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Telephone triage by GPs in out-of-hours primary care in Denmark:

a prospective observational study of efficiency and relevance

Abstract

Background
In the UK, telephone triage in out-of-hours primary care is mostly managed by nurses, whereas GPs perform triage in Denmark.

Aim
To describe telephone contacts triaged to face-to-face contacts, GP-assessed relevance, and factors associated with triage to face-to-face contact.

Design and setting
A prospective observational study in Danish out-of-hours primary care, conducted from June 2010 to May 2011.

Method
Information on patients was collected from the electronic patient administration system and GPs completed electronic questionnaires about the contacts. The GPs conducting the face-to-face contacts assessed relevance of the triage to face-to-face contacts. The authors performed binomial regression analyses, calculating relative risk (RR) and 95% confidence intervals.

Results
In total, 59.2% of calls ended with a telephone consultation. Factors associated with triage to a face-to-face contact were: patient age >40 years (40–64: RR = 1.13; >64: RR = 1.34), persisting problem for 12–24 hours (RR = 1.15), severe problem (RR = 2.60), potentially severe problem (RR = 5.81), and non-severe problem (RR = 2.23). Face-to-face contacts were assessed as irrelevant for 12.7% of clinic consultations and 11.7% of home visits. A statistically significantly higher risk of irrelevant face-to-face contact was found for a persisting problem of >24 hours (RR = 1.25), contact on weekday nights (RR = 1.25), and contact <2 hours before the patient's own GP's opening time (RR = 1.80).

Conclusion
Around 12% of all face-to-face consultations in the study are assessed as irrelevant by GP colleagues, suggesting that GP triage is efficient. Knowledge of the factors influencing triage can provide better education for GPs, but future studies are needed to investigate other quality aspects of GP telephone triage.

Keywords
after-hours care; appropriateness; Denmark; efficiency; primary health care; telephone triage.

INTRODUCTION

Out-of-hours primary care (OOH-PC) is often organised in large-scale organisations, and access for patients is provided through telephone triage.[1] Triage is the process of estimating urgency and the type of health care needed for a particular health problem, to manage patient flows and resources. The diversity of calls in terms of severity, urgency, and medical relevance challenges triage professionals. This emphasises the need for efficient triage to ensure quick and safe care for the patients with the most urgent needs.

Most countries use nurse telephone triage in OOH-PC, which is frequently supported by computerised decision tools.[2–4] Danish OOH-PC is an exception, as GPs are placed at the frontline to answer patient calls and perform telephone triage.[5,6] After the introduction of GP triage in 1992, the number of face-to-face contacts (clinic consultations and home visits) decreased dramatically, particularly home visits.[5] However, most studies have focused on nurse telephone triage in OOH-PC, and little is known about the impact of GP telephone triage and the effects on patient flows.

OOH-PC telephone triage performed by nurses has been shown to reduce the number of face-to-face contacts with a GP,[7] but the frequency of follow-up contacts appears to be considerable.[8] When a GP triages, a medical specialist with extensive knowledge is answering the telephone. Therefore, it can be hypothesised that GP telephone triage is safe and efficient, as it is likely to result in more relevant triage decisions on face-to-face contacts, and a higher rate of contacts is expected to end with a telephone consultation, compared with nurse telephone triage. A first step in studying GP telephone triage therefore is to describe triage decisions and their efficiency.

The authors aimed to describe the frequency and the types of contacts triaged to face-to-face contacts by GPs, and the relevance of the triage decisions. Furthermore, the authors studied factors associated with triage to an (irrelevant) face-to-face contact.

METHOD

Design and setting
The authors used data from a prospective observational study, the LV-KOS study,[9] which was an extensive survey on reasons for encounter (RFE) and disease patterns in Danish OOH-PC. The survey was performed in the Central Denmark Region (CDR), and comprised 1.2 million people (22.7% of all Danish inhabitants). The organisational model for OOH-PC is uniform in four of the five Danish regions. OOH-PC in the CDR is provided by local GPs through two call centres (accessible by a single telephone number), and 13 consultation centres throughout the region.

