Research

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Individual utilisation thresholds and exploring how GPs' knowledge of their patients affects diagnosis:

a qualitative study in primary care

Abstract

Background
One of the tenets of general practice is that continuity of care has a beneficial effect on patient care. However, little is known about how continuity can have an impact on the diagnostic reasoning of GPs.

Aim
To explore GPs' diagnostic strategies by examining GPs' reflections on their patients' individual thresholds for seeking medical attention, how they arrive at their estimations, and which conclusions they draw.

Design and setting
Qualitative study with 12 GPs in urban and rural practices in Germany.

Method
After each patient consultation GPs were asked to reflect on their diagnostic reasoning for that particular case. Qualitative and quantitative analyses of consultations and interview content were undertaken.

Results
A total of 295 primary care consultations were recorded, 134 of which contained at least one diagnostic episode. When elaborating on known patients, GPs frequently commented on how 'early' or 'late' in an illness progression a patient tended to consult. The probability of serious disease was accordingly regarded as high or low. This influenced GPs' behaviour regarding further investigations or referrals, as well as reassurance and watchful waiting. GPs' explanations for a patient's utilisation threshold comprised medical history, the patient's characteristics, family background, the media, and external circumstances.

Conclusion
The concept of an individual threshold for the utilisation of primary care would explain how GPs use their knowledge of individual patients and their previous help-seeking behaviour for their diagnostic decision making. Whether the assumption behind this concept is valid, and whether its use improves diagnostic accuracy, remains to be investigated.

Keywords
clinical decision making; continuity of patient care; general practice; physician–patient relations; qualitative research.

INTRODUCTION

Continuity of care is one of the defining features of general practice.[1,2] There is some evidence that relational or personal continuity of care has a positive impact on the process and the outcomes of care including diagnosis.[3–7] But little is known about the underlying mechanisms or how knowing or being familiar with a patient has an effect on care and its outcome. Diagnostic processes in primary care have been investigated intensively in the past. There are different strategies and heuristics enabling GPs to arrive at a diagnosis.[8–11] However, little is known about how diagnostic processes are influenced by knowing patients in general practice.

In the authors' study of cognitive processes relevant in GPs' diagnosis,[11] physicians were asked to reflect on their diagnostic reasoning. At the beginning of each interview they were asked to start with the beginning of the consultation and the complaint presented by the patient. This was the point when they elaborated on their knowledge of the patient, in particular patients' individual thresholds for attendance and how this was important for the diagnostic work-up. To the authors' knowledge, this phenomenon, which is the topic of this study, has not been described before.

The utilisation threshold arose while working on the data for the previous paper.[11] Here, in this study further analyses regarding the utilisation threshold are presented.

METHOD

A qualitative and descriptive approach was used to investigate the cognitive decision processes used by primary care physicians. Observation of patient–doctor interaction in the real practice setting was thought to offer the best method to capture cognitive mechanisms. After each consultation, GPs were asked to reflect on their diagnostic reasoning in a semi-structured interview, resulting in data for qualitative and quantitative analysis.

Twelve experienced GPs working independently in their practices but associated with the teaching practice network of the University of Marburg in Germany were recruited for this study. This sample offered a broad range of GP characteristics with regards to age, sex, and location (rural or urban) (Table 1). All GPs were informed orally and in writing about the study objectives and the privacy regulations prior to the start of the investigation. Patients were included in order of their appearance in the practice and irrespective of their problems or complaints. Patients were informed by their GPs about the study prior to giving their written consent.

In order to help participating GPs reflect on their diagnostic reasoning, semi-structured interview guidelines were developed based on the relevant literature

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How this fits in

Continuity of care is widely accepted as a key principle in general practice and has proven beneficial in various studies. However, little is still known about how continuity of care affects diagnosis. Assuming an individual utilisation threshold for known patients represents one strategy for GPs to exploit their familiarity with their patients. GPs tailor the diagnostic process accordingly.

(Appendix 1).[8,12] Trained research staff carried out the interviews. They began by asking GPs to recall the beginning of the consultation and to describe their first impressions and thoughts. The aim was to reconstruct the diagnostic process within each individual consultation. Interviews were performed at the GP's office subsequent to each consultation and lasted between 2 and 18 minutes. Because there was no pre-specified hypothesis regarding the individual threshold for seeking medical attention, no questions were asked in this regard. Consultations and interviews were videorecorded remotely without the need for personal control in the consultation room. Tapes were transcribed verbatim using standard word-processing software. Transcripts were saved and analysed in anonymous form.

