel hot?*		
Eliciting patient's concerns/ideas/expectations	2.5%	13.1%
E.g. *There's no obvious explanation for that?*		
Past Medical history	8.6%	30.0%
E.g. *And is there any family history of arthritis of any sort?*		
Design		
Polar Questions - interrogative	29.9%	46.3%
E.g. *Has she vomited at all*		
(Reported complaint & Wider-info gathering activities only)	(25.9%)	(26.3%)
Polar Questions - declarative	52.2%	30.0%
E.g. *And she's weeing okay*		
(Reported complaint & Wider-info gathering activities only)	(45.4%)	(12.5%)
Content WH- questions	13.3%	18.8%
E.g. *And when did the tiredness first start*		
Alternative questions	4.6%	5.0%
E.g. I*s it quite bad or just a little bit of dizziness*		
Action		
Request for confirmation	53.7%	31.9%
E.g. And you said no discharge and no pain		
(Reported complaint & Wider-info gathering activities only)	(46.6%)	(13.8%)
Request for information	46.0%	68.1%
E.g. Do you wear glasses or contact lenses?		
(Reported complaint & Wider-info gathering activities only)	(42.3%)	(40.6%)

Gathering information during Nurse-led triage: a 'no problem' question series

When patients present a problem to clinicians, they may report several symptoms. Nurses, using Odyssey CDSS, need to select one of these symptoms and enter a key word to activate the CDSS for conducting triage with the patient. This activates a pop-up box with a series of symptom-related questions that prompt the nurse to ask of the patient. The nurse can select which questions to ask first but it is important the nurse asks those with a red or orange flag positioned adjacent to the question. Red-flagged questions have a default setting at the highest level of urgency and therefore if left unanswered Odyssey will recommend an emergency response. For each question asked, Odyssey prompts a set of responses in an additional pop-up box from which the nurse must select one. Odyssey therefore imposes an organisational structure on nurse questioning that is absent from GP-led triage. This structure is in terms of the number and order in which questions are asked, but also how questions are designed to elicit a response from patients that fits those offered by Odyssey.

The sequence and screenshot in Box 3 illustrates an interrogative series common to the wider information gathering activity in nurse consultations, using polar questions which firstly constrain the type of response available to patients and secondly are designed to prefer 'no problem' type responses. In this sequence the caller is a mother of an infant who has a high temperature. The nurse has activated the CDSS using the keyword 'high temperature' which has led to the CDSS prompting the nurse to ask the caller about vomiting. This first question is a fully formed interrogative, with the negative polarity item 'at all' preferring a *no* response, indicating the nurse presupposing an absence (and therefore 'no problem') rather than presence of vomiting. The preferred response is

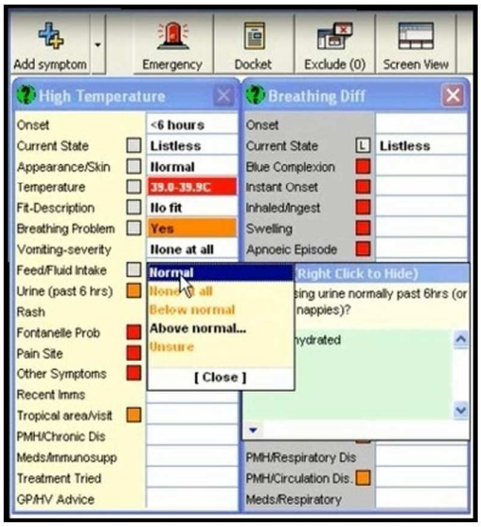
therefore one that should be brief (yes/no) but one which also informs the nurse of the absence rather than presence of vomiting, which will enable a quick transition to the next topic. The mother offers the preferred response with a partial repeat of the nurse's question 'No, she hasn't'. The nurse is then able move on to the next item in the list of prompted questions, 'but she is taking fluids'. This time the nurse's question is designed as a declarative with an optimized presupposition aimed at obtaining confirmation. The mother again responds with a short reiteration of the nurse's statement, functioning to confirm that the nurse's presupposition is correct 'Yes she's drinking some water'. The same question design is then repeated 'and she's weeing okay'. Again the mother repeats the nurse's words and confirms 'Yes she's weeing absolutely fine'. The nurse then switches to a negative declarative design presupposing an absence of a rash and again we can see the mother follows the same pattern. However, following the nurse's next question, we see a slight variation in the mother's response. The nurse again presents a negative declarative question 'she's not coughing', but this time the patient appears to disconfirm the nurse's presupposition. However, this is not a direct disconfirmation (e.g. *Yes she is coughing*) but instead the mother qualifies her response - *not a constant cough,* functioning to uphold the nurse's presupposition as at least partially correct. Finally, the negative declarative 'no other problems normally' is issued with the mother repeating the previous pattern, confirming the optimized presupposition that there are 'no other problems.'

This example was typical of how nurses could be seen to manage the demands of the CDSS prompts by adapting questions that enabled swift progression through the consultation. The use of *And* to preface questions, use of multiple declaratives, optimized for confirmation, and a process of ellipsis whereby questions were shortened made this information

gathering activity appear more as a checklist designed to rule out serious difficulties rather than orienting to the patient's specific presenting problem. Consequently, contracted sequences of interactions with short turns, illustrated in Box 3, were a common feature in the nurse-led data but virtually absent in the GP-led data.

Box 3: Nurse-Led triage – 'no problem' design questions

N: **And has she vomited at a:ll**
P: No (.) she hasn't no
N: And >I know you ha-< you said you hadn't given her her a >bottle this morni-< but **she is taki::ng (.) flui::ds**
P: Yes she's drinking some (water)
N: **And she's weeing okay**
P: Yeah she's weeing absolutely fine
N: **No ra::sh?**
P: No no ra:sh
N: O↑ka::y, (1.8) **and no other symptoms she's not coughi::ng**
P: ↑She had a little cough this morning (3.2) but not a constant cou:gh
N: **↑And ↑normally we:ll no other problems normally::**
P: No she's normally fine running arou:nd like a,



At 1 minute, 45 seconds[i]

In a few cases nurses could be seen to incorrectly presume a 'no problem' response from patients, resulting in some interactional difficulty whereby patients had to disconfirm the presupposition embodied in the question. In Box 4, an example is provided of a nurse asking about the radiation of pain, delivered as an optimised negative declarative statement for the patient to confirm. However there is a pause and then a non-straightforward response from the patient 'We::ll...' which serves to neither confirm or disconfirm the nurse's presupposition. Even after referring to a previous statement and restating that there is some pain in the buttocks, the patient softens the weight of her disconfirmation with a

[i] The times here refer to the time that the extract begins in relation to the start of recording

further 'I don't know.' The effect is that the 'no problem' design in this case leads to a lack of clarity as to the location of the patient's presenting symptoms which is likely to be reflected in how the nurse records the patient's response in Odyssey.

Box 4: Nurse-led triage - No problem design causing interactional difficulty

N: **And you don't feel that it's moving down into the buttocks**
(0.6)
P: We::ll [I'd say it] (0.6) well I don't kno::::w it =
N: [(?)]
P: =(.) it's as I sa:y it ha- halfway do::wn the buttock an- (.) not so far in I would think I don't ↑know
N: Okay that's fi::ne

At 1 minute, 53 seconds

GP-led triage: Questions designed to elicit patient's explanations

In contrast to the exhaustive CDSS-led questioning about the nature of the reported complaint and wider information gathering around it apparent within the nurse-triage data, GPs were frequently observed eliciting patient's explanations for their symptoms. In the extract outlined in Box 5 it is evident that early on in the triage consultation, and immediately following the patient's reported complaint, the GP attempts to rule out any obvious explanations from the patient. Following an initial marked confirmation, the patient takes this opportunity to list the candidate explanations she has considered and the GP then moves straight to triage resolution. Importantly, despite the GP using polar declarative questions that request confirmation, they are orientated to the ongoing talk and caller's responses rather than presented as a series of checklist-style questions.

Interactions where patient's explanations were oriented to and followed up by the GP, were very rare in the nurse triage data and indicate GPs and nurses orientating to different

aspects of the assessment process during triage. Box 5 provides an example of the potential of orienting to patient's explanations for determining triage outcome more efficiently, without an exhaustive interrogative series delivered through the use of the CDSS. However, we observed many instances of GPs and patients engaging in lengthy discussions about the possible causes of symptoms as well as GPs obtaining a detailed wider history from the patient both of which were less common in the nurse data. By contrast, nurses using CDSS did not engage in lengthy discussions about possible diagnoses even when one was offered by the patient, instead confined to the information gathering demands of the CDSS.

Box 5: GP-led triage - Eliciting patient explanations

P: =on it woke up this morning and my who::le (.) my whole eye and the whole left hand side of my face is complete swollen, my ↑eyes almost closed,
D: °Okay° (.) **and there's no obvious explanation for that y-**
P: Not at all
D: °No okay°
P: No I haven't I haven't suffered it, (.) y- y::ou know >I don't suffer with< hay feve:r (.) haven't been anywhe::re (.) unusual or y- y- you kno::w didn't [walk the dogs in any (field)]
D: [(?)] **(o:r) or got anything in the eye or anything like that**
P: No: (>got to admit<) I went to be:d at half past ten (.) perfectly fi::ne (.) and m- I do sleep with my window slightly open
D: °Yep°
P: Um a::nd (04.) went straight to sleep within an hour I just sat bolt upright (0.4) with >this like< ↑burning sensa↑tion,
D: Okay (.) I think we're gonna need to take a look at you .hh can you [come] in this morning?

At 0 minutes, 14 Seconds

Nurse-led triage without CDSS

On a few occasions the Odyssey software was not activated during the recorded nurse-led calls. In these cases, question-response sequences were identified that did not follow the same pattern as those where CDSS was in use. Box 6 provides an example of a sequence where the nurse, not using CDSS, begins the wider information gathering activity with a

typical opening question about duration followed by a declarative question designed to confirm previous patient information. However, instead of then asking a series of questions aimed at gathering information on related symptoms, the nurse proposes a candidate diagnosis. In a similar way to the GP data, this potential diagnosis is then negotiated with the patient within the ongoing interaction.

Box 6: Nurse offering diagnosis when not using CDSS

N: an ongoing, (.) she's had a (.) recent viral illness
P: Yeah
N: And she's pulling at her (0.6) ea::r is ↑it?
P: Yea::h, (.) both of them
N: Is she [teething]?