The OOH period runs from 4 pm to 8 am on weekdays, and during weekends and public holidays. OOH-PC services are free of charge. Patients must first make a telephone call, which is answered directly by a GP who

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How this fits in

Telephone triage in out-of-hours (OOH) primary care is used to manage patient flows and GP workload. The GPs in the study seem to perform efficient triage, as about 60% of calls end with a telephone consultation, and about 12% of face-to-face contacts are assessed as irrelevant. Several factors are associated with a higher likelihood of an irrelevant face-to-face contact, such as a persistent health problem lasting longer than 24 hours, a problem assessed as non-severe, and contact on weekday nights. Knowledge of these factors can facilitate better education for GPs, and ensure more efficient use of OOH primary care services.

assesses urgency and decides on the type of care needed: telephone consultation, referral to hospital, clinic consultation, or home visit.

Only fully licensed GPs are allowed to undertake telephone triage shifts, whereas some clinic consultations and home visits are conducted by GP trainees. The GPs do not use a triage decision support system. Because of the large setting, involving all GPs in the region, a GP on duty seldom meets their own patients. GPs are paid on a fee-for-service basis, depending on the type of care provided. The triage GP receives a higher fee when ending a contact by telephone, as this is more time consuming.

Data collection

The LV-KOS study was performed during a 12-month period from June 2010 to May 2011.[9] GPs on duty were invited to participate when logging on to the electronic system at the start of each OOH shift. The GP completed an electronic questionnaire, which was integrated into the electronic patient administration system (PAS) and popped up for every tenth telephone contact, every third clinic consultation, and every home visit.

The pop-up questionnaires were formulated to fit each contact type. Questions were developed for the study and pilot tested using cognitive interviewing of 12 GPs.[9] GPs received a basic remuneration for their participation and for each registered contact. Supplementary data on patient contacts were collected from the PAS using the unique patient identification number.[10] Data on triage GP characteristics were collected using the GP's OOH identification number.

Variables

The pop-up questionnaires provided information on the duration of the health problem, the GP-assessed severity of the problem, and the GP assessment of whether the patient should have contacted their own GP during office hours, based on their medical knowledge and expertise. Categories of severity were: severe — needs to be admitted directly (for example, a 50-year-old patient who has chest pain, radiating); potentially severe — needs to be seen by a doctor (for example, a 2-year-old with urination problems, has urinary tract infection); not severe — but the patient is ill (for example, a 70-year-old patient with a wound); and the patient is not ill (for example, a 1-year-old with viral exanthema of more than 1 day).

The GPs conducting the clinic consultations or home visits made an assessment of the relevance of the triage decisions leading to face-to-face contact, answering the following question: *'After having seen and examined the patient, would you assess that the patient contact was medically relevant for OOH primary care?'*

From the PAS, the authors retrieved patient age and sex, date and time of contact, contact type (telephone consultation, clinic consultation, or home visit), and RFE. The RFE was subsequently coded according to the International Classification of Primary Care (ICPC) by a trained medical student, supervised by experienced researchers. Using date and time of contact, the authors calculated the time from either the closing or opening hours of the patient's own GP.

Data management and analysis

The authors used all telephone contacts to perform a descriptive analysis of the distribution of contact type per age group, and by looking at characteristics of the triage GP, the patient, and the contact. They also compared the characteristics of calls ending with telephone advice to those calls triaged to a face-to-face contact.

Binomial regression analyses were undertaken to calculate relative risk (RR) with 95% confidence intervals (CI), using robust variance estimates to account for clustering at GP level to analyse factors associated with triage to face-to-face contact.

Using all face-to-face contacts, the GP-assessed relevance of triage decisions were dichotomised into relevant and irrelevant. To identify factors associated with relevant triage to a face-to-face contact, binomial regression analysis was performed, using Stata (version 13.1).