Transcribed data were imported into MAXQDA (version 11), software that supports qualitative data analysis. Data analysis was primarily based on a deductive–inductive approach,[13] starting with previously described diagnostic strategies in primary care such as inductive foraging, triggered routines, and hypothesis testing.[8,14] For exploration of the individual utilisation threshold, which emerged without predefined hypotheses, additional codes were developed for high and low thresholds.

In an inductive process, explanations for different utilisation thresholds and the consequences for diagnosis and treatment arose and were consecutively added. Codes were defined explicitly with multiple memos. Two physician researchers conducted primary coding and analysis, and an in-depth analysis regarding the individual utilisation threshold was undertaken. Two independent raters (both physicians) evaluated the reliability of the coding tree. They agreed in 83% of cases. Conflicts in coding were resolved by discussion within the study team. A departmental working group on qualitative research also discussed conclusions.

Consultations and interviews were conducted in German. For this publication, quotations were translated by the authors and consecutively numbered. All authors work as part-time primary care physicians with a strong background in primary care research.

RESULTS

Utilisation thresholds

During sessions covered by the study team, 344 patients were asked to participate: 49 patients refused to take part, mainly due to lack of time, and therefore 295 patients were included in this study. The number of patients who participated varied between 18 and 38 in each practice. One patient later withdrew their consent.

In 134 consultations at least one diagnostic episode could be identified. See Table 2 for patient characteristics. The remaining consultations were for follow-up visits, chronic disease management, vaccination, or administrative issues. Only consultations with diagnostic content were considered for this study.

Without explicitly being asked, in 49 out of 134 (36%) consultations with diagnostic content, GPs reflected on the individual

Table 1. GP characteristics (*N* = 12)

Characteristic	
Age: years, median (range)	53 (49–62)
Sex: male, *n* (%)	7/12 (58)
Practice	
Group practice, *n* (%)	10 (83)
Single-handed, *n* (%)	2 (17)
Years in general practice, median (range)	21 (9–30)
Setting	
Rural/small town, *n* (%)	6 (50)
Urban, *n* (%)	6 (50)

Table 2. Patient characteristics (*N* = 134)

Characteristic	Value
Age: years, mean (range)	54.6 (9–89)
Sex: male, *n* (%)	49 (37)
Continuity: known by GP, *n* (%)	125 (93)
Family: *n* (%)	
Single/divorced/widow	47 (35)
Married/living with partner	81 (60%)
Adolescent living with parents	6 (5)
Level of education:[a] *n* (%)	
Low	31 (23)
Intermediate	73 (55)
High	30 (22)

[a]Levels defined according to German educational system: low = basic ('Hauptschule'—'general school' — a type of basic secondary school in Germany that follows elementary school but does not qualify students for higher university education), or no secondary education; intermediate = equivalent to GCSEs; high = graduation from grammar school or equivalent (Abitur — the German Abitur is a qualification obtained at the upper Gymnasium level: 'Gymnasiale Obersufe' after 12 or 13 years of school education in a German school, authorising the holder to study any subject at any higher education institution in Germany).

utilisation threshold. Nine of the 12 GPs (75%) did this at least once. In 125 out of 134 (93%) consultations GPs stated that they knew their patient well or very well. Although prompted to reflect on their diagnostic thinking in general, they were not asked 'when does a patient usually consult', that is, the utilisation threshold.

In 48 out of 49 (98%) patients where GPs reflected on their patients' individual utilisation threshold, patients were previously well-known by GPs.

Different utilisation thresholds were mostly framed as patients consulting 'early' or 'late' in an illness episode. In the view of participating GPs, attending 'late', that is, having a high-utilisation threshold, was associated with a high probability of defined or even serious morbidity, and vice versa:

'So I do know that she comes [into my surgery] *rather early than late.*' (GP3 on patient 1, female, age 42 years) [Identifying information in the brackets after quotes refers, first, to the doctor and, second, to the patient; sex and age of the patient is given. See Appendix 2 for GP information].

