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Original Research

How triage nurses generate initial hypotheses during the first patient encounter: A focused ethnographic study

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ABSTRACT

Background: The ability of triage nurses to quickly identify an urgent situation is crucial and requires good clinical reasoning, which is strongly influenced by the context and professional environment.
Aim: To explore how triage nurses generate initial hypotheses at the very start of the triage encounter and which immediately available cues contribute to this early sense-making.
Methods: This qualitative study was conducted in three regional hospitals and included 10 triage nurses. Nurses wore a forehead-mounted GoPro camera to record triage from their point of view. Semi-structured, video-cued recall interviews were conducted immediately after triage. Deductive and inductive coding was then carried out and analysed using thematic analysis methods.
Results: The average age of triage nurses was 36 years, with an average of 6.5 years of professional experience in the emergency department. Triage nurses generated hypotheses as soon as they encountered the patient, largely through pattern recognition (a core mechanism associated with intuition). These hypotheses were sometimes made as soon as the patient was registered at the emergency desk reception and even before talking to them. These hypotheses were based on the patient's main presenting complaint, their facial expression, and the time reported for the onset of symptoms.
Conclusion: Triage nurses operate in a complex environment and use rapid clinical reasoning processes that draw on readily available cues and prior experience. These findings may inform triage education by highlighting the early, experience-based processes involved in hypothesis generation and the potential value of explicitly addressing intuitive reasoning in triage training.

1. Introduction

Triage represents the first stage of any consultation or admission in an emergency department (ED). It originated in military medicine during the Napoleonic Wars [1], then it was adapted for civilian use after the First World War, and has since become a cornerstone of modern emergency care.

Since the early 1980s, triage in ED has typically been conducted by a triage nurse (TN) [2,3].

Triage is intended to optimise the management of patients presenting to the emergency department by identifying those who require immediate care. Patients are categorised according to clinical severity, intensity of suffering, and the risk posed to their health [4].

Several triage scales are in use around the world, such as the Australasian Triage Scale, the Canada Triage and Acuity Scale, the Emergency Severity Index Triage Scale, the Manchester Triage System, and the Swiss Triage Scale. Following the completion of training, ED nurses are trained to assess patients and determine a triage reason and level [5]. However, training programs vary considerably across countries, and there are few recommendations regarding optimal training and

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prerequisites.

The role of the TN is to rapidly ascertain the level of urgency and direct the patient to the appropriate care pathway. Triage should ideally be completed within 2–5 min [6]. Excessively protracted wait times without the opportunity to consult with a TN have been associated with a considerable number of patients leaving the emergency department without receiving treatment [7].

The triage process occurs in a highly specialised and often "chaotic" environment, where the nurse's decisions are pivotal to patient care [8].

This highlights the complexity of triage due to time pressure, limited access to patient information and high patient flow, which is increasing regularly worldwide, despite the constant decrease in the number of staff assigned to triage [9,10]. The patient population is also evolving, with an increase in elderly patients with multiple comorbidities and atypical clinical presentations [11]. Consequently, effective decision-making (DM) within this complex environment poses a significant challenge.

2. Background

DM in these contexts relies on clinical reasoning, a process fundamental to healthcare practice [12]. From a cognitivist perspective, this reasoning can be understood through the widely-accepted dual-process theory [13,14]. According to this theory, two cognitive processes (intuitive and analytic) are mobilised during the decision-making process. Intuitive processes are the default mode of thought for generating hypotheses quickly and without conscious effort [12]. Intuitive processes function primarily according to a principle of "pattern recognition," that is, the recognition of a pathological entity based on a combination of several clinical signs [15]. They entail the recognition of a distinctive configuration of clinical and contextual data, which in turn evokes one or more hypotheses [16]. For example, an experienced triage nurse may rapidly recognise a recurrent clinical configuration (sudden severe flank pain with restlessness, nausea/vomiting and possible groin radiation) which spontaneously evokes the hypothesis of renal colic. This intuitive pattern recognition does not end reasoning; rather, it immediately cues focused questions and safety checks (e.g., fever/chills suggesting obstructed infection, pregnancy risk, atypical features suggesting vascular or abdominal emergencies), thereby generating and prioritising one or more working hypotheses.

Conversely, analytical processes are particularly demanding in cognitive terms [13], as they require controlled judgement, which is based on the collection of additional data during history-taking, clinical examination, and complementary investigations (e.g., laboratory tests, ECG, and imaging), which are primarily used to corroborate intuitively generated hypotheses [14].