RESULTS

Population

Of 700 GPs in the region, 385 participated in the LV-KOS survey at least once, and they

Table 1. GP, patient, and contact characteristics of OOH primary care telephone contacts

Variables	Telephone consultation n (%)	Triage to face-to-face contact n (%)
Total	**4620 (59.2)**	**3190 (40.8)**
GPs answering the telephone calls[a]		
Mean age, years (min–max)	50.5 (32–74)	50.7 (32–74)
Sex (male, %)	3334 (72.2)	2286 (71.7)
Number of shifts within year (mean, SD)	59.9 (32.6)	59.0 (32.2)
Patient		
Mean age, years (min–max)	33.0 (0–101)	35.9 (0–101)
Sex (male, %)	2111 (45.7)	1566 (49.1)
Contact (n, %)		
Reason for encounter[b]		
Trauma	402 (8.7)	250 (7.9)
Infections	200 (4.3)	61 (1.9)
Symptoms/complaints	3188 (69.2)	2748 (86.3)
Other	818 (17.8)	127 (4.0)
Duration of health problem, hours[c]		
<5	1494 (35.4)	980 (31.9)
5–12	988 (23.4)	738 (24.0)
>12–24	662 (15.7)	576 (18.7)
>24	1079 (25.6)	780 (25.4)
GP-assessed severity		
Severe — needs to be admitted directly	206 (4.5)	113 (3.5)
Potentially severe — needs to be seen by a doctor	356 (7.7)	1556 (48.8)
Not severe — but the patient is ill	3000 (64.9)	1309 (41.0)
Patient is not ill	820 (17.8)	101 (3.2)
Don't know	238 (5.2)	111 (3.5)
Time of contact		
Weekend and holidays[d]	2297 (49.7)	1810 (56.7)
Weekday nights (0 am–8 pm)	1165 (25.2)	499 (15.6)
Weekdays late afternoon (4 pm–8 pm)	678 (14.7)	578 (18.1)
Weekday evenings (8 pm–12 pm)	480 (10.4)	303 (9.5)
Duration to opening hours of patient's own GP		
<2 hours after own GP's closing hours	446 (9.7)	379 (11.9)
<2 hours before own GP's opening hours	338 (7.3)	53 (1.7)
>2 hours after own GP's closing or >2 hours before own GP's opening hours	3836 (83.0)	2758 (86.5)

[a]These are not unique GPs. [b]Clusters of the ICPC classification — component codes for main reason for encounter; 16 of these are missing and not presented in the Table. [c]Answering categories 'don't know' and 'not relevant' are recoded as missing and not presented in the Table. [d]Friday 4 pm to Sunday 12 pm, and public holidays. Min–max = the minimum and maximum ages of patients. SD = standard deviation.

registered 21 444 contacts (7810 telephone calls, 6973 clinic consultations, and 6661 home visits).

Characteristics of telephone contacts

In total, 4620 (59.2%, 95% CI = 58.1 to 60.2) calls ended with a telephone consultation and 3190 (40.8%, 95% CI = 39.8 to 41.9) were triaged to a face-to-face contact. Table 1 shows the characteristics of telephone contacts handled exclusively by telephone, and contacts triaged to a face-to-face contact. Patients triaged to a face-to-face consultation were older than patients triaged to a telephone consultation (35.9 years versus 33.0 years), and they had fewer short-term problems (duration of <5 hours 31.9% versus 35.4%). More problems presented by patients triaged to a face-to-face contact were assessed as potentially severe (48.8%) than problems presented by patients triaged to a telephone consultation (7.7%).