'He is actually a very anxious patient, consulting me promptly ... So, if he has got something, he comes rather quickly than too late.' (GP11 on patient 18, male, 40 years)

'She is not somebody coming here three times a week, OK? She comes here rarely ... [and] if she comes, something is really going on.' (GP6 on patient 19, female, 82 years)

Additionally, GPs described their patients as consulting regularly with unimportant issues or only when they really worried in order to illustrate low- or high-utilisation thresholds, respectively:

'She is somebody, consulting me frequently with minor issues.' (GP1 on patient 6, female, 62 years)

'She only comes into my surgery, in cases [where] she really is in trouble.' (GP2 on patient 10, female 74 years)

In just one exception a GP reflected on the utilisation threshold of a patient not personally known by him. That was made possible by a textual comment of a colleague in the patient's record.

GPs' perceptions of why patients consult early or late
During interviews, GPs gave explanations or reasons as to what they perceived might cause their patients to consult promptly or late. Five factors were identified: medical history and life-changing (medical) events; emotional and behavioural characteristics; family background and social environment; the media; and external circumstances.

The medical history and life-changing (medical) events of the patient. GPs argued that severe or even life-threatening disease that their patients had experienced in the past played a role in their threshold for seeking medical help. This was mostly found in patients with a more frequent and

'early' consultation pattern:

'She once had leukaemia and chemotherapy … and of course she is a bit anxious now.' (GP3 on patient 1, female, 42 years)

'First time he went to the men's health check with his urologist he was 45 years old being diagnosed with prostate cancer … Now he is driven by fears of a relapse.' (GP11 on patient 34, male, 54 years)

Emotional and behavioural characteristics of the patient. Some patients were characterised as being generally anxious and sensitive, leading to a low-utilisation threshold:

'He has dreadful angst.' (GP3 on patient 5, male, 19 years)

'… because he is just anxious … and very sensitive.' (GP11 on patient 34, male 54 years)

Sometimes patients were described as being socially withdrawn, resulting in a high-utilisation threshold:

'I know that he is a withdrawn person, not willing to seek the doctor's help … It's difficult to get anything out of him … He is a close-lipped person, as all men are.' (GP5 on patient 4, male, 72 years)

'She never shows up … because she doesn't want to interrupt my work. That's what she said to me once.' (GP7 on patient 15, female 76 years)

Some patients presented not only 'late', but had also previously missed follow-up appointments:

'One or two years ago she did manage not to attend for an INR (anticoagulation check) for more than 3 months.' (GP11 on patient 2, female 75 years)

The patient's family background and social environment. GPs pointed out the importance of the patients' family and/or their social environment as an influence on their patients' consultation habits.

Issues of trouble and stress in their surrounding family were associated with both high- and low-utilisation thresholds, depending on how patients were affected by them:

'There is a lot of trouble [in the family].' (GP11 on patient 2, female 75 years) was

a comment in a patient with usually 'late' consultations.

However, the following was stated for patients with 'early' consultation habits:

'He really had hard times, after the death of his partner in an accident … [Since then] he comes quite often for minor colds etc, somehow he appears like a child looking for love.' (GP3 on patient 15, male, 45 years)

'Now, 10 days ago her elder sister, only a little bit older than herself, died from a heart attack. And of course that totally threw her off the rails.' (GP7 on patient 12, female, 40 years)

Both events apparently led to frequent visits with a low likelihood of serious morbidity.

GPs complained about a sometimes weak lay system ['lay system' here refers to self-care strategies and family advice] for managing minor health problems in patients with low-utilisation thresholds:

'Often I ask myself: "Why is he coming to my surgery?" If there was a grandmother around, she might say "Stay in bed, I'll make a cup of tea for you and it'll all turn out fine tomorrow."' (GP3 on patient 15, male, 45 years)

The media. One GP mentioned that the media influenced susceptible people, which lowered their utilisation threshold.

'She picks up from the media what might happen.' (GP3 on patient 1, female, 42 years)

The external circumstances of the patient. GPs reported simple external constraints leading to lower-utilisation thresholds such as needing sick notes from the first day of illness, which in Germany is required for blue-collar workers (blue collar refers to someone of working-class extraction, historically defined by hourly rates of pay and manual labour):

'She was just in need of a sick note for today.' (GP11 on patient 31, female, 28 years)

Pre-emptive consultations apparently also occurred, by which patients prepared themselves for exceptional events, such as holidays or examinations:

'If she didn't need to leave for Berlin tomorrow, she wouldn't have shown up, I guess.' (GP2 on patient 6, female, 53 years)

The cognitive, emotional, and behavioural consequences for GPs when reflecting on individual utilisation thresholds

Although the concept of the individual utilisation threshold was described almost identically by most GPs touching on this topic, their related beliefs, feelings, and actions varied widely, depending on the particular situation.

