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RESEARCH ARTICLE

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Telephone triage in urgent unscheduled primary care in 16 European countries: a cross-national questionnaire-based expert study

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ABSTRACT

Background: Rising demand and workforce shortages challenge European healthcare systems. Unscheduled healthcare, including out-of-hours (OOH) primary care, is often managed through telephone triage. Improving triage quality is essential to maintain accessible and sustainable unscheduled care across Europe.

Aim: To describe the role and organization of telephone triage in OOH primary care services that provide care for patients with urgent unscheduled health problems.

Design: A cross-national questionnaire-based expert study.

Methods: We developed a web-based questionnaire that was distributed to members of a European research network on OOH primary care (EurOOHnet), aiming to have one informant per country. Questionnaire data were validated through email consultation with informants.

Results: Expert informants from 16 countries completed the survey. Most countries had general practice care, ambulance care, and emergency departments to provide urgent unscheduled care. Access routes to unscheduled care varied considerably between countries; 11 countries used telephone triage. Three triage models were identified: 1) Triage to care, 2) Advice and referral, and 3) Advice helplines. Self-advice tools, triage preparation tools, and chatbots were uncommon.

Conclusion: We identified three triage models that had different roles related to access to unscheduled care. Telephone triage is used frequently to fit demand to available resources.

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Introduction

In Europe, healthcare is under pressure, including unscheduled healthcare for urgent and non-urgent health problems [1–5], which may challenge access, quality of care, and safety [6,7]. Healthcare provision is tested by increasing demand and a shortage of workforce, resulting in a high workload [3,5,8,9]. Consequences of this increased pressure include stressed healthcare professionals, lower patient satisfaction, longer waiting times, risk of treatment delay, and adverse health outcomes [10–12].

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When a citizen experiences an acute health problem, a range of services are available across countries to provide unscheduled healthcare, both inside and outside of office hours. Most countries have similar emergency medical services for ambulance care and hospital emergency departments (EDs), but out-of-hours (OOH) primary care is provided by different services [13,14]. In some countries, general practice is the gatekeeper to secondary care (i.e. EDs, hospital ambulatory care, and specialist care), thereby limiting ED crowding [4,15,16]. OOH primary care services often use telephone triage to manage patient flows, assessing the urgency, timing, and level of care needed [13,14,17]. Yet, different call-takers perform triage in these OOH primary care services, varying from non-medical staff to general practitioners (GPs) [17]. In addition, the use of decision support tools to support telephone triage varies [18].

Many countries struggle to maintain accessible and sustainable unscheduled OOH primary care of high quality due to high demands [3,4,11]. High demands could be addressed by reducing the influx of patients [19], particularly those with non-urgent health problems who can be seen during daytime in a general practice. However, accessibility and availability of daytime general practice is key [3,4]. Another approach is demand management through improvement of the quality of telephone triage, although telephone triage nurses seem reluctant to consider themselves gatekeepers to OOH primary care [20,21].

Insights into existing telephone triage models are highly relevant as European countries face similar challenges despite varying healthcare systems and OOH primary care services. Such insights can provide pertinent knowledge to stakeholders who provide unscheduled healthcare. Thus, this cross-national questionnaire-based study aims to describe the role and organization of telephone triage in OOH primary care services that provide care for patients with urgent unscheduled health problems.

Methods

Design

We conducted a cross-national expert study, using a questionnaire framework. The study was conducted by EurOOHnet, a European network for OOH primary care research aiming to collaborate, exchange experiences, and expand possibilities for international research to improve the quality of care [22]. A web-based questionnaire was used as a framework to ensure uniform data collection among EurOOHnet members considered key informants in their respective countries [13,14].

Questionnaire development

The overall aim of the questionnaire was to create an overview of the organization of urgent unscheduled care, including contextual factors like the use of telephone triage, point-of-care testing, and video. This paper focuses on the role and organization of telephone triage in urgent unscheduled care at OOH primary care services.

The development of the questionnaire followed six consecutive steps:

1. We started with a pre-existing questionnaire used in two previous studies by EurOOHnet and a student telephone triage questionnaire, which we adjusted based on our experiences with data collection and handling [13,14].
2. We added open-ended questions to avoid misinterpretation of answering categories, due to language issues and the variation in terminology for similar services.
3. We added questions based on relevant literature and six feedback rounds that consisted of written feedback followed by discussion in a virtual meeting with the author group [23,24].
4. We added contextual questions related to geography, demography, workforce, funding of each healthcare system, and unscheduled care in general.
5. We tested the questionnaire in cognitive interviews with three researchers from three countries (Belgium, England, and Sweden), which resulted in several alterations to optimize applicability in different healthcare systems.
6. Eight project group members, representing seven countries, checked the questionnaire for completeness, clarity, face-, and content validity.