Factors related to triage to face-to-face contact

Table 2 shows the factors associated with triage to face-to-face contact. Severe problems (RR = 2.60, 95% CI = 1.94 to 3.49), potentially severe problems (RR = 5.81, 95% CI = 4.69 to 7.18), and non-severe problems

Table 2. Factors related to getting a face-to-face contact (clinic consultation or a home visit) when calling OOH primary care

	n (%)	Adjusted RR (95% CI)[a]
GPs answering the telephone calls		
Age, years		
30–39	1416 (18.1)	Ref.
40–49	2013 (25.8)	1.03 (0.91 to 1.17)
50–59	2843 (36.4)	1.04 (0.93 to 1.16)
≥60	1538 (19.7)	0.99 (0.82 to 1.20)
Sex		
Male	5620 (72.0)	Ref.
Female	2190 (28.0)	0.99 (0.88 to 1.11)
Number of shifts within year		
0–29	1717 (22.3)	Ref.
30–49	2062 (26.8)	1.05 (0.95 to 1.17)
≥50	3909 (50.9)	1.00 (0.90 to 1.11)
Patient		
Age, years		
0–17	2473 (31.7)	1.04 (0.96 to 1.11)
18–39	2330 (29.8)	Ref.
40–64	1713 (21.9)	1.13 (1.04 to 1.23)
>64	1293 (16.6)	1.34 (1.25 to 1.45)
Sex		
Male	3677 (47.1)	Ref.
Female	4133 (52.9)	0.92 (0.88 to 0.97)
Contact		
Reason for encounter		
Trauma	652 (8.4)	0.84 (0.75 to 0.94)
Infections	261 (3.4)	0.50 (0.41 to 0.61)
Symptoms/complaints	5936 (76.2)	Ref.
Other	945 (12.1)	0.34 (0.29 to 0.41)
Duration of health problem, hours		
<5	2474 (33.9)	Ref.
5–12	1726 (23.7)	1.07 (1.00 to 1.15)
>12–24	1238 (17.0)	1.15 (1.06 to 1.24)
>24	1859 (25.5)	1.03 (0.95 to 1.11)
GP-assessed severity		
Severe — needs to be admitted directly/potentially life-threatening[b]	319 (4.1)	2.60 (1.94 to 3.49)
Potentially severe — needs to be seen by a doctor	1912 (24.5)	5.81 (4.69 to 7.18)
Not severe — but the patient is ill	4309 (55.2)	2.23 (1.81 to 2.75)
Patient is not ill	921 (11.8)	Ref.
Don't know	349 (4.5)	3.15 (2.37 to 4.19)
Time of contact		
Weekend and holidays[c]	4107 (52.6)	0.94 (0.86 to 1.02)
Weekday nights (0 am–8 pm)	1664 (21.3)	0.61 (0.55 to 0.68)
Weekdays late afternoon (4 pm–8 pm)	1256 (16.1)	Ref.
Weekday evenings (8 pm–12 pm)	783 (10.0)	0.82 (0.74 to 0.91)
Duration to opening hours of patient's own GP		
<2 hours after own GP's closing hours	825 (10.6)	Ref.
<2 hours before own GP's opening hours	391 (5.0)	0.27 (0.21 to 0.35)
>2 hours after own GP's closing or >2 hours before own GP's opening hours	6594 (84.4)	0.84 (0.78 to 0.91)

[a] Adjusted for age group of patient, sex of patient, duration of health problem, and reason for encounter. [b] 'Severe — needs to be admitted directly' for calls ended as a telephone consultation, and 'severe — potentially life-threatening' for calls referred to a face-to-face contact. [c] Friday 4 pm to Sunday 12 pm, and public holidays. Ref. = reference. RR = relative risk.

(RR = 2.23, 95% CI = 1.81 to 2.75) were more likely to end in a face-to-face contact than

for patients who were not ill. Patients aged >40 years were more likely to be triaged to face-to-face contacts (40–64 years: RR = 1.13, 95% CI = 1.04 to 1.23; >64 years: RR = 1.34, 95% CI = 1.25 to 1.45) than patients aged 18–40 years.