At 1 minute, 3 seconds

DISCUSSION

Despite nurses asking three times as many questions as GPs, the similarity in the duration of triage calls is explained by the content and form of questions used and their different interactional consequences. Most notably, nurses' frequent use of 'no-problem' polar declaratives requesting confirmation, deployed predominantly to gather information around the reported complaint, created contracted question-response sequences. These features were almost completely absent in the GP data where more polar interrogatives were employed to request information from patients, taking a more unknowing stance and allowing more room for elaboration or sequence expansion[21]. GP questions also launched a wider range of activities including eliciting patients' own views and obtaining a relevant past medical history. This differential distribution of question design, action and activities in the GP data led to typically longer patient responses and subsequently to other kinds of

practitioner contribution such as GP's own evaluations, patient education or advice. The nurses, using CDSS, and GPs, self-determining their questions, could therefore be considered to promote different aspects of the clinical assessment process during telephone triage. Whilst nurses' focus on current symptoms emphasised an assessment of urgency and efficient risk management of the patient, GP's attempts to elicit patient's own explanations and obtain a wider past medical history demonstrated more familiar consultation behaviours[22].

The interactional differences observed in our sample reveal that nurse–led telephone triage, using CDSS, is not a straightforward like-for-like substitution for GP-led triage. The design of nurse questions could be seen as an adaptive strategy to the constraints of the software. As a result, their attempts to rule out more serious conditions, manifested as a series of linked checklist-style questions that appeared closer to a social survey than a medical interaction orientated to patient's specific problems. This is reflected in the findings of the ESTEEM process evaluation[23] which found that some patients did not understand why nurses asked so many questions during triage calls, revealing that patients experience triage differently when conducted by a nurse using CDSS or a GP without CDSS.

Our findings also demonstrate that GPs acting independently, and nurses using CDSS are likely to obtain different types of information from patients. The differences in information collected may have an impact on how GPs and nurses decide on management and disposition, and also on how patients are assessed in any subsequent consultation following the triage call. A key task for assessing the value of these different approaches therefore lies

in research that examines how the content of triage calls is used in, or informs, subsequent face-to-face or other primary care consultations.

GPs have historically been cast as expert decision-makers and so it is perhaps not surprising that their eliciting of patient perspectives and detailed history have been identified as common features of both face-to-face and telephone consultations[11]. Patient-centred consultation styles have been shown to lead to increased patient satisfaction, treatment adherence and treatment outcomes[24-28] and it would therefore seem to be a logical style to reproduce within triage calls. However, the primary aim of telephone triage is to manage and direct patients within the healthcare system. GPs, when eliciting patient explanations, may therefore contribute to longer triage times than might be necessary to determine the triage outcome. Nurses using CDSS, by contrast, would appear to strictly adhere to the end point of patient management and perhaps more efficiently determine the route patients should take in primary care. However, using CDSS involves extensive questioning which may also unnecessarily contribute to longer triage times. A key issue is therefore how these different triage methods affect triage outcome and overall consultation time. The benefit of GPs delivering a more patient-centred consultation during triage, or nurses focusing solely on patient management, for patients and in terms of resources therefore remains unclear.

Limitations and strengths of the study

This study was limited by the inclusion of only two GP practices. It is possible that nurses and GPs conducting triage in other GP surgeries would have employed different patterns of distribution of question designs, actions and activities to those reported here. It might also be the case that given further training and experience of the CDSS, nurses would have

delivered different interactions from those we observed here. However, our findings clearly demonstrate how the CDSS imposes a structure on the number, order and design of nurse's questioning compared with GPs questioning. This is backed up by our observation of nurses' different questioning pattern when not using CDSS. The resonance between nurses' questioning in our data and interactions observed in NHS Direct consultations[14]; and the GP's questioning style in our data and previous research on telephone consultations[11] also indicates how our findings may be transferred to other primary care settings. Studies such as the one reported here therefore offer important insights into the actual implementation of telephone triage using different professionals, and how CDSS can organise telephone triage interactions and patient experiences. Such insights can assist both with the training of those professionals in conducting triage, help improve the design of CDSS systems, and manage patient expectations.

CONCLUSION

Our data suggests nurse triage using CDSS is not a straightforward substitution for GP triage without CDSS. Computer decision support software, employing algorithms designed to minimise risk, plays a fundamental role in organising nurse's questioning during triage leading to differences in the number, content and form of questions used by GPs and nurses. These differences have consequences for the type of information collected from patients during triage calls and for how patients experience those calls. These findings are based on a small sample and it is not known how these triage styles are linked to triage outcomes. However, given the well-established relationship between consultation style and outcomes in primary care, our findings provide important evidence for the training of staff and for the design of CDSS in supporting staff to conduct telephone triage.

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COMPETING INTEREST DECLARATION

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: all authors had financial support from SW GP Trust for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work."

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The study was funded by the South West GP Trust. Neither the funder nor the sponsor had a role in the design, data collection, analysis, interpretation, writing up, or decision to submit for publication, responsibility for which rested solely with the authors. The researchers were therefore independent from the funders in the conduct, analysis, write-up and dissemination of the study's findings.

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The ESTEEM study will be published in full in Health Technology Assessment [volume and issue number to be confirmed]. See the HTA programme website for further project information. The ESTEEM report presents independent research commissioned by the National Institute for Health Research [NIHR]. The views and opinions expressed by the authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, MRC, CCF, NETSCC, the HTA programme or the Department of Health'

ETHICAL APPROVAL

The study was approved by the South West Research Ethics Committee, reference number: 09/H0202/53. All healthcare professionals and patients provided written consent before taking part.

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Question design in Nurse and GP-Led Telephone Triage for Same-Day Appointment Requests: A Comparative Investigation

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Question design in Nurse and GP-Led Telephone Triage for Same-Day Appointment Requests: A Comparative Investigation

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Abstract

Objective: To compare doctors' and nurses' communication with patients in primary care telephone triage consultations.

Design: Qualitative comparative study of content and form of questions in 51 telephone triage encounters between practitioners (GPs= 29; nurses=22) and patients requesting a same-day appointment in primary care. Audio-recordings of nurse-led calls were synchronised with video recordings of nurse's use of computer decision support software (CDSS) during triage.

Setting: Two GP practices in Devon and Warwickshire, UK.

Participants: Four GPs and 29 patients; and four nurses and 22 patients requesting a same-day face-to-face appointment with a GP.

Main outcome measure: Form and content of practitioner-initiated questions and patient responses during clinical assessment.

Results: A total of 484 question-response sequences were coded (160 GP; 324 N). Despite average call lengths being similar (GP=4mins, 37secs, (SD=1mins, 26secs); N=4mins, 39secs, (SD=2mins, 22secs)), GPs and nurses differed in the average number (GP=5.51, (SD=4.66); N=14.72, (SD=6.42)), the content and form of questions asked. A higher frequency of questioning in nurse-led triage was found to be due to nurses' use of CDSS to guide telephone triage. Eighty-nine per cent of nurse questions were oriented to asking patients about their reported complaint or to wider-information gathering, compared to 54% of GP questions. Forty-three percent of GP questions involved eliciting patient concerns or expectations, and obtaining details of past medical history, compared to 11% of nurse questions. Nurses using CDSS frequently delivered questions designed as declarative statements requesting confirmation and which typically preferred a 'no problem' response.

In contrast, GPs asked a higher proportion of interrogative questions designed to request information.

Conclusions: Nurses and GPs emphasise different aspects of the clinical assessment process during telephone triage. These different styles of triage have implications for the type of information available following nurse or doctor-led triage, and for how patients experience triage.

ARTICLE SUMMARY

Strengths and limitations of this study

- Strengths of this study are that it is the first study to provide naturally occurring audio and video data directly comparing nurse-led and GP-led triage. It provides clear evidence that computer decision support software (CDSS) organises nurse questioning, creating very different triage interactions to GPs not using CDSS.
- This study was limited by the inclusion of only two GP practices. Given further training in the use of CDSS, the nurses in this study might also have conducted triage differently.
- The different styles of triage we observed have implications for the type of information collected from patients, and for how patients experience triage.

INTRODUCTION

Telephone triage is the process where calls, from people with a health care problem, are received, assessed and managed by giving advice or by referral to a more appropriate service[1]. It is increasingly being used internationally to help with the provision of out-of-hours care, manage demand for care, or provide an additional source of help and advice[2]. In the UK, the use of the telephone to triage patients requesting same-day appointments represents one strategy to manage the increasing workload taking place in primary care[3]. Nurses and general practitioners may provide telephone triage and consultation, with nurses typically trained to use computerised decision support software to provide this service, both in office hours and out-of-hours. Whilst there is some evidence that telephone triage may reduce GP workload[4,5], there is equivocal evidence that telephone triage is a safe[6-9] and satisfactory means of delivering care to patients[5,10]. The quality of patient-clinician interaction during triage and telephone consultation is key to aspects of safety, effectiveness, patient experience[2,11] and, potentially, to health outcomes[12]. How clinicians communicate with patients and respond to their presenting concerns within telephone triage consultations is therefore central to decisions about its delivery within primary care.

Research comparing how GPs and nurses communicate with patients within face-to-face consultations has identified patterned differences in the process of assessing patients and in the opportunities afforded to patients to explain their presenting problems[13]. Richards et al.[14] used GPs and nurses to retrospectively assess audio-taped nurse-led telephone triage, and found that GPs and nurses had only moderate levels of agreement on the level of information sought by nurses and on the appropriateness of triage outcome. A recent study using conversation analytic methods to compare doctor-patient consultations conducted

face-to-face and on the telephone[15] found little difference in consultation styles between the two methods of delivering care, but found that patients differed in the number and complexity of topics introduced on the telephone compared with face-to-face consultations.

The role of computer decision support software (CDSS) and the professionals who use it is central to assessing the safety and effectiveness of telephone triage. In primary care, CDSS is promoted as supporting the clinical expertise of nurses to conduct triage[16], representing a substitute for the expertise provided by GPs who do not use CDSS to triage patients. Whilst there is evidence that using CDSS to support clinical decisions is a safe and effective means of triaging patients[17], other research suggests that nurses orientate to potential dissonance between CDSS question-prompts and the specific circumstances of the caller's concern[18]; interact with both the patient and the CDSS in 'purposive interaction chains'[19]; or regularly deviate from and modify CDSS prompted questions, potentially leading to a divergence rather than standardisation in triage outcomes[20].