Historically, clinical errors have often been attributed to failures of intuition [17]. However, evidence from the past 15 years challenges this assumption. Multiple studies have demonstrated that extended deliberation does not necessarily improve clinical performance and may, in some cases, hinder it [18]. Intuitive reasoning, central to the formulation of initial hypotheses, is a key determinant of performance, and warrants greater attention than it has traditionally received in the literature.

Several studies have examined the reasoning processes employed by TNs, most of them with quasi-experimental design [9,19–22]. It is asserted that TNs rely on the patient's primary complaint, vital signs, or medical history to inform their decisions [23]. However, there is a paucity of research addressing the cognitive processes mobilised by which TNs formulate hypotheses during their preliminary encounter with the patient.

This study aimed to explore how triage nurses generate initial hypotheses during the first moments of the emergency department triage encounter, and which immediately available cues contribute to this early sense-making.

3. Methods

3.1. Study design

A qualitative approach was used to examine clinical reasoning among TNs. To explore the cognitive processes that are inherently implicit, we opted for an ethnographic approach, which facilitates a *"general approach to the exploration and understanding of social contexts and processes"* [24]. This method facilitates an in-depth understanding of decision-making within authentic and complex environments and aligns with the naturalistic decision-making paradigm [25]. The focused ethnographic approach focuses on a specific phenomenon within a given context, facilitating a more comprehensive understanding of the decisions made by the actors within their environment [26]. The study followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines [27].

3.2. Setting and participants

This study was conducted in Switzerland, a country with 26 cantons and 4 linguistic regions (German, French, Italian, and Romansh). The cantons are entrusted with the organisation of hospitals, the promotion of public health, and the regulation of health professions [28].

Emergency care is delivered through a universal, insurance-based healthcare system. Citizens are required to carry mandatory health insurance, which provides access to emergency departments without direct payment at the point of care.

Data were collected at three regional hospitals with a combined annual patient volume of 97,500, serving a catchment area of approximately 595,000 inhabitants.

The multicentre design aimed to enhance credibility by sampling across different regional ED organisations while using the same national triage scale. Given the exploratory qualitative aim and sample size, the study was not designed to compare sites; therefore, we did not perform a site-by-site comparative analysis.

Senior managers of the TNs in the three facilities were contacted by email and a convenience sample was obtained through "face-to-face" recruitment with the TN on duty on the day of data collection. Prior to data collection, written consent was obtained from participants (i.e., patients and the TN). The patients were informed that they were being filmed and that the video would be destroyed immediately after the interview with the nurse. TNs were informed that the study was about their clinical reasoning, but in a deliberately evasive manner. Exclusion criteria were patients <18 years old and life-threatening emergencies. Because recording occurred during the initial triage encounter, only patients who were clinically stable, not in severe distress, and able to provide written informed consent prior to filming were eligible. This practical and ethical requirement may have led to an over-representation of lower-acuity encounters and is addressed as a limitation.

The study was approved by the Cantonal Commission for Ethics in Human Research of the Canton of Vaud (Switzerland) (Req-2022-01254) and carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki). Participants did not receive any reward/remuneration for their participation.

3.3. Measurement

One triage encounter per nurse was recorded from a first-person perspective using a GoPro® camera (GoPro Inc., San Mateo, CA, USA) mounted on the participant's forehead [12,29,30]. This technique involves the filming of actions observed by the subject, rather than the broader context or the subjects themselves. It has proven to be a potent instrument in the examination of decision-making processes in a naturalistic setting, facilitating the revelation of the knowledge and cognitive processes mobilised by the subject and the identification of relationships

between healthcare professionals in a clinical environment [31,32].

The GoPro® camera was configured in high-definition mode with a wide-angle field of view to ensure that subtle patient cues (e.g., gestures, facial expressions, and posture) were captured. Immediately after triage (i.e., after the triage decision had been made and the patient handed over) the nurse participated in a video-cued recall interview (also referred to as a subjective re-situating interview). The researcher and participant viewed the recording sequentially; the video was paused at key moments (e.g., first visual contact, first question, choice of vital signs) and the nurse was invited to verbalise what they noticed, the hypothesis generated, and what information they sought next to confirm or refute it. A semi-structured interview guide was used, containing open-ended questions, to facilitate reflections and dialogue with the participants. The questions aimed to capture the processes involved during the initial patient contact. They were of the following type: 'At this point [in the video], what were your hypotheses for this patient?' or 'For what reasons did you decide at this point [in the video] to measure this vital sign?'. The objective was to re-immerse the nurse in their own sequence of actions and prompt verbalisation of reasoning and decision-making processes in direct relation to the video-recorded events [29,30]. This approach minimises retrospective bias and facilitates access to tacit and intuitive forms of reasoning that are often difficult to articulate spontaneously.