Furthermore, patients reporting health problems lasting 12–24 hours were more likely to get a face-to-face contact (RR = 1.15, 95% CI = 1.06 to 1.24) than patients reporting health problems lasting <5 hours. A lower likelihood of getting a face-to-face consultation was found for calls on weekday nights (RR = 0.61, 95% CI = 0.55 to 0.68) or evenings (RR = 0.82, 95% CI = 0.74 to 0.91), compared to late afternoon.

Relevance of triage to face-to-face contacts

A majority of the GPs who did the clinic consultations or home visits assessed the triage to these face-to-face contacts as relevant (84.1% of clinic consultations, 73.9% of home visits), whereas 7–8% of the face-to-face contacts could have ended as a telephone consultation (7.9% of clinic consultations, 6.8% of home visits) (Table 3). Also, 4.9% of clinic consultations and 5.0% of home visits were not relevant for OOH-PC.

Factors related to irrelevant face-to-face contact

Contacts for severe problems (RR = 0.15, 95% CI = 0.10 to 0.21), potentially severe problems (RR = 0.05, 95% CI = 0.04 to 0.07), and non-severe problems (RR = 0.35, 95% CI = 0.31 to 0.41) were less likely to end in an irrelevant face-to-face contact than contacts for patients who were not ill (Table 4). In addition, patients aged >40 years were less likely to be triaged to an irrelevant face-to-face contact (40–64 years: RR = 0.83, 95% CI = 0.72 to 0.95; >64 years: RR = 0.64, 95% CI = 0.54 to 0.76) than patients aged 18–40 years, and patients triaged by GPs with ≥30 shifts per year (30–49 shifts: RR = 0.79; ≥50 shifts: RR = 0.61) were less likely than patients triaged by GPs with <30 shifts per year. Furthermore, contacts for problems persisting for 12–24 hours had a lower likelihood (RR = 0.84, 95% CI = 0.71 to 0.99) than problems persisting for <5 hours, whereas a higher likelihood was found for problems persisting for >24 hours (RR = 1.25, 95% CI = 1.07 to 1.47).

DISCUSSION
Summary
In total, 59% of all patient calls ended with a telephone consultation. These patients were younger, had more short-term problems, and had fewer potentially severe problems

Table 3. Assessment of relevance of telephone triage into a face-to-face contact with OOH primary care by GPs performing face-to-face contacts

After having seen and examined the patient, would you assess that the patient contact was medically relevant for OOH primary care?	Clinic consultation n (%)	Home visit n (%)
Yes, for the triaged type of contact	5867 (84.1)	4919 (73.9)
Yes, but could have been triaged to another type of face-to-face contact	59 (0.9)	791 (11.9)
Yes, but could have ended in a telephone consultation	548 (7.9)	450 (6.8)
No	338 (4.9)	331 (5.0)
Do not know	161 (2.3)	170 (2.6)
Total	6973	6661

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than patients triaged to a face-to-face contact. Factors associated with triage to a face-to-face contact were higher patient age, problems persisting for 12–24 hours, and severe/potentially severe/non-severe problems. Female patients, contacts on weekday nights and evenings, and patients assessed as non-ill had a lower likelihood of getting a face-to-face contact. GPs assessed that 12% of face-to-face contacts could have ended in a telephone consultation. High likelihood of irrelevant face-to-face contact was related to problems persisting for >24 hours, contacts on weekday nights, and contacts <2 hours before opening time of own GP. Other factors associated with relevance of triage to face-to-face contact were shifts per year of the triage GP, patient age, and assessed medical severity.

Several factors are related to triage to face-to-face contact. Patients calling with a severe or potentially severe problem get a face-to-face contact more often, as expected. Urgent problems more often need physical examination, diagnostic tests, and medication.[11,12] Furthermore, GPs more often triaged older patients to face-to-face contacts, which could be related to higher frequency of comorbidity and higher likelihood of a severe acute health problem.[13–15] Moreover, a problem persisting for 12–24 hours could indicate a (sub)acute problem that needs relatively quick treatment, indicating a need for consultation in particular during weekends when own GP is unavailable.