A recent retrospective case review of closed malpractice claims regarding telephone-related consultations in the United States[21] found that 38% of litigation cases were because of problems with communication. Reporting on cases involving clinicians from a range of professional disciplines, Katz et al suggested that as workload increases, clinicians may rush through triage and in some cases patients may be doing the triage rather than the clinician. In a similar analysis of calls to Swedish Healthcare Direct, Ernesater et al[22] reported that failures in communication and asking the caller too few questions were commonly observed in malpractice claims, a finding also reported in a Dutch study of simulated calls to out-of-hours centres[17].

If nurse/GP triage is to be widely used within primary care in the UK there is therefore a need for greater insight into patient-clinician telephone communication that is both safe and acceptable to patients. To date there has been no research that has directly compared telephone triage communication of nurses using CDSS with GPs conducting telephone triage without the additional support of CDSS.

We compared communication between GP-led and nurse-led computer-supported telephone triage in primary care. We proposed to contribute an understanding of the 'real-time' use of telephone triage in primary care by both nurses and GPs. In this article, we focus on a key element of telephone triage – the interrogative series driving the process of clinical assessment, - a crucial source of information to support decision-making about triage outcomes.

PARTICIPANTS AND METHODS

The research was a sub-study, and formed part of the recruitment process for the ESTEEM trial[23], the first multi-centre randomised controlled trial to compare GP-led vs. nurse-led telephone triage vs. usual care for UK patients requesting same-day appointments. A qualitative comparative study of nurse-led and GP-led triage consultations was used to enable close analysis of interaction between clinicians and patients; and the role the CDSS played in organising nurse-patient interactions.

Five intervention practices were approached (2 Nurse, 3 GP), from whom two were successfully recruited (1 Nurse, 1 GP). Four Nurses and four GPs participated. Participating

practices were not systematically triaging patients prior to their inclusion in ESTEEM and therefore nurses had to be trained in the use of CDSS prior to commencing the trial. However, data for the sub-study were not collected until practices were in their final week (average 8 weeks post training in CDSS) of participation in ESTEEM. Patients (or their proxy) who phoned their surgery requesting a same-day, face-to-face appointment with a GP were eligible for participation. Patients were excluded from the sub-study if they did not fulfill the criteria for inclusion to the main ESTEEM trial[23], including:

- Patients who were (i) too ill to participate; (ii) unable to speak English; (iii) temporary residents.
- Young people aged 12.0-15.9 years.
- Children under 12 years unless a proxy phoned on their behalf.

Over a two-day period in each practice, 81 audio-recordings of telephone triage (47 Nurse, 34 GP) and 35 video-recordings of Nurses' use of Odyssey CDSS were made. Written consent was given by patients to analyse 51 complete recorded calls (22 Nurse, 29 GP) including 10 video-recordings. Video-recordings were synchronized with audio-recordings to enable analysis of how nurses used Odyssey during triage. Demographic data collected as part of the ESTEEM trial were also extracted for consented patients. Call length was determined by length of recording which began as soon as the patient picked up the telephone and ended at the call close. Forty females (17 Nurse, 23 GP) and 11 males participated, with an average age of 44 years (SD= 25) – see Table 1. In addition, triage outcome was collected for all consenting patients – see Table 2.

Analysis

All calls were transcribed in detail according to standard conversation analytic conventions[24] (see Box 2 for transcription key). Call lengths were measured from audio-recordings. This led to identifying potentially important differences between the two groups in call length and numbers of questions clinicians asked. In order to understand the nature of these differences we adapted an established conversation-analytic coding scheme for analysis of question-response sequences[25]. Conversation analysis is increasingly being used to support medical research aimed at understanding the distribution of interactional practices by offering operational definitions of phenomena that can subsequently be coded and counted[26]. Inclusion criteria for the coding scheme were:

- Questions had to effectively seek to elicit information, confirmation or agreement whether or not they made use of an interrogative sentence type);
- Questions seeking acknowledgment were **not** coded because they sought not neither confirmation nor affirmation;
- Repair questions ("Pardon") as well as partial repeats (''He went where?'') were **not** coded;
- Questions that suggest, propose, or offer something to another as well as questions that request something from another were **not** coded (e.g. ''Can I just confirm your date of birth before we go any further" or "Just bear with a moment we'll see what we can have a look at for you").

The scheme included 12 coding categories (see Box 1), including question design, the action they performed and the responses elicited. We also coded for an additional dimension of the broader activity questions were oriented towards. Working from the inclusion criteria with audio-recordings and transcripts, all eligible questions were identified and agreed by

JM, RB and JP (n=484). Two raters (JM, RB) then each independently coded 10% of questions to determine inter-rater reliability. Kappa scores were calculated for all coding categories revealing moderate to high levels of agreement (0.67-1.00). JM coded the remaining data and ambiguous cases were discussed in order to reach a consensus on the final code. JM, RB and JP then closely examined prototypical cases identified in the coding of question-response sequences and which demonstrated recurrent patterns of interaction across the consultations.

Box 1: Question-Response coding scheme (adapted from Stivers & Enfield 2010)

- Semantic structure
- Through-produced multi-questions
- Polar questions –turn-final element; negative marking; declarative
- Type of Q-word in content Wh- questions
- Social action of question
- Response type
- Response timing
- Confirming or disconfirming answer to polar question
- Form of answer to polar question

Added for analysis of triage interactions:

- Question activity – reported complaint; wider-information gathering; eliciting patient explanations, views; past medical history

Box 2: Transcription conventions[24]

(.)	A micropause, hearable but too short to measure.
>he said<	'greater than' and 'lesser than' signs enclose speeded-up talk. Occasionally they are used the other way round for slower talk.
Underlining	indicates emphasis; the extent of underlining within individual words locates emphasis and also indicates how heavy it is.
↑ ↓	Vertical arrows precede marked pitch movement, over and above normal rhythms of speech. They are used for notable changes in pitch beyond those represented by stops, commas and question marks.
she wa::nted	Colons show degrees of elongation of the prior sound; the more colons, the more elongation.
[ ]	Square brackets mark the start and end of overlapping speech. They are aligned to mark the precise position of overlap as in the example below.
°↑I know it,°	'degree' signs enclose hearably quieter speech.

RESULTS

Question Activity

Average call length (minutes:seconds – mean, standard deviation, range) was similar across both arms, (Nurse-led = 4:39, 2:22, 1:45-10:46; GP-led = 4:37, 1:26, 1:29-8:14). However, nurses asked patients an average of 14.7 (SD = 6.4, range = 4-28) questions to assess the problem during telephone triage consultations, in contrast to only 5.5 (SD = 4.6, range = 0-17) asked by GPs. Nurses were predominantly oriented towards two types of question activity (Table 3) – the assessment of the patient's reported complaint (Nurse 32.1%; GP 21.9%) and wider information gathering around the reported complaint (Nurse 56.8%; GP 32.5%). In contrast, GP questions were more evenly distributed across four types of question activity, including eliciting patient's own explanations for their symptoms (Nurse 2.5%; GP 13.1%) - e.g. *There's no obvious explanation for that?* and seeking a more detailed

past medical history from the patient (Nurse 8.6%; GP 30.0%) – e.g. *What do you attend the hospital for?*

Table 1: Call Sample

Call Sample Descriptors	Nurse-Led	GP-Led
Male	5	6
Female	17	23
Mean patient age (years)	45.2	44.7
Patient age range (years)	1.4-88.4	0.2-80.6
Calling on own behalf	17	22
Calling on behalf of other	5	7
Unknown problem	18	18
Known problem	5	11
Single-issue problem	22	23
Multiple problems	0	6

Table 2: Triage Outcome

Triage Outcome	Nurse-Led	GP-Led
Same Day with nurse	10	2
Same Day with GP	6	18
Nurse or GP next day	3	0
Nurse or GP 3-7 days	1	1
Self-Care	2	3
Nurse or GP >7 days	0	5

Question Design and Action

Over three-quarters of questions deployed by GPs and Nurses (Nurse 82.1% GP 76.3%) were polar questions. A key feature of polar questions is that they are designed for either a yes or no response[27]. Secondly, polar questions are commonly employed in medical history-taking where they are frequently designed to prefer a 'no problem' response. For example the inclusion of the negative polarity item 'at all' tilts, *Has she a temperature at all?* to prefer a *no* and therefore the absence of fever (an optimal state of affairs). In contrast *And you're breathing normally?* prefers a *yes* response and therefore the absence of breathing problems (again an optimal state of affairs). GPs used a higher proportion of polar questions with an interrogative design (Nurse 29.94% GP 46.25%) – e.g. *Have you vomited at all?* whilst over half of the nurses' polar questions were designed as declarative statements (Nurse 52.16% GP 30%) with a presupposed answer embodied within the question for confirmation or disconfirmation – e.g. *passing urine okay?* The proportion of polar,

declarative questions used by nurses is also reflected in the proportion of questions that nurses asked that requested caller confirmation (Nurse 53.7% GP 31.87%). This stood out in contrast to GPs predominantly asking questions that requested information rather than confirmation (Nurse 45.99% GP 68.13%).

Nurses using CDSS, were therefore deploying a higher proportion of declarative questions about the patient's reported complaint or wider-information gathering than GPs, designed to optimise the report of the patient's situation by ruling out a variety of medical problems (Nurse 45.37% GP 12.51%). In contrast, GPs, not using CDSS and therefore more able to self-determine their questions, employed questions more evenly distributed across the four different activities, typically designed as interrogatives aimed at requesting information from the caller. In order to reveal the implications of these different distributions for how GPs and Nurses, using CDSS, conducted telephone triage in our sample it is necessary to examine how these differences in question number, activity, design and action are consequential within the triage interactions themselves.