The final questionnaire consisted of 69 questions (35 open-ended and 34 closed-ended), covering the organization of the overall healthcare system and of unscheduled primary care, telephone triage, use of video consultations, and use of point-of-care testing (Appendix 1).

Selection of informants

The EurOOHnet members were informed about the project and the questionnaire by email and by personal invitation during the EurOOHnet conference in May 2023. Each country ($n = 20$) was asked to select one informant who was responsible for completing the questionnaire on a national or regional level. If needed, extra informants could be contacted. In addition, each informant was responsible for input in the validation rounds that we conducted during data cleaning and analysis. In case of significant regional differences within a country, the informant could decide to answer the questionnaire on a regional level.

Data collection and validation

The informants received a link to the final questionnaire in LimeSurvey by email in February 2024. To gain the desired extensive overview of the organization of unscheduled primary care, informants were actively reminded by repeated email contact whenever relevant (1–4 times). Furthermore, significant delays due to peak pressure at work or on holidays were accepted. Consequently, data collection ran from February to October 2024.

After the initial data collection, the main researcher (IBJC) downloaded the data, conducted data cleaning, and categorized open-text answers as open and broad as possible, and checked closed-end questions for completeness. IBJC also defined clarifying questions in case of uncertainty or missing data. The categorization and clarifying questions were checked by a senior researcher (LH), who suggested corrections and additional clarifying questions when needed. IBJC and LH achieved consensus or contacted the informant for further clarification. Next, the informants received an overview of the categorization, clarifying questions by email to ensure valid data. If necessary, a second validation round was conducted to address the remaining uncertainties. As a final validation step, all informants were asked to check the final results.

Data handling and analysis

Responses to open-ended questions were coded by themes (by IBJC, LH) to overcome the large variation in terminology for similar services. Predefined categories were used for closed-end questions. Descriptive analyses of context factors (e.g. workforce, funding of each healthcare system, and organization of unscheduled care) were conducted per country, to be used as interpretive background. Next, we described the organization of telephone triage, focusing on accessibility, type of care and referrals, triage professional and additional staff, the role of decision support tools, and triage outcomes, stratified per country and triage model. Finally, the CROSS checklist was completed (Appendix 2).

Results

Informants

Informants from 16 countries completed the entire data collection process; six informants invited extra informants to either provide input or assist in completing the questionnaire. Most informants were GPs and/or researchers ($n = 14$), one informant was a nurse and researcher, and one was a GP trainee. Informants had a median experience of 16 years (range 9 to 24 years) as healthcare professionals and of 4 years (range 0–18 years) as researchers (Appendix 3). Most informants were able to provide information about the entire country, but the following presented information on a regional level: Belgium, Denmark, Greece, Northern Ireland, and Switzerland.

Unscheduled healthcare services

In most countries, several services were available to provide urgent unscheduled care, most commonly general practice care, ambulance care, and EDs. GPs providing primary care were the most common service (Table 1). Patients could call, book an appointment online, or refer themselves, all day or within defined time slots. In Greece and Romania, patients mainly self-referred to healthcare services. GPs had a gatekeeping function for unscheduled acute secondary care in Denmark, the Netherlands, Norway, Slovenia, Sweden, and Wales. Access to EDs was either restricted to medical referrals (Denmark, the Netherlands, Norway, Portugal), available through self-referral (Greece, the Republic of Ireland, Switzerland), or by a combination of the two (Belgium, Croatia, England, Germany, Northern Ireland, Romania, Slovenia, Sweden, and Wales). In most countries, general practice had limited availability for unscheduled care, which could result in transfer to the EDs (not in Table). At EDs, long waits exist for patients with non-urgent problems, who may be referred to general practice without a full assessment. Slovenian urgent unscheduled care was fully integrated, with telephone helpline 112 being the entry point for emergency units (OOH GP care), emergency centers (ED care), and ambulance care.