Patients most often get a face-to-face contact during the first two opening hours of OOH-PC. The current study does not explain the reason(s) for this finding, but several factors could play a role, such as worsening of a problem, problem first identified when picking up a child from day care, inability to visit own GP during the day due to work, problems with accessibility, limited availability of own GP,[16,17] and the possibility of getting a direct telephone contact with a GP outside office hours.

The factors that relate to lower likelihood of triage to an irrelevant face-to-face contact and factors related to higher likelihood of triage to a face-to-face contact are quite similar. Older patients more often had a relevant face-to-face contact, as did patients contacting for a severe or potentially severe problem. The assessed level of severity is closely related to the type of care given.[11] In addition, contact with a GP who had ≥30 shifts/year implied a lower likelihood of triage to an irrelevant face-to-face contact. This suggests that GP experience with OOH-PC had a positive effect on the relevance of triage decisions.

Face-to-face contacts for problems persisting >24 hours were more often assessed as irrelevant. A problem existing >24 hours is not considered acute and OOH-PC is meant for problems that cannot wait for own GP. Thus, health problems of longer duration may be more appropriate for the patient's own GP during daytime.

Strengths and limitations
To the authors' knowledge, this study is the first to investigate GP telephone triage and assessment of triage decisions of specific contacts in OOH-PC. The number of included patient contacts was high, providing high statistical precision, and the contacts were representative of all contacts in the study period.[9] Information bias may be present, as the GPs' assessment of their colleagues' telephone triage might be too positive. Yet, GPs who assessed the relevance of face-to-face contacts at night may have been more critical as they had to see these patients during the night. The results can be generalised to countries with a similar gatekeeping system and GP telephone triage in OOH-PC.

The efficiency of GP triage could be affected by the fee-for-service remuneration and the ability to prescribe medication by telephone. The exact effect of this cannot be assessed in this study but must be taken into consideration in assessing the generalisability of the findings. Furthermore, even though the short-term efficiency (that is, ending contacts by telephone) may be high, the long-term efficiency (that is, the frequency of follow-up contacts to the patient's own GP or another healthcare setting) and safety of triage is unknown.

Comparison with existing literature
Like Christensen and Olesen,[5] the authors found that GP telephone triage seems to be an efficient way of managing patient flows in OOH-PC, as 59% of contacts ended by telephone. Most triage decisions involving

Table 4. GP, patient, and contact characteristics associated with getting a face-to-face contact that could have ended in a telephone consultation, according to the consulting GP[a]