Table 3: Interrogative Series – Coding for Question Activity, Design and Action

	Nurse	GP
Activity		
Reported Complaint	32.1%	21.9%
E.g. *Is he getting more breathless?*		
Wider information gathering	56.8%	32.5%
E.g. *and have you got a temperature at all do you feel hot?*		
Eliciting patient's concerns/ideas/expectations	2.5%	13.1%
E.g. *There's no obvious explanation for that?*		
Past Medical history	8.6%	30.0%
E.g. *And is there any family history of arthritis of any sort?*		
Design		
Polar Questions - interrogative	29.9%	46.3%
E.g. *Has she vomited at all*		
(Reported complaint & Wider-info gathering activities only)	(25.9%)	(26.3%)
Polar Questions - declarative	52.2%	30.0%
E.g. *And she's weeing okay*		
(Reported complaint & Wider-info gathering activities only)	(45.4%)	(12.5%)
Content WH- questions	13.3%	18.8%
E.g. *And when did the tiredness first start*		
Alternative questions	4.6%	5.0%
E.g. I*s it quite bad or just a little bit of dizziness*		
Action		
Request for confirmation	53.7%	31.9%
E.g. And you said no discharge and no pain		
(Reported complaint & Wider-info gathering activities only)	(46.6%)	(13.8%)
Request for information	46.0%	68.1%
E.g. Do you wear glasses or contact lenses?		
(Reported complaint & Wider-info gathering activities only)	(42.3%)	(40.6%)

Gathering information during Nurse-led triage: a 'no problem' question series

When patients present a problem to clinicians, they may report several symptoms. Nurses, using Odyssey CDSS, need to select one of these symptoms and enter a key word to activate the CDSS for conducting triage with the patient. This activates a pop-up box with a series of symptom-related questions that prompt the nurse to ask of the patient. The nurse can select which questions to ask first but it is important the nurse asks those with a red or orange flag positioned adjacent to the question. Red-flagged questions have a default setting at the highest level of urgency and therefore if left unanswered Odyssey will recommend an emergency response. For each question asked, Odyssey prompts a set of responses in an additional pop-up box from which the nurse must select one. Odyssey therefore imposes an organisational structure on nurse questioning that is absent from GP-led triage. This structure is in terms of the number and order in which questions are asked, but also how questions are designed to elicit a response from patients that fits those offered by Odyssey.

The sequence and screenshot in Box 3 (Figure 1) illustrates an interrogative series common to the wider information gathering activity in nurse consultations, using polar questions which firstly constrain the type of response available to patients and secondly are designed to prefer 'no problem' type responses. In this sequence the caller is a mother of an infant who has a high temperature. The nurse has activated the CDSS using the keyword 'high temperature' which has led to the CDSS prompting the nurse to ask the caller about vomiting. This first question is a fully formed interrogative, with the negative polarity item 'at all' preferring a *no* response, indicating the nurse presupposing an absence (and therefore 'no problem') rather than presence of vomiting. The preferred response is

therefore one that should be brief (yes/no) but one which also informs the nurse of the absence rather than presence of vomiting, which will enable a quick transition to the next topic. The mother offers the preferred response with a partial repeat of the nurse's question 'No, she hasn't'. The nurse is then able move on to the next item in the list of prompted questions, 'but she is taking fluids'. This time the nurse's question is designed as a declarative with an optimized presupposition aimed at obtaining confirmation. The mother again responds with a short reiteration of the nurse's statement, functioning to confirm that the nurse's presupposition is correct 'Yes she's drinking some water'. The same question design is then repeated 'and she's weeing okay'. Again the mother repeats the nurse's words and confirms 'Yes she's weeing absolutely fine'. The nurse then switches to a negative declarative design presupposing an absence of a rash and again we can see the mother follows the same pattern. However, following the nurse's next question, we see a slight variation in the mother's response. The nurse again presents a negative declarative question 'she's not coughing', but this time the patient appears to disconfirm the nurse's presupposition. However, this is not a direct disconfirmation (e.g. *Yes she is coughing*) but instead the mother qualifies her response - *not a constant cough,* functioning to uphold the nurse's presupposition as at least partially correct. Finally, the negative declarative 'no other problems normally' is issued with the mother repeating the previous pattern, confirming the optimized presupposition that there are 'no other problems.'

This example was typical of how nurses could be seen to manage the demands of the CDSS prompts by adapting questions that enabled swift progression through the consultation. The use of *And* to preface questions, use of multiple declaratives, optimized for confirmation, and a process of ellipsis whereby questions were shortened made this information

gathering activity appear more as a checklist designed to rule out serious difficulties rather than orienting to the patient's specific presenting problem. Consequently, contracted sequences of interactions with short turns, illustrated in Box 3, were a common feature in the nurse-led data but virtually absent in the GP-led data.

Box 3 and Figure 1: Nurse-Led triage – 'no problem' design questions

N: **And has she vomited at a:ll**
P: No (.) she hasn't no
N: And >I know you ha-< you said you hadn't given her her a >bottle this morni-< but **she is taki::ng (.) flui::ds**
P: Yes she's drinking some (water)
N: **And she's weeing okay**
P: Yeah she's weeing absolutely fine
N: **No ra::sh?**
P: No no ra:sh
N: O↑ka::y, (1.8) **and no other symptoms she's not coughi::ng**
P: ↑She had a little cough this morning (3.2) but not a constant cou:gh
N: **↑And ↑normally we:ll no other problems normally::**
P: No she's normally fine running arou:nd like a,

At 1 minute, 45 seconds[i]

In a few cases nurses could be seen to incorrectly presume a 'no problem' response from patients, resulting in some interactional difficulty whereby patients had to disconfirm the presupposition embodied in the question. In Box 4, an example is provided of a nurse asking about the radiation of pain, delivered as an optimised negative declarative statement for the patient to confirm. However there is a pause and then a non-straightforward response from the patient 'We::ll...' which serves to neither confirm or disconfirm the nurse's presupposition. Even after referring to a previous statement and restating that there is some pain in the buttocks, the patient softens the weight of her disconfirmation with a

[i] The times here refer to the time that the extract begins in relation to the start of recording

further 'I don't know.' The effect is that the 'no problem' design in this case leads to a lack of clarity as to the location of the patient's presenting symptoms which is likely to be reflected in how the nurse records the patient's response in Odyssey.

Box 4: Nurse-led triage - No problem design causing interactional difficulty

N: **And you don't feel that it's moving down into the buttocks**
(0.6)
P: We::ll [I'd say it] (0.6) well I don't kno::::w it =
N: [(?)]
P: =(.) it's as I sa:y it ha- halfway do::wn the buttock an- (.) not so far in I would think I don't ↑know
N: Okay that's fi::ne

At 1 minute, 53 seconds

GP-led triage: Questions designed to elicit patient's explanations

In contrast to the exhaustive CDSS-led questioning about the nature of the reported complaint and wider information gathering around it apparent within the nurse-triage data, GPs were frequently observed eliciting patient's explanations for their symptoms. In the extract outlined in Box 5 it is evident that early on in the triage consultation, and immediately following the patient's reported complaint, the GP attempts to rule out any obvious explanations from the patient. Following an initial marked confirmation, the patient takes this opportunity to list the candidate explanations she has considered and the GP then moves straight to triage resolution. Importantly, despite the GP using polar declarative questions that request confirmation, they are orientated to the ongoing talk and caller's responses rather than presented as a series of checklist-style questions.

Interactions where patient's explanations were oriented to and followed up by the GP, were very rare in the nurse triage data and indicate GPs and nurses orientating to different

aspects of the assessment process during triage. Box 5 provides an example of the potential of orienting to patient's explanations for determining triage outcome more efficiently, without an exhaustive interrogative series delivered through the use of the CDSS. However, we observed many instances of GPs and patients engaging in lengthy discussions about the possible causes of symptoms as well as GPs obtaining a detailed wider history from the patient both of which were less common in the nurse data. By contrast, nurses using CDSS did not engage in lengthy discussions about possible diagnoses even when one was offered by the patient, instead confined to the information gathering demands of the CDSS.

Box 5: GP-led triage - Eliciting patient explanations

P: =on it woke up this morning and my who::le (.) my whole eye and the whole left hand side of my face is complete swollen, my ↑eyes almost closed,
D: °Okay° (.) **and there's no obvious explanation for that y-**
P: Not at all
D: °No okay°
P: No I haven't I haven't suffered it, (.) y- y::ou know >I don't suffer with< hay feve:r (.) haven't been anywhe::re (.) unusual or y- y- you kno::w didn't [walk the dogs in any (field)]
D: [(?)] **(o:r) or got anything in the eye or anything like that**
P: No: (>got to admit<) I went to be:d at half past ten (.) perfectly fi::ne (.) and m- I do sleep with my window slightly open
D: °Yep°
P: Um a::nd (04.) went straight to sleep within an hour I just sat bolt upright (0.4) with >this like< ↑burning sensa↑tion,
D: Okay (.) I think we're gonna need to take a look at you .hh can you [come] in this morning?

At 0 minutes, 14 Seconds

Nurse-led triage without CDSS

On a few occasions the Odyssey software was not activated during the recorded nurse-led calls. In these cases, question-response sequences were identified that did not follow the same pattern as those where CDSS was in use. Box 6 provides an example of a sequence where the nurse, not using CDSS, begins the wider information gathering activity with a

typical opening question about duration followed by a declarative question designed to confirm previous patient information. However, instead of then asking a series of questions aimed at gathering information on related symptoms, the nurse proposes a candidate diagnosis. In a similar way to the GP data, this potential diagnosis is then negotiated with the patient within the ongoing interaction.

Box 6: Nurse offering diagnosis when not using CDSS

N: an ongoing, (.) she's had a (.) recent viral illness
P: Yeah
N: And she's pulling at her (0.6) ea::r is ↑it?
P: Yea::h, (.) both of them
N: Is she [teething]?

At 1 minute, 3 seconds

DISCUSSION

Despite nurses asking three times as many questions as GPs, the similarity in the duration of triage calls is explained by the content and form of questions used and their different interactional consequences. Most notably, nurses' frequent use of 'no-problem' polar declaratives requesting confirmation, deployed predominantly to gather information around the reported complaint, created contracted question-response sequences. These features were almost completely absent in the GP data where more polar interrogatives were employed to request information from patients, taking a more unknowing stance and allowing more room for elaboration or sequence expansion[27]. GP questions also launched a wider range of activities including eliciting patients' own views and obtaining a relevant past medical history. This differential distribution of question design, action and activities in the GP data led to typically longer patient responses and subsequently to other kinds of

practitioner contribution such as GP's own evaluations, patient education or advice. The nurses, using CDSS, and GPs, self-determining their questions, could therefore be considered to promote different aspects of the clinical assessment process during telephone triage. Whilst nurses' focus on current symptoms emphasised an assessment of urgency and efficient risk management of the patient, GP's attempts to elicit patient's own explanations and obtain a wider past medical history demonstrated more familiar consultation behaviours[28].

The interactional differences observed in our sample reveal that nurse–led telephone triage, using CDSS, is not a straightforward like-for-like substitution for GP-led triage. The design of nurse questions could be seen as an adaptive strategy to the constraints of the software. As a result, their attempts to rule out more serious conditions, manifested as a series of linked checklist-style questions that appeared closer to a social survey than a medical interaction orientated to patient's specific problems. This is reflected in the findings of the ESTEEM process evaluation[29] which found that some patients did not understand why nurses asked so many questions during triage calls, revealing that patients experience triage differently when conducted by a nurse using CDSS or a GP without CDSS.