Models of telephone triage

Telephone services were present in 11 countries (Belgium, England, Germany, Northern Ireland, Norway, Portugal, the Republic of Ireland, Slovenia, Sweden, Switzerland, and Wales. We identified three models for telephone triage that were commonly used: 1) Triage to care: OOH services for urgent unscheduled care are accessible by telephone (point of entry) and perform triage that includes referral to care provided within their own service, 2) Advice and referral: Stand-alone telephone helpline with call centers that provide telephone triage and advice or refer to the most appropriate care service, and 3) Advice helplines: A stand-alone telephone helpline that only provides telephone advice and recommendations to contact another service (Table 2). Some of these services were accessible 24/7, whereas others operated only outside office hours. In a few countries, various services existed that included different triage models.

Belgium, Croatia, Denmark, the Netherlands, Norway, Northern Ireland, and the Republic of Ireland used the *triage to care* model. Most of these OOH services offered telephone advice and clinic consultations, and some also home visits, as well as referrals to ED or ambulance care. The telephone *advice and referral* service was present in Belgium, England, Germany, Northern Ireland, Portugal, Slovenia, Sweden, and Wales. These services provided telephone advice or referred to other urgent care services. Some *advice and referral* services could book appointments at other services. Finally, some telephone *advice helplines* existed. The Republic of Ireland had nurse-led telephone advice helplines, but these were only available for members of specific insurance companies. In the German-speaking part of Switzerland, multiple regional emergency telephone triage services existed; some were solely telephone helplines, whereas others were advice and referral telephone services.

Call-taking

Call-takers with different backgrounds performed telephone triage across countries and services, regardless of the triage model. At the Danish OOH primary care service and some Swiss telephone helplines, GPs and other physicians answered the telephone without the use of decision support tools. Many countries used other healthcare professionals, mostly nurses, nurse practitioners, and advanced nurse practitioners, whereas a few countries had non-clinical call-takers. Non-clinical call-takers were commonly supervised by a physician and obligated to use a decision support tool. Other healthcare professionals also used decision support tools, mostly computerized decision-tree-based. Often, call-takers could overrule the decision support tool, either based on clinical experience, protocols, or after supervisor advice (sometimes only towards a higher level of urgency). Details provided in Appendix 4.

Self-advice and triage preparation tools

Several initiatives existed, focusing on self-advice tools, triage preparation tools, and chatbots (Not in Table). In the Netherlands, most OOH primary care services already offered digital triage preparation;

Table 1. Accessible healthcare services for patients with an urgent unscheduled health problem, including their opening hours and access ways, per country/region.

Services[1]	Opening hours	Access ways
Triage to care		
Belgium *(Region Flanders)*		
General practice	Daytime	Varies on practice level (e.g. telephone call, online booking).
Hospital ED	24/7.	Self-referral or medical referral.
GP cooperatives	Some regions: weekdays 6 pm – 8 am. All regions: weekends/holidays	Self-referral or telephone call.
Telephone service 1733[2]	Regional variation.	Telephone call.
Pharmacies	Weekdays: 8 am – 6 pm. Weekends: Friday 6 pm–Monday 8 am.	Walk-in.
Croatia *(country)*		
General practice	Daytime	Telephone call, sometimes scheduling tool on practice website.
OOH GP services	Weekdays: 5/6 pm – 8 am. Weekends/holidays.	Telephone call. Often digital triage preparation (e.g. tool on website, sometimes with chat function or video option). Walk-ins are possible but not encouraged.
Hospital ED	24/7.	Medical referral by GPs (gatekeeping) or ambulance care. Self-referral strictly discouraged.
Denmark *(3/5 regions)*		
General practice	Daytime: 8 am – 4 pm.	Variation on practice level: telephone call, some online booking. Limited timeslots with self-referral for acute issues.
GP cooperatives	Weekdays: 4 pm – 9 pm. Weekends/holidays: 8 am – 9 pm.	Telephone call.
Night OOH service	All days: 11 pm – 8 am.	Telephone call.
Hospital ED	24/7.	Medical referral by GPs/GP cooperatives, night OOH service, or ambulance. No self-referral.
The Netherlands *(country)*		
General practice	Weekdays: 8 am – 5 pm.	Telephone call, sometimes a scheduling tool on practice website.
OOH GP services	Weekdays: 5/6 pm – 8 am. Weekends/holidays.	Telephone call, often digital triage preparation (e.g. a tool on their website, sometimes with chat function or video option). Walk-ins are not encouraged.
Hospital ED	24/7.	Medical referral by GPs and ambulance. Self-referral strictly discouraged.
Norway *(country)*		
General practice	Weekdays: 8 am – 4 pm.	Telephone call, self-referral (discouraged), electronic request for available time slots.
GP cooperatives, GP rotation groups, or larger GP clinics	Variation: Larger emergency primary care clinics: 24/7. Smaller clinics: weekdays 4 pm – 8 am, weekends/holidays.	Telephone call (116117), self-referral (discouraged), and ambulance.
Telephone service 116117 (LEMC)	24/7.	Telephone call.
Large emergency primary care clinics	24/7.	Telephone call to telephone service 116117, self-referral.
Hospital ED	24/7.	Medical referral (from GP, OOH GP, or ambulance), no self-referral.
Republic of Ireland *(country)*[3]		
General practice	Daytime.	Telephone call or self-referral.
Acute medical assessment units	Daytime.	Referral from GP.
Minor injury units	Daytime.	Self-referral.
GP cooperatives	Weekdays 6 pm – 8 am. Weekends/holidays 24/7.	Telephone call, self-referral is strictly discouraged.
Telephone service (nurse-led helpline)[4]	In hours, some also OOH. (only for members of insurance companies)	Telephone call.
Hospital ED	24/7.	Self-referral.
Advice and referral		
England *(country)*		
General practice	Daytime.	Variation of practice level: telephone calls, online form (with limited time slots), with text or ring back response.
Telephone service (NHS 111)	24/7. Integrated with GP OOH services on weekdays (6.30 pm – 8 am) and weekends.	Telephone call, online form.
Urgent treatment centers/minor injuries units/walk-in centers	Regional variation: 24/7, 8 pm – 8 am.	Regional variation: self-referral (often), referral by NHS 111 (sometimes).
Hospital ED	24/7.	Self-referral, medical referral.