Rather than watching the footage uninterrupted, interviews were conducted through repeated short viewing–pause cycles aligned with decision points, which enabled focused probing within a 20–35-minute format. To address potential divergence between what was visible in the footage and what was spontaneously verbalised, the interviewer used real-time video-cued probing. When a visible action or cue (e.g., repositioning to view the patient, selecting a specific vital sign, focusing on a body area) was not mentioned by the nurse, the video was paused and the nurse was asked to explicate (i) what they were attending to at that moment and (ii) what hypothesis-testing goal the action served (corroboration vs. challenge). This procedure operationalised concordance/divergence within the interview rather than treating the video as a separate observational dataset.

Consequently, the data obtained from the exchanges were closely linked to the situations recorded, which ensured a high degree of consistency between the nurses' interviews and their observed practices.

The interviews were then subsequently transcribed in full by the principal investigator who did not work at any of the sites studied. The interviewer (YN, male) holds a master's degree in medical education and has prior experience in qualitative research.

3.4. Data collection

Data were collected between March and December 2023 as part of a larger study. The semi-structured interviews lasted between 20 and 35 min. The triage process was similar in the three hospitals studied and was carried out by the TN according to the Swiss Triage Scale established in 1997, which comprises 4 levels of severity [33]: level 1 relates to vital or functional emergencies that require immediate medical attention; level 2 requires medical attention within a maximum of 20 min; level 3 concerns emergencies that can wait up to 120 min; and level 4 concerns relative emergencies whose treatment can be postponed. Once the TN had determined a triage reason and level, the patient was assigned to a bedside nurse for further care. Interviews were scheduled to minimise disruption to patient flow (e.g., conducted when the triage station could be temporarily covered according to local staffing procedures).

3.5. Analysis

Interviews were transcribed in full and anonymised. A list of categories from the conceptual framework was first drawn up by one of the researchers in order to proceed with deductive coding. An initial vertical reading was carried out in order to re-immerse the researcher in the interviews. A horizontal reading then made it possible to enrich the list of codes using an inductive approach. Codes were then shared and discussed between the first and a second researcher (EM). Double coding was carried out using Atlas© (Atlas.ti) software. Verbatim transcripts were blind-coded by YN and EM for 30% of the interviews. Extracts were selected at random. In accordance with recommendations, we sought to obtain an intercoder agreement of >90%. [34].

Data saturation was reached after the eighth interview, meaning that no new information emerged in subsequent interviews.

4. Results

4.1. Characteristics of study participants

Ten triage nurses were interviewed (6 women; 4 men), with an average of 6.5 years' experience in the emergency department and an average age of 36 years old (Table 1). All triage nurses interviewed had received two days of triage training. Six had a specialty certification in emergency care, which is a diploma obtained after a two-year training course. [28] Three main themes emerged from the analysis: elements immediately available upon patient arrival; hypotheses made as soon as the patient was registered administratively in the emergency department; and patients referred by their GP (see Table 2).

4.2. Elements immediately available from the patient

With the exception of TNs 4 and 5 who triaged a patient already diagnosed by the attending physician, all the TNs interviewed made hypotheses from their first contact with the patient and before taking vital signs or conducting a thorough medical history. The initial hypotheses concerning low specificity (serious/not serious) were formulated based on data immediately observable in the patient, such as facial expressions and pain intensity.

- [TN 1] about a patient who came in complaining of headaches: *"I took a quick look. Quick, succinct. She had a good colour, didn't appear to be in pain, she wasn't doubled over or grimacing, she wasn't holding her head and no vomiting. For me, she was reassuring at first sight"*.
- [TN 3] about a patient who was experiencing dizziness: *"When I saw him, I was quite reassured because he was standing and not vomiting and talking to me; he didn't appear to have lateralization or anything like that"*.