Our findings also demonstrate that GPs acting independently, and nurses using CDSS are likely to obtain different types of information from patients. The differences in information collected may have an impact on how GPs and nurses decide on management and disposition, and also on how patients are assessed in any subsequent consultation following the triage call. A key task for assessing the value of these different approaches therefore lies

in research that examines how the content of triage calls is used in, or informs, subsequent face-to-face or other primary care consultations.

GPs have historically been cast as expert decision-makers and so it is perhaps not surprising that their eliciting of patient perspectives and detailed history have been identified as common features of both face-to-face and telephone consultations[15]. Patient-centred consultation styles have been shown to lead to increased patient satisfaction, treatment adherence and treatment outcomes[30-34] and it would therefore seem to be a logical style to reproduce within triage calls. However, the primary aim of telephone triage is to manage and direct patients within the healthcare system. GPs, when eliciting patient explanations, may therefore contribute to longer triage times than might be necessary to determine the triage outcome. Nurses using CDSS, by contrast, would appear to strictly adhere to the end point of patient management and perhaps more efficiently determine the route patients should take in primary care. However, using CDSS involves extensive questioning which may also unnecessarily contribute to longer triage times. How these different triage methods affect triage outcome and overall consultation time; whether training nurses to adapt their question design when using CDSS affects triage outcome; and how patients experience and respond to these different approaches are key issues requiring investigation.

Limitations and strengths of the study

This study was limited by the inclusion of only two GP practices. It is possible that nurses and GPs conducting triage in other GP surgeries would have employed different patterns of distribution of question designs, actions and activities to those reported here. Although GPs did not use CDSS to triage patients, we also recognise that GPs may have actively consulted

electronic patient records whilst triaging which might have provided an interesting comparison to the nurse data.

Given further training and experience of the CDSS, nurses might have delivered different interactions from those we observed here. However, our findings clearly demonstrate how the CDSS imposes a structure on the number, order and design of nurse's questioning compared with GPs questioning. This is backed up by our observation of nurses' different questioning pattern when not using CDSS. Investigating how nurses with extensive training in the use of CDSS communicate with patients, and how this compares with nurses not using CDSS would therefore provide important insights into the contribution of CDSS in supporting nurses to deliver safe and effective patient management. The resonance between nurses' questioning in our data and interactions observed in NHS Direct consultations[18]; and the GP's questioning style in our data and previous research on telephone consultations[15] also indicates how our findings may be transferred to other primary care settings. Training for telephone triage could be designed to incorporate working with sample recordings and transcripts of real calls to illustrate the full range of questions that can be asked in the interrogative series; and how question design itself can be consequential for the nature of a patient's response. Studies such as the one reported here therefore offer important insights into the actual implementation of telephone triage using different professionals, and how CDSS can organise telephone triage interactions and patient experiences. Such insights can assist with the training of those professionals in conducting triage; with revealing how the design of CDSS systems might be more effectively configured; and with the management of patient expectations around new technologies for medical service delivery.

Although the parent trial to this study examined the issue of patient safety alongside telephone triage[23], we did not specifically examine safety in this qualitative study. Previous relevant reviews[2,35], and individual studies[4,6,17,36] are conflicting in respect of patient safety outcomes and the related matters of hospital admissions or A&E attendance associated with triage. Specific concerns have been raised in relation to the quality of information gathering in telephone triage consultations[8,17], and the differences in information-gathering between nurses using CDSS, and GPs not using CDSS, in our findings place communication, information-gathering and the role of CDSS at the heart of ongoing debates about patient safety.

CONCLUSION

Our data suggests nurse triage using CDSS is not a straightforward substitution for GP triage without CDSS. Computer decision support software, employing algorithms designed to minimise risk, plays a fundamental role in organising nurse's questioning during triage leading to differences in the number, content and form of questions used by GPs and nurses. These differences have consequences for the type of information collected from patients during triage calls and for how patients experience those calls. These findings are based on a small sample and it is not known how these triage styles are linked to triage outcomes. However, given the well-established relationship between consultation style and outcomes in primary care, our findings provide important evidence for the training of staff and for the design of CDSS in supporting staff to conduct telephone triage.

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CONTRIBUTORSHIP STATEMENT

Jamie Murdoch was joint principal investigator. With Rebecca Barnes, he led the development of the original protocol, funding application and co-ordinated the overall running of the project. He conducted the analyses, contributed to interpretation of

findings and drafted and edited the paper.

Rebecca Barnes was joint principal investigator. With Jamie Murdoch, she led the development of the original protocol, funding application and co-ordinated the overall running of the project. She conducted the analyses, contributed to interpretation of findings and drafted and edited the paper.

Jill Pooler was the Associate Research Fellow on the project. Jill implemented the project protocol, including recruiting GP practice staff and patients and collection and storage of data. She contributed to the analyses, interpretation of findings and edited the paper.

John Campbell was Chief Investigator for the ESTEEM trial. John contributed to the development of the original protocol, funding application and oversaw how the sub-study was embedded within the running of the ESTEEM trial. He contributed to the interpretation of the findings and edited the paper.

Val Lattimer was Co-Investigator for the ESTEEM trial. Val contributed to the development of the original protocol and funding application. She contributed to how the sub-study was embedded within the running of the ESTEEM trial, contributed to the interpretation of the findings and edited the paper.

Emily Fletcher was Trial Manager for the ESTEEM trial. Emily contributed to the development of the original protocol, funding application and obtaining R&D and ethical approval. Emily managed the implementation of the sub-study within the running of the ESTEEM trial. She contributed to the interpretation of the findings and edited the paper.

COMPETING INTEREST DECLARATION

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: all authors had financial support from SW GP Trust for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work."

ETHICAL APPROVAL

The study was approved by the South West Research Ethics Committee, reference number: 09/H0202/53. All healthcare professionals and patients provided written consent before taking part.

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Question design in Nurse and GP-Led Telephone Triage for Same-Day Appointment Requests: A Comparative Investigation

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Abstract

Objective: To compare doctors' and nurses' communication with patients in primary care telephone triage consultations.

Design: Qualitative comparative study of content and form of questions in 51 telephone triage encounters between practitioners (GPs= 29; nurses=22) and patients requesting a same-day appointment in primary care. Audio-recordings of nurse-led calls were synchronised with video recordings of nurse's use of computer decision support software (CDSS) during triage.

Setting: Two GP practices in Devon and Warwickshire, UK.

Participants: Four GPs and 29 patients; and four nurses and 22 patients requesting a same-day face-to-face appointment with a GP.

Main outcome measure: Form and content of practitioner-initiated questions and patient responses during clinical assessment.

Results: A total of 484 question-response sequences were coded (160 GP; 324 N). Despite average call lengths being similar (GP=4mins, 37secs, (SD=1mins, 26secs); N=4mins, 39secs, (SD=2mins, 22secs)), GPs and nurses differed in the average number (GP=5.51, (SD=4.66); N=14.72, (SD=6.42)), the content and form of questions asked. A higher frequency of questioning in nurse-led triage was found to be due to nurses' use of CDSS to guide telephone triage. Eighty-nine per cent of nurse questions were oriented to asking patients about their reported complaint or to wider-information gathering, compared to 54% of GP questions. Forty-three percent of GP questions involved eliciting patient concerns or expectations, and obtaining details of past medical history, compared to 11% of nurse questions. Nurses using CDSS frequently delivered questions designed as declarative statements requesting confirmation and which typically preferred a 'no problem' response.

In contrast, GPs asked a higher proportion of interrogative questions designed to request information.

Conclusions: Nurses and GPs emphasise different aspects of the clinical assessment process during telephone triage. These different styles of triage have implications for the type of information available following nurse or doctor-led triage, and for how patients experience triage.

ARTICLE SUMMARY

Strengths and limitations of this study

- Strengths of this study are that it is the first study to provide naturally occurring audio and video data directly comparing nurse-led and GP-led triage. It provides clear evidence that computer decision support software (CDSS) organises nurse questioning, creating very different triage interactions to GPs not using CDSS.
- This study was limited by the inclusion of only two GP practices. Given further training in the use of CDSS, the nurses in this study might also have conducted triage differently.
- The different styles of triage we observed have implications for the type of information collected from patients, and for how patients experience triage.

INTRODUCTION

~~The use of the telephone to triage patients requesting same-day appointments represents one strategy to manage the increasing workload taking place in primary care~~[1] Telephone triage is the process where calls, from people with a health care problem, are received, assessed and managed by giving advice or by referral to a more appropriate service[1]. It is increasingly being used internationally to help with the provision of out-of-hours care, manage demand for care, or provide an additional source of help and advice[2]. In the UK, the use of the telephone to triage patients requesting same-day appointments represents one strategy to manage the increasing workload taking place in primary care[3]. Nurses and general practitioners may provide telephone triage and consultation, with nurses typically trained to use computerised decision support software to provide this service, both in office hours and out-of-hours. Whilst there is some evidence that telephone triage may reduce GP workload[4,5], there is equivocal evidence that telephone triage is a safe[6-9] and satisfactory means of delivering care to patients[5,10]. The quality of patient-clinician interaction during triage and telephone consultation is key to aspects of safety, effectiveness, patient experience[2,11] and, potentially, to health outcomes[12]. How clinicians communicate with patients and respond to their presenting concerns within telephone triage consultations is therefore central to decisions about its delivery within primary care.

Research comparing how GPs and nurses communicate with patients within face-to-face consultations has identified patterned differences in the process of assessing patients and in the opportunities afforded to patients to explain their presenting problems[13]. Richards et al.[14] used GPs and nurses to retrospectively assess audio-taped nurse-led telephone triage, and found that GPs and nurses had only moderate levels of agreement on the level of

information sought by nurses and on the appropriateness of triage outcome. A recent study using conversation analytic methods to compare doctor-patient consultations conducted face-to-face and on the telephone[15] found little difference in consultation styles between the two methods of delivering care, but found that patients differed in the number and complexity of topics introduced on the telephone compared with face-to-face consultations.