(*Continued*)

Table 1. Continued.

Services[1]	Opening hours	Access ways
Germany *(country)*		
General practice and secondary care physicians	Obligation to offer open consultation hours (≥5 h/week).	Telephone call, mail, or online booking for appointments, and self-referral for open consultation hours. For secondary care physicians, a referral is useful and sometimes necessary.
GP cooperatives	Variations between federal states. Generally evenings, weekends, and public holidays.	Telephone call, self-referral, medical referral by telephone service 116117.
Telephone and online service 116117 (national)	24/7.	Telephone call and online platform.
Hospital ED	24/7.	Self-referral, medical referral (physicians, telephone service 116117, or ambulance).
Northern Ireland *(1/5 providers)*		
General practice	Daytime.	Access by telephone call
Urgent care centers	Daytime.	Referral from GP or Phone First service.
Telephone service Phone First	Weekdays 9 am–9 pm.	Telephone call.
Urgent care OOH centers	Weekdays: 6 pm – 8 am. Weekends/holidays.	Telephone call, direct electronic referral by GP, referral from ED of walk-in patients at the ED when Phone First is not operational.
Minor injury units	Weekdays: 9 am – 9 pm. Weekends/holidays: 10 am – 6 pm.	Access by self-referral.
Hospital ED	24/7.	Gatekeeping through Phone First on weekdays 9 am – 9 pm, otherwise self-referral. Medical referral (OOH services, GPs, ambulance).
Optician	Daytime, weekday evenings (some until 9 pm), and weekends.	Telephone call.
Pharmacy	Weekdays/Saturdays 9 am – 6 pm (up to 10 pm in urban areas). Cities/larger towns may have Sundays.	Self-referral.
Portugal *(country)*		
General practice (health centres/units)	Daytime.	Self-referral, telephone call.
Primary care units (rotation)	Regional variation: Weekdays: mostly 5 pm – 8 pm. Weekends/holidays: mostly 10 am – 5 pm.	Self-referral, telephone call.
Telephone service Saude24	24/7.	Telephone call.
Hospital ED	24/7.	Telephone call to helpline Saúde24, medical referral (from GP). No self-referral.
Slovenia *(country)*		
General practice	Weekdays: usually 7 am – 7 pm.	Telephone call, online form, self-referral.
Emergency units in primary care centers	24/7.	Self-referral, referral by telephone service 112.
Emergency centers at hospital	24/7.	Self-referral, referral by telephone service 112 or ambulance conveyance.
Telephone service (112)	24/7.	Telephone call.
Sweden *(country)*		
General practice healthcare centers	Large practice variation: often 8 am – 5 pm.	Telephone call.
General practice prehospital ED service	5 pm – 11 pm.	Referral by telephone service 1177, self-referral.
Nurse-led telephone helpline (1177)	24/7.	Telephone call.
Hospital ED	24/7.	Self-referral, medical referral (from healthcare center or 1177).
Wales *(country)*		
General practice	Large practice variation.	Online form, self-referral, telephone call.
GP cooperatives	Outside office hours.	Referral or appointment booking at telephone service (NHS 111).
Telephone service (NHS 111)	24/7. Can send calls to GP cooperatives between 6.30 pm – 8 am. Can only refer to other services during daytime.	Telephone call.
Hospital ED	24/7.	Self-referral, medical referral (GPs, ambulance).
Optician	Daytime.	Telephone call.
Pharmacy	Weekdays/Saturdays: 9 am – 5 pm (up to 8 pm) in urban areas. Cities may have Sundays open.	Self-referral.
Advice Helplines		
Switzerland *(German-speaking part)*		
General practice	Daytime.	Telephone call.
GPs in rotation groups	Varies: Individual practices: 8 am – 12 am on Saturdays. Rotation groups: 24/7 or 7 am – 10 pm (referral to hospital ED during the night.	Online appointment booking, telephone call.