	n (%)	Adjusted RR (95% CI)[b]
GP who answered the telephone call		
Age, years		
30–39	1848 (14.1)	Ref.
40–49	3929 (30.0)	1.00 (0.84 to 1.18)
50–59	4463 (34.1)	1.12 (0.94 to 1.33)
≥60	2851 (21.8)	1.08 (0.89 to 1.30)
Sex		
Male	8918 (68.1)	Ref.
Female	4173 (31.9)	1.05 (0.95 to 1.15)
Number of shifts within 1 year		
0–29	3725 (27.3)	Ref.
30–49	3756 (27.5)	0.79 (0.64 to 0.97)
≥50	6166 (45.2)	0.61 (0.47 to 0.79)
Patient		
Age, years		
0–17	3576 (26.9)	0.92 (0.81 to 1.05)
18–39	3077 (23.1)	Ref.
40–64	3098 (23.3)	0.83 (0.72 to 0.95)
>64	3548 (26.7)	0.64 (0.54 to 0.76)
Sex		
Male	6340 (47.7)	Ref.
Female	6963 (52.3)	1.04 (0.95 to 1.14)
Contact		
Reason for encounter		
Trauma	851 (6.7)	0.91 (0.74 to 1.11)
Infections	184 (1.5)	0.97 (0.65 to 1.44)
Symptoms/complaints	10 594 (83.9)	Ref.
Other	1003 (7.9)	1.05 (0.86 to 1.30)
Duration of health problem, hours		
<5	3267 (25.1)	Ref.
5–12	3285 (25.2)	0.96 (0.82 to 1.12)
>12–24	2424 (18.6)	0.84 (0.71 to 0.99)
>24	4066 (31.2)	1.25 (1.07 to 1.47)
GP-assessed severity		
Severe — potentially life-threatening	841 (6,3)	0.15 (0.10 to 0.21)
Potentially severe — needs to be seen by a doctor	4952 (37.2)	0.05 (0.04 to 0.07)
Not severe — but the patient is ill	5789 (43.5)	0.35 (0.31 to 0.41)
Patient is not ill	1436 (10.8)	Ref.
Don't know	280 (2.1)	0.44 (0.30 to 0.65)
Time of contact		
Weekend and holidays[c]	7935 (59.7)	0.87 (0.72 to 1.06)
Weekday nights (0 am–8 pm)	1992 (15.0)	1.25 (1.02 to 1.54)
Weekdays late afternoon (4 pm–8 pm)	1603 (12.1)	Ref.
Weekday evenings (8 pm–12 pm)	1773 (13.3)	0.95 (0.76 to 1.16)
Duration to opening hours of patient's own GP		
<2 hours after own GP's closing hours	274 (2.1)	Ref.
<2 hours before own GP's opening hours	663 (5.0)	1.80 (1.27 to 2.55)
>2 hours after own GP's closing or >2 hours before own GP's opening hours	12 366 (93.0)	1.00 (0.80 to 1.25)

[a]Adjusted for clustering of GPs. [b]Adjusted for age group of patient, sex of patient, duration of health problem, and reason for encounter. [c]Friday 4 pm to Sunday 12 pm, and public holidays. Ref. = Reference. RR = relative risk.

face-to-face contact, rather than a telephone consultation, were found to be relevant. In other words, the GPs assessed that a low rate of over-triage was present for face-to-face contacts. To the authors' knowledge, no other studies have focused on GP telephone triage in OOH-PC, but a few studies have explored nurse telephone triage in OOH-PC. Dutch nurses handle about 40% of contacts by telephone alone.[18]

Denmark has almost twice as many OOH-PC contacts as the Netherlands,[19] indicating that a larger share of calls may concern minor ailments and hence are more easily managed by telephone. More studies have focused on telephone triage in daytime primary care. Doctors can manage 52%[20] to 72%[21] by telephone advice alone, whereas nurses can handle 26% of calls.[22] Telephone triage by doctors and nurses in daytime primary care seemed to reduce the number of same-day appointments and increase follow-up contacts after the initial contact.[4,21,22] Several studies on the relevance of OOH nurse triage using mystery patients or paper-case scenarios have found that over-triage varies from 1% to 18%.[3,23–25] Furthermore, assessing severity in a telephone consultation is different from doing so in a face-to-face contact, as one has no visual cues or possibility for examination.[26] Some over-triage is thus expected in telephone triage to maintain safety. Studies on nurse telephone triage have shown that experience and educational background are positively related to correct triage decisions.[24,27]

Implications for research and practice
The authors identified three factors related to a higher likelihood of an irrelevant face-to-face contact: problems persisting for >24 hours, contacts during weekday nights, and contacts <2 hours before the patient's own GP's opening hours. This new insight could be used for the education of GPs in the form of specific telephone triage courses. Furthermore, patients could be informed about the appropriate use of OOH-PC, as some contacts were in relation to non-severe problems.

Future studies should investigate GP telephone triage in OOH-PC in more detail, with a particular focus on safety, long-term efficiency (that is, the number of follow-up contacts), quality of communication, and patient satisfaction. Furthermore, nurse and GP telephone triage should be compared. Additionally, exploring the patients' reasons for contacting OOH-PC, the patient perspective in GP triage, and factors that are related to contacts during the first 2 hours could help to optimise the healthcare system.

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