GP cognition. In patients with high-utilisation thresholds, GPs showed an elevated level of awareness and concentration. They reported making an extra effort not to miss the prospect of serious disease:

'He is not frank ... and I have to be attentive to find out everything.' (GP7 on patient 15, female, 76 years)

'I have known her for many years ... and have known her lack of compliance. [So] *I'm very alarmed ... so I think I have to dig deeper into it, not to miss anything.'* (GP7 on patient 6, female, 84 years)

Furthermore, the GPs pondered about why patients are withdrawn and whether or not there was a serious problem behind a seemingly innocuous presentation:

'Probably he just raises this [trivial] *problem as a pretext for coming here ... but he is not yet willing to tell me what the matter is.'* (GP5 on patient 4, male, 72 years)

With patients who had a low-utilisation threshold, GPs described struggling to take the patient and their complaint seriously:

'I really need to concentrate on taking their complaints seriously, as the patient expects me to ... This symptom wouldn't bother me at all ... but I want to make him feel ... that he is being looked after.' (GP6 on patient 10, female, 72 years)

GP emotion: When being confronted with patients consulting 'early' (in an illness progression), some GPs grew irritated or even reacted aggressively:

'She was getting on my nerves ... I'm glad to see her leave again.' (GP1 on patient 10, female, 83 years)

'When he comes here, I'm a little annoyed.' (GP7 on patient 16, male, 67 years)

However, they could see this group of patients in a more positive light when they became aware of circumstances impacting on their patients' utilisation behaviour:

'Knowing his background [of prostate cancer], *I do understand* [his behaviour of frequent visits for minor problems].*'* (GP11 on patient 34, male, 54 years)

GP behaviour. In patients with low-utilisation thresholds, GPs did not expect there to be a severe disease outcome. Thus they stressed the benign course of the symptoms mentioned and tried to reassure their patients. Sometimes they performed a physical examination or arranged for follow-up visits purely for this purpose. However, they usually refrained from specialist referrals or invasive investigations:

'I try to explain the situation to her. The purpose behind me examining her abdomen is calming this patient down, rather than expecting anything there.' (GP3 on patient 1, female, 42 years)

One GP became irritated and referred their patient to a specialist, so that he did not have to deal with her any more:

'I gave her a referral, so I will have my peace ...' (GP6 on patient 13, female, 34 years)

Of the GPs who were aware of individually varying thresholds, most adapted their diagnostic decision making as described earlier. Two GPs, however, stressed the risks that might arise from this kind of individualisation. They deliberately tried to ignore individual variation in consultation thresholds and followed the diagnostic procedures required for the symptoms or problem at hand:

'I really had the feeling: "that was exaggerated!" but still I do my differential diagnosis and have a further look.' (GP5, patient 9, female, 63 years)

'However, we will check the blood ... and a stool sample ... so that we won't miss anything.' (GP6 on patient 10, female, 72 years)

In patients with high-utilisation thresholds, GPs put more time and effort into their diagnostic work, probing for more information or referring to specialists. They tried actively to convince their patients to keep appointments:

'I know he has some [serious issue], *when he drops into my surgery ... [Though I*

didn't find anything on my examination] / *finally referred him to a urologist.*' (GP11 on patient 10, male, 47 years)

'*Sometimes my nurses let me know when she* [the patient] *is in to get herself a new prescription: "You haven't seen her for a while." So I go to the reception desk and ask her if she wants to see me. But mostly she refuses and leaves the practice.*' (GP7 on patient 15, female, 76 years)

The above is an example of a GP believing a patient might harm herself by not consulting, that is, having a high-utilisation threshold and possibly putting her health at risk by neglecting the presence of a serious illness. The GP not only considers the patient's utilisation threshold, but in this case also actively intervenes to influence consultation behaviour.

DISCUSSION
Summary
In more than one-third of interviews, GPs spontaneously reflected on their patients' individual utilisation thresholds. These were usually framed as patients tending to consult 'early' or 'late' in the course of their illness, that is, having a low- or high-utilisation threshold, respectively. Patients with high-utilisation thresholds caused increased awareness or even alarm when consulting. In patients with low-utilisation thresholds, however, the likelihood of serious disease was regarded as low. In these cases GPs provided reassurance and mostly refrained from further investigations. GPs elaborated on their patients' utilisation thresholds early in the interview, without being prompted and in considerable detail. This therefore appears to be a highly relevant part of GPs' diagnostic decision making in patients they know well.