The time factor was a particularly important factor taken into account in defining the degree of seriousness.

- [TN 2] for a patient who presented with pain in his left shoulder: *"That's why I insisted a little on 'since yesterday'… if it's a dislocation, would he really have stayed at home from yesterday until now?"*
- [TN 1] about a patient's headaches: *"If she had told me I've had headaches for a week, like a helmet, then I would have triaged her under*

Table 1
Sociodemographic data of TNs.

	Gender	Age (years)	Experience in triage (years)	Specialisation
TN 1	Woman	28	1.5	No
TN 2	Woman	30	2.5	No
TN 3	Woman	35	5.5	Yes
TN 4	Woman	29	1.5	No
TN 5	Male	36	10	No
TN 6	Male	38	7	Yes
TN 7	Male	48	12	Yes
TN 8	Woman	55	22	Yes
TN 9	Male	32	2	Yes
TN 10	Woman	30	4	Yes

Table 2
Analytic framework with exemplar codes and illustrative excerpts.

Theme	Code	Definition	Example
Theme 1: Immediately available cues at first patient contact	Appearance/ general impression	Overall visual impression (colour, distress, posture) used to form an initial "serious vs. not serious" hypothesis	*"She had a good colour, didn't appear to be in pain… For me, she was reassuring at first sight."* [TN1]
	Pain behaviour / facial expression	Facial cues and behaviours interpreted as markers of severity and urgency	*"…not doubled over or grimacing…"* [TN1]
	Mobility / functional status	Ability to stand/ walk/speak used as a quick proxy for stability	*"I was reassured because he was standing… and talking to me."* [TN3]
	Symptom onset duration (time factor)	Time since onset used to infer likely severity/ acuity	*"…if it's a dislocation, would he really have stayed at home from yesterday until now?"* [TN2]
Theme 2: Hypotheses formed at administrative registration	Chief complaint heard at reception	Complaint heard before direct assessment triggers immediate diagnostic/acuity hypotheses	*"Vertigo… it can be peripheral or central."* [TN3]
	Pre-alert / escalation triggered before triage	Early hypothesis leads to escalation actions (e.g., alerting staff) before full assessment	*"…before assessing the patient, the TN decided to call…"* [TN6]
Theme 3: GP referral with pre-established diagnosis	Reliance on referral diagnosis	When diagnosis is provided, nurse prioritises protocolised checks rather than generating alternatives	*"…that's part of the standard assessment at triage."* [TN5]
	Analytic corroboration via protocol (vital signs + focused history)	Targeted data collection to verify severity criteria and calibrate acuity	*"…is he febrile, tachycardic… part of the standard assessment…"* [TN5]

mild headaches, degree 3".

Hypotheses of higher specificities were quickly issued after the serious/not serious assumptions by eight triage nurses, based on an association of some observable data.

- [TN 6], triage of a patient who came in with palpitations and chest pains: *"When she told me she had palpitations, she then held her chest and it felt tight; I thought to myself, well, maybe there's a tachycardia behind it or something else that's making it tight"*,
- [TN 8] for a patient who presented with pain in the left iliac fossa: *"She was experiencing pain in the left iliac fossa radiating into the back, so basically for me there are two main approaches: if it's a urinary infection, cystitis, it will be medicine, but if it's more reminiscent of renal colic or diverticulitis or something like that, it's more likely to be surgery"*.

Some TNs relied on the patient's age to guide their triage.

- [TN 3] about a patient who was experiencing dizziness: *"But it's anyway the age when you can start having problems, like strokes and that sort of thing"*.

- [TN 4] about an 85-year-old patient who presented with nausea and vomiting: *"Then with older patients like that, I tend to do a bit of a check-up, even if he had told me that he didn't have a stomach ache, I would still have asked a few questions about his transit to be sure…"*.

4.3. Hypotheses established promptly upon registration of the patient in the emergency department

Hypotheses were sometimes made when the patient announced the reason for their visit to the emergency department secretariat. In the three hospitals studied, the TNs and the secretariat worked in the same area (see Table 3).

- [TN 3] about a patient registering with the secretariat: *"Yes, she said she has vertigo […] I thought to myself, vertigo is always a bit 'mixed' because it can be peripheral or central"*.
- [TN 6] about a patient who reported to the secretariat with chest pains: *"She was a patient who arrived under her own steam at the triage accompanied by her husband and complaining of chest pains and palpitations […] I thought to myself that maybe there was a tachycardia behind it or something else that was oppressing her"*. In this case, and before assessing the patient, the TN decided to call the nurse in charge of the admissions process to announce the patient.