The role of computer decision support software (CDSS) and the professionals who use it is central to assessing the safety and effectiveness of telephone triage. In primary care, CDSS is promoted as supporting the clinical expertise of nurses to conduct triage[16], representing a substitute for the expertise provided by GPs who do not use CDSS to triage patients. Whilst there is evidence that using CDSS to support clinical decisions is a safe and effective means of triaging patients[17], other research suggests that nurses orientate to potential dissonance between CDSS question-prompts and the specific circumstances of the caller's concern[18]; interact with both the patient and the CDSS in 'purposive interaction chains'[19]; or regularly deviate from and modify CDSS prompted questions, potentially leading to a divergence rather than standardisation in triage outcomes[20].

A recent retrospective case review of closed malpractice claims regarding telephone-related consultations in the United States[21] found that 38% of litigation cases were because of problems with communication. Reporting on cases involving clinicians from a range of professional disciplines, Katz et al suggested that as workload increases, clinicians may rush through triage and in some cases patients may be doing the triage rather than the clinician. In a similar analysis of calls to Swedish Healthcare Direct, Ernesater et al[22] reported that failures in communication and asking the caller too few questions were commonly observed

in malpractice claims, a finding also reported in a Dutch study of simulated calls to out-of-hours centres[17].

If nurse/GP triage is to be widely used within primary care in the UK there is therefore a need for greater insight into patient-clinician telephone communication that is both safe and acceptable to patients. To date there has been no research that has directly compared telephone triage communication of nurses using CDSS with GPs conducting telephone triage without the additional support of CDSS.

We compared communication between GP-led and nurse-led computer-supported telephone triage in primary care. We proposed to contribute an understanding of the 'real-time' use of telephone triage in primary care by both nurses and GPs. In this article, we focus on a key element of telephone triage – the interrogative series driving the process of clinical assessment, - a crucial source of information to support decision-making about triage outcomes.

PARTICIPANTS AND METHODS

The research was a sub-study, and formed part of the recruitment process for the ESTEEM trial[23], the first multi-centre randomised controlled trial to compare GP-led vs. nurse-led telephone triage vs. usual care for UK patients requesting same-day appointments. A qualitative comparative study of nurse-led and GP-led triage consultations was used to enable close analysis of interaction between clinicians and patients; and the role the CDSS played in organising nurse-patient interactions.

Five intervention practices were approached (2 Nurse, 3 GP), from whom two were successfully recruited (1 Nurse, 1 GP). Four Nurses and four GPs participated. Participating practices were not systematically triaging patients prior to their inclusion in ESTEEM and therefore nurses had to be trained in the use of CDSS prior to commencing the trial. However, data for the sub-study were not collected until practices were in their final week (average 8 weeks post training in CDSS) of participation in ESTEEM. Patients (or their proxy) who phoned their surgery requesting a same-day, face-to-face appointment with a GP were eligible for participation. Patients were excluded from the sub-study if they did not fulfill the criteria for inclusion to the main ESTEEM trial[23], including:

- Patients who were (i) too ill to participate; (ii) unable to speak English; (iii) temporary residents.
- Young people aged 12.0-15.9 years.
- Children under 12 years unless a proxy phoned on their behalf.

Over a two-day period in each practice, 81 audio-recordings of telephone triage (47 Nurse, 34 GP) and 35 video-recordings of Nurses' use of Odyssey CDSS were made. Written consent was given by patients to analyse 51 complete recorded calls (22 Nurse, 29 GP) including 10 video-recordings. Video-recordings were synchronized with audio-recordings to enable analysis of how nurses used Odyssey during triage. Demographic data collected as part of the ESTEEM trial were also extracted for consented patients. Call length was determined by length of recording which began as soon as the patient picked up the telephone and ended at the call close. Forty females (17 Nurse, 23 GP) and 11 males participated, with an average age of 44 years (SD= 25) – see Table 1. In addition, triage outcome was collected for all consenting patients – see Table 2.

Analysis

All calls were transcribed in detail according to standard conversation analytic conventions[24] (see Box 2 for transcription key). Call lengths were measured from audio-recordings. This led to identifying potentially important differences between the two groups in call length and numbers of questions clinicians asked. In order to understand the nature of these differences ~~W~~we adapted an established conversation-analytic coding scheme for analysis of question-response sequences[25]. Conversation analysis is increasingly being used to support medical research aimed at understanding the distribution of interactional practices by offering operational definitions of phenomena that can subsequently be coded and counted[26]. Inclusion criteria for the coding scheme were:

- Questions had to ~~be either (or both) a formal question (i.e., it had to rely on lexico-morpho-syntactic or prosodic interrogative marking) or a functional question (i.e., it had to~~ effectively seek to elicit information, confirmation or agreement whether or not they made use of an interrogative sentence type);
- Questions seeking acknowledgment were **not** coded because they sought not neither confirmation nor affirmation;
- Repair questions ("Pardon") as well as partial repeats (''He went where?'') were **not** coded;
- Questions that suggest, propose, or offer something to another as well as questions that request something from another were **not** coded (e.g. ''Can I just confirm your date of birth before we go any further" or "Just bear with a moment we'll see what we can have a look at for you").

The scheme included 12 coding categories (see Box 1), including question design, the action they performed and the responses elicited. We also coded for an additional dimension of the broader activity questions were oriented towards. Working from the inclusion criteria with audio-recordings and transcripts, all eligible questions were identified and agreed by JM, RB and JP (n=484). Two raters (JM, RB) then each independently coded 10% of questions to determine inter-rater reliability. Kappa scores were calculated for all coding categories revealing moderate to high levels of agreement (0.67-1.00). JM coded the remaining data and ambiguous cases were discussed in order to reach a consensus on the final code. JM, RB and JP then closely examined prototypical cases identified in the coding of question-response sequences and which demonstrated recurrent patterns of interaction across the consultations.

Box 1: Question-Response coding scheme (adapted from Stivers & Enfield 2010)

- Semantic structure
- Through-produced multi-questions
- Polar questions –turn-final element; negative marking; declarative
- Type of Q-word in content Wh- questions
- Social action of question
- Response type
- Response timing
- Confirming or disconfirming answer to polar question
- Form of answer to polar question

Added for analysis of triage interactions:

- Question activity – reported complaint; wider-information gathering; eliciting patient explanations, views; past medical history

Box 2: Transcription conventions[24]

(.)	A micropause, hearable but too short to measure.
>he said<	'greater than' and 'lesser than' signs enclose speeded-up talk. Occasionally they are used the other way round for slower talk.
Underlining	indicates emphasis; the extent of underlining within individual words locates emphasis and also indicates how heavy it is.
↑↓	Vertical arrows precede marked pitch movement, over and above normal rhythms of speech. They are used for notable changes in pitch beyond those represented by stops, commas and question marks.
she wa::nted	Colons show degrees of elongation of the prior sound; the more colons, the more elongation.
[ ]	Square brackets mark the start and end of overlapping speech. They are aligned to mark the precise position of overlap as in the example below.
°↑I know it,°	'degree' signs enclose hearably quieter speech.

RESULTS

Question Activity

Average call length (minutes:seconds – mean, standard deviation, range) was similar across both arms, (Nurse-led = 4:39, 2:22, 1:45-10:46; GP-led = 4:37, 1:26, 1:29-8:14). However, nurses asked patients an average of 14.7 (SD = 6.4, range = 4-28) questions to assess the problem during telephone triage consultations, in contrast to only 5.5 (SD = 4.6, range = 0-17) asked by GPs. Nurses were predominantly oriented towards two types of question activity (Table 3) – the assessment of the patient's reported complaint (Nurse 32.1%; GP 21.9%) and wider information gathering around the reported complaint (Nurse 56.8%; GP 32.5%). In contrast, GP questions were more evenly distributed across four types of question activity, including eliciting patient's own explanations for their symptoms (Nurse 2.5%; GP 13.1%) - e.g. *There's no obvious explanation for that?* and seeking a more detailed

past medical history from the patient (Nurse 8.6%; GP 30.0%) – e.g. *What do you attend the hospital for?*

Table 1: Call Sample

Call Sample Descriptors	Nurse-Led	GP-Led
Male	5	6
Female	17	23
Mean patient age (years)	45.2	44.7
Patient age range (years)	1.4-88.4	0.2-80.6
Calling on own behalf	17	22
Calling on behalf of other	5	7
Unknown problem	18	18
Known problem	5	11
Single-issue problem	22	23
Multiple problems	0	6

Table 2: Triage Outcome

Triage Outcome	Nurse-Led	GP-Led
Same Day with nurse	10	2
Same Day with GP	6	18
Nurse or GP next day	3	0
Nurse or GP 3-7 days	1	1
Self-Care	2	3
Nurse or GP >7 days	0	5

Question Design and Action

Over three-quarters of questions deployed by GPs and Nurses (Nurse 82.1% GP 76.3%) were polar questions. A key feature of polar questions is that they are designed for either a yes or no response[27]. Secondly, polar questions are commonly employed in medical history-taking where they are frequently designed to prefer a 'no problem' response. For example the inclusion of the negative polarity item 'at all' tilts, *Has she a temperature at all?* to prefer a *no* and therefore the absence of fever (an optimal state of affairs). In contrast *And you're breathing normally?* prefers a *yes* response and therefore the absence of breathing problems (again an optimal state of affairs). GPs used a higher proportion of polar questions with an interrogative design (Nurse 29.94% GP 46.25%) – e.g. *Have you vomited at all?* whilst over half of the nurses' polar questions were designed as declarative statements (Nurse 52.16% GP 30%) with a presupposed answer embodied within the question for confirmation or disconfirmation – e.g. *passing urine okay?* The proportion of polar,

declarative questions used by nurses is also reflected in the proportion of questions that nurses asked that requested caller confirmation (Nurse 53.7% GP 31.87%). This stood out in contrast to GPs predominantly asking questions that requested information rather than confirmation (Nurse 45.99% GP 68.13%).

Nurses using CDSS, were therefore deploying a higher proportion of declarative questions about the patient's reported complaint or wider-information gathering than GPs, designed to optimise the report of the patient's situation by ruling out a variety of medical problems (Nurse 45.37% GP 12.51%). In contrast, GPs, not using CDSS and therefore more able to self-determine their questions, employed questions more evenly distributed across the four different activities, typically designed as interrogatives aimed at requesting information from the caller. In order to reveal the implications of these different distributions for how GPs and Nurses, using CDSS, conducted telephone triage in our sample it is necessary to examine how these differences in question number, activity, design and action are consequential within the triage interactions themselves.