(*Continued*)

Table 1. Continued.

Services[1]	Opening hours	Access ways
Primary care centers	Varies: Weekdays: often 7 am – 8 pm (up to 10 pm). Weekends/holidays: 8 am – 6 pm (up to 7 am – 10 pm).	Self-referral, medical referral by GP.
Telephone services	Multiple services, often 24/7.	Telephone call.
Hospital ED	24/7.	Self-referral.
Hospital ED with integrated GP practice	Weekdays: 6 pm – 11 pm. Weekends: 8 am – 11 pm.	Self-referral, medical referral by GP.
No Triage		
Greece *(Urban area of Vari (Attiki-Athens))*[3]		
General practice	24/7.	Public sector: self-referral. Private sector: self-referral during daytime and telephone call outside office hours.
Hospital ED	24/7.	Self-referral.
Romania *(country)*		
General practice	Daytime.	Self-referral, telephone call.
Private medical office	Daytime.	Telephone call (only available in larger cities).
GP cooperatives	Weekdays: 3 pm – 8 am. Weekends/holidays: 24/7.	Self-referral.
Hospital ED	24/7.	Self-referral, medical referral (e.g. GP, specialist).

[1]All countries had an ambulance service, open 24/7 and accessible by telephone call.
[2]Model of triage is advice and referral.
[3]No final validation of the content of this table by a national expert.
[4]Model of triage is advice helpline.
ED: emergency department; GP: general practitioner; LEMC: local emergency medical communication center; NHS: National Health Service; OOH: out-of-hours.

Table 2. Telephone triage models in primary care services that are accessible for patients with an urgent unscheduled health problem outside office hours.

Triage to care OOH services for urgent unscheduled care are accessible by telephone (entry point) and perform triage that includes referral to care provided within their own OOH service.
• *GP cooperatives (BE, CR, DK1, PT, RI), urgent care OOH centers (NI), night response team (DK2), OOH GP services (NL), local emergency communication centre (NO).* Most OOH services offer telephone advice and clinic consultations, and some also offer home visits (BE, DK, NL, NO). Video is sparsely used in telephone triage (DK). • Do refer to the ED or ambulance care, but referral to other services also exists (e.g. mental health crisis team, social service team (NI)). • Often open during evenings, nights, and weekends; in some countries, only part of the OOH period. • Call-takers vary, including non-clinical staff without use of DST (BE), nurses, medical assistants, medical students, and paramedics (NL), pharmacists (NI), nurses, NPs, and ANPs (NI, RI, PT), GPs (DK1), GPs and nurses (CR), and GPs/doctors (DK2). • DST is often used when call-takers are not doctors (NL, DK2, NI, NO, PT); if a DST is present, call-takers are mostly obligated to use the DST. • DSTs often result in triage urgency levels with time windows, but time windows also exist in services without DST (e.g. urgent GP clinic consultation <2 h).
Advice and referral A stand-alone telephone helpline with call centers that can provide telephone advice or refer to other healthcare services (outside office hours or 24/7).
• Helpline for OOH primary care (BE), telephone medical helpline NHS 111 (ENG), nationwide telephone helpline 116117 (DE), Phone First service (NIE), national telephone helpline Saude24 (PT), nationwide 112 integrated telephone service (SI), telephone advice helpline 1177 (SE), 111 service (WLS).Open during evenings, nights, and weekends; some 24/7. • Referral to self-care advice, clinic consultations, home visits, ED, or ambulance care. 24/7 services can refer to GP practices (ENG, DE). Phone First only refers to ED and UCC. • Often national numbers (BE, DE, ENG). • Call-takers vary, including non-clinical staff (BE), nurses, NPs, ANPs (ENG, NIE, SE), paramedics, and GPs (ENG). NHS 111 uses primary and secondary triage (ENG). • DSTs are available in all countries (partly digital BE) and obligatory for most call-takers (with options to overrule), but not for GPs. Supervision by GPs/physicians is common.
Advice helplines A stand-alone telephone helpline that only provides telephone advice and recommendations to contact other service.
• *Private telephone advice helpline (RI), regional medical telephone helplines (CH).*Some helplines are accessible for all, whereas others are restricted to private health insurance. • Call-takers often are nurses, but can be paramedics and physicians. • Provide telephone advice and, in some cases, refer to home visits (CH). • DST is common, but paramedics and nurses take calls without DST.