4.4. Patients referred by their GP

Among the 10 triage nurses interviewed, two had triaged a patient referred by their GP. In both cases, the diagnosis had already been established by the GP in the letter addressed to the emergency department. The triage nurses did not put forward any other hypotheses but took the patient's vital signs and anamnesis (medical history) as recommended by the triage scale. Taking these vital signs allowed to verify whether there were any severity criteria.

- [TN 5] regarding a patient referred by the GP for an obstructed urinary catheter and urinary tract infection: *"It's a probable infection. I want to see if it happens again. Regarding his hemodynamic stability, if I had other leads…is he febrile, tachycardic because of the fever. And then that's part of the standard assessment at triage"*.
- [TN 4] regarding a patient referred by the GP for nausea, vomiting and asthenia (marked fatigue/weakness) in the context of Vexas disease (a rare adult-onset autoinflammatory condition): *"As he told me he was vomiting and had abdominal pain, I wanted to rule out anything to do with the digestive system, so I asked about the stools and vomiting and then also ruled out urinary infection. Then I do a bit of a check-up on elderly patients like that"*.

5. Discussion

The aim of this study was to explore how triage nurses generate initial hypotheses during the first moments of the triage encounter, the cues that trigger this process, and how they describe corroborating or challenging these hypotheses as triage unfolds.

Most studies on clinical reasoning have been carried out as part of experimental quantitative studies [35]. Although the results made it possible to document the influence of different factors on reasoning, they are hardly transferable to real practice *"where context, patient-related factors, ambient conditions, human factors, team dynamics and a variety of other influences prevail"* due to their experimental and controlled nature [35]. Using a focused ethnographic approach, we were able to capture the cognitive processes mobilised during the action in an

Table 3
Video-cued recall procedure.

(1) Patient eligible and consent obtained (stable, able to consent; excluding life-threatening emergencies)
(2) Head-mounted GoPro recording of one triage encounter (first-person perspective)
(3) Triage decision made + patient handed over
(4) Immediate post-triage interview using video-cued recall
– short view → pause/rewind at decision points → probing (including unmentioned visible cues)
(5) Transcription & anonymisation
(6) Thematic analysis with combined deductive/inductive coding + double coding

original way.

Reasoning during triage is a complex exercise. Our results showed that the TNs interviewed mainly used immediately observable data from the patient to make hypotheses by combining a few elements, which is the main mechanism associated with intuition. These elements included the reason for consultation given by the patient, their physical appearance, duration of the onset of symptoms, or even the age of the patient. These early hypotheses should be understood as working hypotheses: they did not conclude the reasoning process, but rather oriented subsequent history-taking, vital-sign assessment, and clinical examination. Our findings suggest an iterative process in which early pattern recognition continued to interact with more deliberate data gathering as triage unfolded.

The time factor, i.e. duration of symptom onset, was an important factor for TNs in order to make hypotheses about severity or non-severity. In practice, symptoms that had been present for several days were often associated with lower acuity, illustrating how time of symptom onset played a central role in reasoning. This pattern is consistent with the *"holistic assessment"* commonly described in triage literature [36]. When the patient was referred by a GP with an established reason, no other hypotheses were made. TNs relied on the diagnosis of the GP and oriented their anamnesis according to this reason and vital signs were taken in order to avoid criteria of severity according to an analytical approach.

In an environment as specific as emergency triage, the early formulation of hypotheses enables nurses to rapidly categorise urgency. In time-pressured contexts such as triage, intuitive (System 1) processing may support rapid sense-making and early risk categorization [15]; however, it should be understood as an initial hypothesis-generation. These findings are also compatible with early phases of clinical judgment often described as noticing and interpreting, while responding and reflecting were only partially accessible within our study design.

The ability of a nurse to quickly hypothesise the severity of a patient's condition requires a certain amount of experience and exposure to numerous clinical situations [2,37]. Our results are consistent with a study of emergency physicians conducted by Pelaccia *et al.* using the same methodology [12]. The authors showed that emergency physicians make the majority of their diagnostic hypotheses in the first 5 min of their encounter with the patient according to cognitive mechanisms involving intuitive processes.