Table 3: Interrogative Series – Coding for Question Activity, Design and Action

	Nurse	GP
Activity		
Reported Complaint	32.1%	21.9%
E.g. *Is he getting more breathless?*		
Wider information gathering	56.8%	32.5%
E.g. *and have you got a temperature at all do you feel hot?*		
Eliciting patient's concerns/ideas/expectations	2.5%	13.1%
E.g. *There's no obvious explanation for that?*		
Past Medical history	8.6%	30.0%
E.g. *And is there any family history of arthritis of any sort?*		
Design		
Polar Questions - interrogative	29.9%	46.3%
E.g. *Has she vomited at all*		
(Reported complaint & Wider-info gathering activities only)	(25.9%)	(26.3%)
Polar Questions - declarative	52.2%	30.0%
E.g. *And she's weeing okay*		
(Reported complaint & Wider-info gathering activities only)	(45.4%)	(12.5%)
Content WH- questions	13.3%	18.8%
E.g. *And when did the tiredness first start*		
Alternative questions	4.6%	5.0%
E.g. I*s it quite bad or just a little bit of dizziness*		
Action		
Request for confirmation	53.7%	31.9%
E.g. And you said no discharge and no pain		
(Reported complaint & Wider-info gathering activities only)	(46.6%)	(13.8%)
Request for information	46.0%	68.1%
E.g. Do you wear glasses or contact lenses?		
(Reported complaint & Wider-info gathering activities only)	(42.3%)	(40.6%)

Gathering information during Nurse-led triage: a 'no problem' question series

When patients present a problem to clinicians, they may report several symptoms. Nurses, using Odyssey CDSS, need to select one of these symptoms and enter a key word to activate the CDSS for conducting triage with the patient. This activates a pop-up box with a series of symptom-related questions that prompt the nurse to ask of the patient. The nurse can select which questions to ask first but it is important the nurse asks those with a red or orange flag positioned adjacent to the question. Red-flagged questions have a default setting at the highest level of urgency and therefore if left unanswered Odyssey will recommend an emergency response. For each question asked, Odyssey prompts a set of responses in an additional pop-up box from which the nurse must select one. Odyssey therefore imposes an organisational structure on nurse questioning that is absent from GP-led triage. This structure is in terms of the number and order in which questions are asked, but also how questions are designed to elicit a response from patients that fits those offered by Odyssey.

The sequence and screenshot in Box 3 (Figure 1) illustrates an interrogative series common to the wider information gathering activity in nurse consultations, using polar questions which firstly constrain the type of response available to patients and secondly are designed to prefer 'no problem' type responses. In this sequence the caller is a mother of an infant who has a high temperature. The nurse has activated the CDSS using the keyword 'high temperature' which has led to the CDSS prompting the nurse to ask the caller about vomiting. This first question is a fully formed interrogative, with the negative polarity item 'at all' preferring a *no* response, indicating the nurse presupposing an absence (and therefore 'no problem') rather than presence of vomiting. The preferred response is

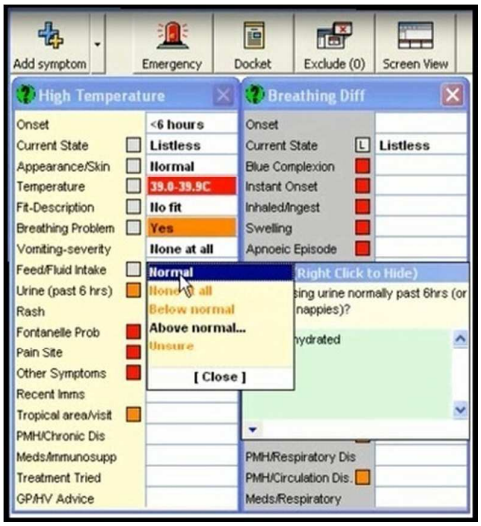
therefore one that should be brief (yes/no) but one which also informs the nurse of the absence rather than presence of vomiting, which will enable a quick transition to the next topic. The mother offers the preferred response with a partial repeat of the nurse's question 'No, she hasn't'. The nurse is then able move on to the next item in the list of prompted questions, 'but she is taking fluids'. This time the nurse's question is designed as a declarative with an optimized presupposition aimed at obtaining confirmation. The mother again responds with a short reiteration of the nurse's statement, functioning to confirm that the nurse's presupposition is correct 'Yes she's drinking some water'. The same question design is then repeated 'and she's weeing okay'. Again the mother repeats the nurse's words and confirms 'Yes she's weeing absolutely fine'. The nurse then switches to a negative declarative design presupposing an absence of a rash and again we can see the mother follows the same pattern. However, following the nurse's next question, we see a slight variation in the mother's response. The nurse again presents a negative declarative question 'she's not coughing', but this time the patient appears to disconfirm the nurse's presupposition. However, this is not a direct disconfirmation (e.g. *Yes she is coughing*) but instead the mother qualifies her response - *not a constant cough,* functioning to uphold the nurse's presupposition as at least partially correct. Finally, the negative declarative 'no other problems normally' is issued with the mother repeating the previous pattern, confirming the optimized presupposition that there are 'no other problems.'

This example was typical of how nurses could be seen to manage the demands of the CDSS prompts by adapting questions that enabled swift progression through the consultation. The use of *And* to preface questions, use of multiple declaratives, optimized for confirmation, and a process of ellipsis whereby questions were shortened made this information

gathering activity appear more as a checklist designed to rule out serious difficulties rather than orienting to the patient's specific presenting problem. Consequently, contracted sequences of interactions with short turns, illustrated in Box 3, were a common feature in the nurse-led data but virtually absent in the GP-led data.

Box 3 and Figure 1: Nurse-Led triage – 'no problem' design questions

N: **And has she vomited at a:ll**
P: No (.) she hasn't no
N: And >I know you ha-< you said you hadn't given her her a >bottle this morni-< but **she is taki::ng (.) flui::ds**
P: Yes she's drinking some (water)
N: **And she's weeing okay**
P: Yeah she's weeing absolutely fine
N: **No ra::sh?**
P: No no ra:sh
N: O↑ka::y, (1.8) **and no other symptoms she's not coughi::ng**
P: ↑She had a little cough this morning (3.2) but not a constant cou:gh
N: **↑And ↑normally we:ll no other problems normally::**
P: No she's normally fine running arou:nd like a,



At 1 minute, 45 seconds[i]

In a few cases nurses could be seen to incorrectly presume a 'no problem' response from patients, resulting in some interactional difficulty whereby patients had to disconfirm the presupposition embodied in the question. In Box 4, an example is provided of a nurse asking about the radiation of pain, delivered as an optimised negative declarative statement for the patient to confirm. However there is a pause and then a non-straightforward response from the patient 'We::ll...' which serves to neither confirm or disconfirm the nurse's presupposition. Even after referring to a previous statement and restating that there is some pain in the buttocks, the patient softens the weight of her disconfirmation with a

[i] The times here refer to the time that the extract begins in relation to the start of recording

further 'I don't know.' The effect is that the 'no problem' design in this case leads to a lack of clarity as to the location of the patient's presenting symptoms which is likely to be reflected in how the nurse records the patient's response in Odyssey.

Box 4: Nurse-led triage - No problem design causing interactional difficulty

N: **And you don't feel that it's moving down into the buttocks**
(0.6)
P: We::ll [I'd say it] (0.6) well I don't kno::::w it =
N: [(?)]
P: =(.) it's as I sa:y it ha- halfway do::wn the buttock an- (.) not so far in I would think I don't ↑know
N: Okay that's fi::ne

At 1 minute, 53 seconds

GP-led triage: Questions designed to elicit patient's explanations

In contrast to the exhaustive CDSS-led questioning about the nature of the reported complaint and wider information gathering around it apparent within the nurse-triage data, GPs were frequently observed eliciting patient's explanations for their symptoms. In the extract outlined in Box 5 it is evident that early on in the triage consultation, and immediately following the patient's reported complaint, the GP attempts to rule out any obvious explanations from the patient. Following an initial marked confirmation, the patient takes this opportunity to list the candidate explanations she has considered and the GP then moves straight to triage resolution. Importantly, despite the GP using polar declarative questions that request confirmation, they are orientated to the ongoing talk and caller's responses rather than presented as a series of checklist-style questions.

Interactions where patient's explanations were oriented to and followed up by the GP, were very rare in the nurse triage data and indicate GPs and nurses orientating to different

aspects of the assessment process during triage. Box 5 provides an example of the potential of orienting to patient's explanations for determining triage outcome more efficiently, without an exhaustive interrogative series delivered through the use of the CDSS. However, we observed many instances of GPs and patients engaging in lengthy discussions about the possible causes of symptoms as well as GPs obtaining a detailed wider history from the patient both of which were less common in the nurse data. By contrast, nurses using CDSS did not engage in lengthy discussions about possible diagnoses even when one was offered by the patient, instead confined to the information gathering demands of the CDSS.

Box 5: GP-led triage - Eliciting patient explanations

P: =on it woke up this morning and my who::le (.) my whole eye and the whole left hand side of my face is complete swollen, my ↑eyes almost closed,
D: °Okay° (.) **and there's no obvious explanation for that y-**
P: Not at all
D: °No okay°
P: No I haven't I haven't suffered it, (.) y- y::ou know >I don't suffer with< hay feve:r (.) haven't been anywhe::re (.) unusual or y- y- you kno::w didn't [walk the dogs in any (field)]
D: [(?)] **(o:r) or got anything in the eye or anything like that**
P: No: (>got to admit<) I went to be:d at half past ten (.) perfectly fi::ne (.) and m- I do sleep with my window slightly open
D: °Yep°
P: Um a::nd (04.) went straight to sleep within an hour I just sat bolt upright (0.4) with >this like< ↑burning sensa↑tion,
D: Okay (.) I think we're gonna need to take a look at you .hh can you [come] in this morning?

At 0 minutes, 14 Seconds

Nurse-led triage without CDSS

On a few occasions the Odyssey software was not activated during the recorded nurse-led calls. In these cases, question-response sequences were identified that did not follow the same pattern as those where CDSS was in use. Box 6 provides an example of a sequence where the nurse, not using CDSS, begins the wider information gathering activity with a

typical opening question about duration followed by a declarative question designed to confirm previous patient information. However, instead of then asking a series of questions aimed at gathering information on related symptoms, the nurse proposes a candidate diagnosis. In a similar way to the GP data, this potential diagnosis is then negotiated with the patient within the ongoing interaction.

Box 6: Nurse offering diagnosis when not using CDSS

N: an ongoing, (.) she's had a (.) recent viral illness
P: Yeah
N: And she's pulling at her (0.6) ea::r is ↑it?
P: Yea::h, (.) both of them
N: Is she [teething]?