No validation of the content of this table by national experts from NIE and RI.
Abbreviations: ANP: advanced nurse practitioner; DST: decision support tool; ED: emergency department; GP: general practitioner; MIU: minor injury unit; NHS: national health system; NP: nurse practitioner; OOH: outside office hours; UCC: urgent care centers.
Countries: Belgium (BE), Croatia (HR), Denmark (DK), England (ENG), Germany (DE), Ireland (NIE), the Netherlands (NL), Northern Ireland (NIR), Norway (NO), Portugal (PT), Romania (RO), Slovenia (SI), Sweden (SE), Switzerland (CH), Wales (WLS).

patients could access a tool that either gave advice or ended with a referral to telephone triage, chat, or video with a healthcare professional. In Germany and Sweden, a digital chatbot was part of the national telephone triage service to assess patients' acute health problems. In Germany, this chatbot was a stand-alone self-advice tool that ended with a range of options, such as calling the helpline, booking an appointment with a physician, and getting a video consultation. In Sweden, eleven out of 21 regions had 1177 Direct that used a chatbot; this could be followed by a chat triage consultation with a nurse.

Discussion

Main findings

We identified three telephone triage models in primary care services for unscheduled healthcare: 1) Triage to care (point of entry for urgent unscheduled care services), 2) Advice and referral (a stand-alone telephone triage service can direct patients to the most appropriate care service, and 3) Advice helplines (a stand-alone telephone advice and helpline service). The conditions of telephone triage varied by service, across triage models: Services with GP or physician-led triage did not use a decision support tool, whereas services that had other healthcare professionals or non-clinical staff performing triage mostly used a decision support tool. The use of decision support tools was often mandatory with limited options to overrule, in general, only to a higher level of urgency. Some countries had (online) triage preparation systems and digital chatbots.

Strengths and limitations

We consider the expert input from 16 European countries a strength, as this provided a relevant overview of the organization of unscheduled care and the role of telephone triage. Furthermore, our data collection had several validation steps to ensure valid data and correct interpretation. We also considered contextual factors of the healthcare systems in our data collection. We used open-ended questions in the questionnaire to avoid information bias due to misinterpretation and misclassification. Yet, some misinterpretation and misclassification could be present, as the authors may consider their national context when interpreting the cross-country data. However, the authors represent countries that have all three telephone triage models, which we believe mitigates the risk of misinterpretation. The social and cultural context should be taken into consideration when interpreting the results of this study [25]. Finally, although we were able to include informants from 16 countries, our results do not reflect an overview of all European countries.

Comparison with existing literature

We found that countries use call-takers with a range of backgrounds to perform telephone triage. Research is conflicting about the impact of different professionals undertaking telephone triage. Nurse triage of OOH calls is safe and of high quality [26–28], but can be associated with over-triage of patients in comparison to physician triage [28]. Although generally safe for the individual patient, over-triage risks overwhelming already under-resourced healthcare systems and creates conflicting situations between triage services and healthcare services [29–31]. Furthermore, healthcare systems with limited or even unavailable in-person capacity could create pressure on triage staff to downgrade the acuity of patient contacts not to overburden services, which can cause risks to patients and stress to staff [32–34]. An educational intervention for Norwegian triage nurses, designed to reduce OOH attendance for patients with respiratory tract infections of low acuity, showed that it is difficult to influence how these calls are handled [35]. Evidence on the impact of using non-clinical call-takers to answer and handle calls is limited [36].