These intuitive mechanisms were used by the majority of TNs, regardless of their years of experience or specialisations. This aligns with a study that reported that clinicians at all levels generate hypotheses intuitively [38]. While intuition remains debated, evidence suggests that it can positively contribute to patient care, particularly when grounded in experience and structured knowledge [39]. Benner and Tanner pointed out as early as 1987 that nurses' intuition was devalued by doctors and colleagues and that *"Western culture in general has proposed replacing intuitive judgements with rational calculations. Rational calculation, apparently, is confused with human reasoning and is wrongly presented as the quintessence of knowledge"* [40]. Even today, intuition is often associated with a high risk of error, particularly in the literature on emergency medicine, although recent data contradicts this [41]. Intuitive processes are not the sole cause of reasoning errors, either among experts or novices [42]. The latest research points to the central role of knowledge and, more specifically, the organisation of this knowledge among healthcare professionals [18]. Since intuition is based on knowledge, it can therefore be taught. Odell *et al.* emphasise in their systematic review that it *"would be useful to develop intuitive reasoning skills, accompanied by training in more in-depth assessment techniques"* [43].

Given the importance of intuition in clinical reasoning, its early integration into the TN curriculum seems essential and appropriate alongside evidence-based data. There are some interesting ideas in the literature for developing intuitive processes in novices. These include shadowing which involves a novice TN spending time observing an experienced TN during the process of triage [44]. This form of learning is relatively passive and should be combined with more active forms.

To develop pattern recognition in novice TNs, tutors should verbalise their reasoning and hypotheses from the initial patient encounter, highlighting relevant observable elements. The goal is to make *"the invisible visible"* [45] by using thinking aloud in a cognitive apprenticeship approach.

It is essential to expose novice nurses to a wide range of patients during triage or simulation and to provide consistent feedback, thereby fostering the development of their clinical intuition [46].

This study is, to our knowledge, the first to explore triage nurses' reasoning through head-mounted video combined with re-situ interviews. This innovative approach offers unique insight into the formation of early, intuitive hypotheses during the initial patient encounter.

5.1. Limitations

This study has several limitations. First, the sample size was small (n = 10), and the study was not designed to compare sites; therefore, findings should be interpreted as an in-depth exploration rather than as broadly generalisable estimates. Moreover, theoretical data saturation was reached by the eighth interview. Second, because recording took place during the initial triage encounter, only patients who were clinically stable and able to provide written informed consent could be included, and life-threatening emergencies were excluded. Consequently, the filmed encounters likely over-represented lower-acuity presentations and do not capture reasoning in the most time-critical resuscitation scenarios. Third, the interview took place immediately after triage and required nurses to verbalise their reasoning; while video-cued recall is intended to reduce retrospective reconstruction, post-hoc rationalisation cannot be fully excluded. Fourth, we did not assess the accuracy of triage decisions against outcomes or expert adjudication; future work should triangulate reasoning processes with objective markers of triage performance and patient outcomes. Finally, we did not conduct formal member checking; we sought to enhance trustworthiness through double coding, team discussions, and maintaining an audit trail of analytic decisions.

6. Implications for nursing practice

Clinical reasoning is a core skill for nurses. The unique context of triage requires nurses to think quickly and generate early hypotheses, often on the basis of immediately available cues. Early hypothesis formulation requires experience and repeated exposure to various clinical situations. Similarly, structured opportunities to observe experts

and reflect on observable cues can further strengthen intuitive reasoning alongside evidence-based protocols. Finally, simulation provides novices with exposure to a wide range of clinical scenarios, complementing hands-on practice.

7. Conclusion

TNs very quickly form hypotheses regarding the patient's state of health, which emerge from the initial encounter or even as soon as the patient announces the reason for their consultation to the emergency department receptionist. These early hypotheses appear to rely on intuitive processes. Our findings highlight the importance of pursuing research into the clinical reasoning of TNs, with a particular emphasis on how these early hypothesis-generation processes can be integrated into TN training. This use of intuitive processes is a strong marker of the expertise of healthcare professionals.

CRediT authorship contribution statement

Yoann Noiré: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Youcef Guechi:** Writing – review & editing, Validation, Resources. **Thierry Pelaccia:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Eliott Mazar:** Writing – review & editing, Data curation. **Vincent Ribordy:** Writing – review & editing, Validation, Supervision, Resources, Project administration.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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