At 1 minute, 3 seconds

DISCUSSION

Despite nurses asking three times as many questions as GPs, the similarity in the duration of triage calls is explained by the content and form of questions used and their different interactional consequences. Most notably, nurses' frequent use of 'no-problem' polar declaratives requesting confirmation, deployed predominantly to gather information around the reported complaint, created contracted question-response sequences. These features were almost completely absent in the GP data where more polar interrogatives were employed to request information from patients, taking a more unknowing stance and allowing more room for elaboration or sequence expansion[27]. GP questions also launched a wider range of activities including eliciting patients' own views and obtaining a relevant past medical history. This differential distribution of question design, action and activities in the GP data led to typically longer patient responses and subsequently to other kinds of

practitioner contribution such as GP's own evaluations, patient education or advice. The nurses, using CDSS, and GPs, self-determining their questions, could therefore be considered to promote different aspects of the clinical assessment process during telephone triage. Whilst nurses' focus on current symptoms emphasised an assessment of urgency and efficient risk management of the patient, GP's attempts to elicit patient's own explanations and obtain a wider past medical history demonstrated more familiar consultation behaviours[28].

The interactional differences observed in our sample reveal that nurse–led telephone triage, using CDSS, is not a straightforward like-for-like substitution for GP-led triage. The design of nurse questions could be seen as an adaptive strategy to the constraints of the software. As a result, their attempts to rule out more serious conditions, manifested as a series of linked checklist-style questions that appeared closer to a social survey than a medical interaction orientated to patient's specific problems. This is reflected in the findings of the ESTEEM process evaluation[29] which found that some patients did not understand why nurses asked so many questions during triage calls, revealing that patients experience triage differently when conducted by a nurse using CDSS or a GP without CDSS.

Our findings also demonstrate that GPs acting independently, and nurses using CDSS are likely to obtain different types of information from patients. The differences in information collected may have an impact on how GPs and nurses decide on management and disposition, and also on how patients are assessed in any subsequent consultation following the triage call. A key task for assessing the value of these different approaches therefore lies

in research that examines how the content of triage calls is used in, or informs, subsequent face-to-face or other primary care consultations.

GPs have historically been cast as expert decision-makers and so it is perhaps not surprising that their eliciting of patient perspectives and detailed history have been identified as common features of both face-to-face and telephone consultations[15]. Patient-centred consultation styles have been shown to lead to increased patient satisfaction, treatment adherence and treatment outcomes[~~32~~20-34] and it would therefore seem to be a logical style to reproduce within triage calls. However, the primary aim of telephone triage is to manage and direct patients within the healthcare system. GPs, when eliciting patient explanations, may therefore contribute to longer triage times than might be necessary to determine the triage outcome. Nurses using CDSS, by contrast, would appear to strictly adhere to the end point of patient management and perhaps more efficiently determine the route patients should take in primary care. However, using CDSS involves extensive questioning which may also unnecessarily contribute to longer triage times. ~~The benefit of GPs delivering a more patient-centred consultation during triage, or nurses focusing solely on patient management, for patients and in terms of resources therefore remains unclear.~~ How these different triage methods affect triage outcome and overall consultation time; whether training nurses to adapt their question design when using CDSS affects triage outcome; and how patients experience and respond to these different approaches are key issues requiring investigation.

Limitations and strengths of the study

This study was limited by the inclusion of only two GP practices. It is possible that nurses and GPs conducting triage in other GP surgeries would have employed different patterns of distribution of question designs, actions and activities to those reported here. Although GPs did not use CDSS to triage patients, we also recognise that GPs may have actively consulted electronic patient records whilst triaging which might have provided an interesting comparison to the nurse data.

~~It might also be the case that g~~Given further training and experience of the CDSS, nurses might ~~would~~ have delivered different interactions from those we observed here. However, our findings clearly demonstrate how the CDSS imposes a structure on the number, order and design of nurse's questioning compared with GPs questioning. This is backed up by our observation of nurses' different questioning pattern when not using CDSS. Investigating how nurses with extensive training in the use of CDSS communicate with patients, and how this compares with nurses not using CDSS would therefore provide important insights into the contribution of CDSS in supporting nurses to deliver safe and effective patient management. The resonance between nurses' questioning in our data and interactions observed in NHS Direct consultations[18]; and the GP's questioning style in our data and previous research on telephone consultations[15] also indicates how our findings may be transferred to other primary care settings. Training for telephone triage could be designed to incorporate working with sample recordings and transcripts of real calls to illustrate the full range of questions that can be asked in the interrogative series; and how question design itself can be consequential for the nature of a patient's response. Studies such as the one reported here therefore offer important insights into the actual implementation of telephone triage using different professionals, and how CDSS can organise telephone triage interactions and

patient experiences. ~~Such insights can assist both with the training of those professionals in conducting triage, help improve the design of CDSS systems, and manage patient expectations.~~ Such insights can assist with the training of those professionals in conducting triage; with revealing how the design of CDSS systems might be more effectively configured; and with the management of patient expectations around new technologies for medical service delivery.

Although the parent trial to this study examined the issue of patient safety alongside telephone triage[23], we did not specifically examine safety in this qualitative study. Previous relevant reviews[2,35], and individual studies[4,6,17,36] are conflicting in respect of patient safety outcomes and the related matters of hospital admissions or A&E attendance associated with triage. Specific concerns have been raised in relation to the quality of information gathering in telephone triage consultations[8,17], and the differences in information-gathering between nurses using CDSS, and GPs not using CDSS, in our findings place communication, information-gathering and the role of CDSS at the heart of ongoing debates about patient safety.

CONCLUSION

Our data suggests nurse triage using CDSS is not a straightforward substitution for GP triage without CDSS. Computer decision support software, employing algorithms designed to minimise risk, plays a fundamental role in organising nurse's questioning during triage leading to differences in the number, content and form of questions used by GPs and nurses. These differences have consequences for the type of information collected from patients during triage calls and for how patients experience those calls. These findings are

based on a small sample and it is not known how these triage styles are linked to triage outcomes. However, given the well-established relationship between consultation style and outcomes in primary care, our findings provide important evidence for the training of staff and for the design of CDSS in supporting staff to conduct telephone triage.

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COMPETING INTEREST DECLARATION

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: all authors had financial support from SW GP Trust for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work."

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publication, responsibility for which rested solely with the authors. The researchers were therefore independent from the funders in the conduct, analysis, write-up and dissemination of the study's findings.

The ESTEEM study will be published in full in Health Technology Assessment [volume and issue number to be confirmed]. See the HTA programme website for further project information. The ESTEEM report presents independent research commissioned by the National Institute for Health Research [NIHR]. The views and opinions expressed by the authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, MRC, CCF, NETSCC, the HTA programme or the Department of Health'

ETHICAL APPROVAL

The study was approved by the South West Research Ethics Committee, reference number: 09/H0202/53. All healthcare professionals and patients provided written consent before taking part.

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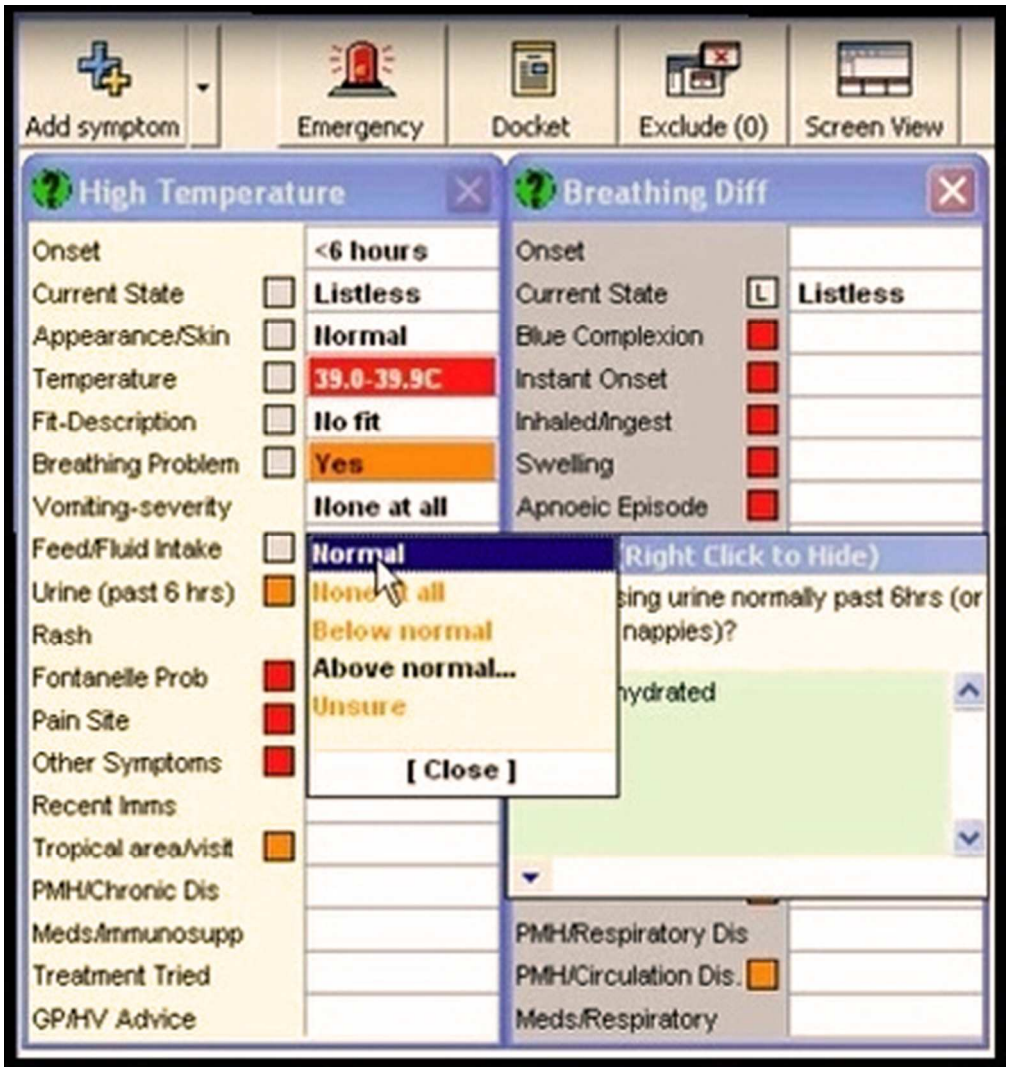

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