Many countries used decision support tools to support call takers, but some did not, even though decision support tools ensure patient safety and contribute to uniformity in advice and suggested triage outcomes [18]. Decision support tools are relatively safe but tend to include some over-triage [17,36]. In addition, most decision support tools focus on one main symptom, which can lead to using the wrong

algorithm in calls for patients with multiple symptoms and subsequently result in wrong acuity [32]. Furthermore, nurses can deviate from decision support tools, both upgrading and downgrading the acuity, thereby using the decision support tool to confirm their recommendations rather than as support for triage [35]. This deviation by nurses from the decision support tool has been the cause of malpractice claims [34].

Even though digital tools, such as chatbots for self-advice and triage preparation, are being implemented, evidence is lacking [37]. At regional Swedish telephone triage services, a chatbot was rapidly implemented, but later paused again in some regions due to serious adverse events compromising patient safety [38]. This example emphasizes the need for increased focus on evaluating digital tools and aligning their implementation to avoid patient safety incidents. Some countries introduced symptom checkers for self-advice, but the accuracy of such products vary significantly [39,40]. Furthermore, artificial intelligence-based solutions able to synthesize multiple symptoms are being introduced in some healthcare systems [37]. Although these may have potential, a recent study has highlighted that when used by real people, they may give wrong advice and incorrectly signpost to services [41].

Implications for future research and practice

Across Europe, unscheduled care is facing similar issues, and telephone triage is used or implemented to alleviate some of the pressure. However, creating change within healthcare settings is complex [42], context-specific, and prone to failure. Furthermore, constant progress in technological developments means healthcare services struggle to keep up with innovation [43]. Cross-national comparison and learning are important sources when adopting new models of care. When considering transferring services and innovations across countries, one should account for regional and national complexities in healthcare systems. However, data sharing and knowledge transfer are known to be limited within healthcare [44]. To stimulate cross-national comparisons, a common language is necessary. The identification of the three triage models for unscheduled care supports this common language that is relevant in practice and cross-national comparison.

The combination of increased use of OOH primary care and shortage of workforce creates an imbalance between supply and demand, which may lead to an overemphasis on telephone triage and technological solutions to address this mismatch [29]. Research into patient pathways and service use across different urgent unscheduled healthcare services may help identify relevant solutions to accommodate the challenges of healthcare systems. However, research should also include evaluations of the impact of these solutions on all quality of care domains.

Conclusion

Eleven of 16 informants reported that telephone triage was used to better fit the demand for urgent unscheduled care to the available resources. We identified three triage models: 1) *triage to care*, 2) *advice and referral*, and 3) *advice helplines*. The medical background of call-takers varied considerably, from lay people to GPs. Decision support tools were frequently used if call-takers were not GPs or other physicians. Future studies may focus on patient pathways and service use, perceptions of citizens and professionals on access to care for unscheduled health problems, and further cross-national comparisons.

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Ethical considerations

The project follows the prevailing general ethical principles of good clinical research practice drawn up by the World Medical Association in the Helsinki Declaration and the principles of professional responsibility by the American

Anthropological Association. The study was listed in the record of processing activities at the Research Unit for General Practice in Aarhus in accordance with the provisions of the General Data Protection Regulation.

Author contributions

CRediT: **Ida Bergholdt Jul Christiansen**: Data curation, Formal analysis, Methodology, Writing – original draft; **Beate Zoch-Lesniak**: Conceptualization, Funding acquisition, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing; **Bent Lindberg**: Conceptualization, Methodology, Validation, Writing – original draft, Writing – review & editing; **Lotte Ramerman**: Conceptualization, Methodology, Validation, Writing – original draft, Writing – review & editing; **Rebecca Payne**: Conceptualization, Methodology, Validation, Writing – original draft, Writing – review & editing; **Tobias Herrmann**: Conceptualization, Methodology, Writing – original draft, Writing – review & editing; **Vesna Homar**: Conceptualization, Methodology, Validation, Writing – original draft, Writing – review & editing; **Linda Huibers**: Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing.

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