Strengths and limitations
The fact that consultations were video-recorded may have influenced GPs' and patients' behaviour. Nevertheless, this approach is more suitable for capturing real-world decision making than other techniques such as standardised patients in laboratory settings or GPs' written self-reports.

In Germany primary care practices are small with high rates of short consultations (on average 7 minutes).[15] Familiarity with patients is perhaps greater than in large practices with a more developed division of labour. This may have an impact on the personal continuity of care and should be kept in mind when comparing these results with other healthcare systems.

Reflection on someone else's thinking requires time and a quiet space. Interviewing during the busy practice day might impede this process. Thus the GP's surgery schedule was generously planned to allow for sufficient time for interviewing and reflection directly after each consultation. Moreover, practice partners helped out and saw patients waiting to see a GP where possible in order to prevent time pressure during interviews.

The idea that individual utilisation thresholds are relevant for GPs' diagnostic reasoning was not initially under consideration when planning the study. The authors therefore present a secondary post-hoc analysis. There was, on the other hand, no risk of influencing participating GPs' elaborations in the direction of the findings presented here. It might therefore be assumed that active questioning would have resulted in an even higher proportion of GPs referring to utilisation thresholds of the kind described in this study. Some GPs, for example, might use the technique without mentioning it. And, if they had been asked 'Do you take into account your patients' usual utilisation threshold?', that would probably have led to a higher proportion of GPs admitting to use this. But this is an assumption requiring verification.

Comparison with existing literature
Only a small proportion of people with medical complaints present to health professionals. Most health problems are managed in the lay sector[16,17] (by patients themselves and their families). The decision to consult a physician is multifaceted and highly complex.[18] The term 'illness behaviour' defines '*the ways in which given symptoms may be differentially perceived, evaluated and acted (or not acted) upon by different kinds of persons*'.[19] This study shows that GPs reflect on their patients' transition from the lay to the professional sector and adapt their decision making accordingly.

Explanations for the individual thresholds provided by participating GPs are in line with findings from direct research of health services utilisation: family, social, and cultural background;[20–22] emotional and behavioural characteristics;[23,24] medical history and individual experiences;[25] media influences;[26,27] and external constraints[28] have been shown to impact on utilisation behaviour. The current study's findings thus provide a link between these psychological and sociological surveys, on the one hand, and the clinical decision-making literature, on the other.

The group of patients attending 'early' in an illness progression includes those characterised as 'frequent attenders',[29,30] or a minority even as 'heartsink patients'.[31,32] The factors mentioned in studies as lowering utilisation thresholds partly overlap with the characteristics of frequent attenders in primary care.[33]

Although the problem of frequent attenders is usually framed as a burden for individual practices and the healthcare system,[34] the reflections of the GPs in this study shed a positive light on the phenomenon. The variability in patients' utilisation patterns allows for conclusions regarding the probability of serious illness. Patients leading to a GP's 'heart sink' were found in this study at some points, for both patients with low- and high-utilisation thresholds. This provides a link between the phenomenon of heartsink patients and patients with high- or low-utilisation thresholds. However, it cannot be extrapolated from this study that heartsink patients only belong to one of the two groups.

Implications for research and practice

Given the design constraints of this study, it might be assumed that GPs use their experience of patients' previous utilisation behaviour even more often than in a third of cases. This may be a universal feature of diagnosis in settings where the proportion of known patients is high. Whether this is true remains to be investigated in future and larger confirmatory studies. Future studies could investigate different healthcare systems, settings such as emergency departments and out-of-hours services, or could deliberately include unknown patients in order to allow direct comparisons. Moreover, it would be interesting to learn about the patients' perspective on this phenomenon.

In diagnostic accuracy studies, manipulating the threshold of a diagnostic test leads to different positive predictive values. All other parameters being equal, a high threshold results in a high positive predictive value, and vice versa.[35] In a similar fashion, GPs estimate the likelihood of relevant disease as high or low, depending on the threshold defined by the patient. GPs seem to adapt their behaviour accordingly by, for example, providing further diagnostic work-up or reassurance.

Although GPs often pride themselves for the continuity of care they provide, in the area of diagnosis this notion has been somewhat vague in the past. The reflection on individual utilisation thresholds provides a mechanism for how knowing a patient reasonably well promotes diagnostic reasoning.

Whether decision making is improved by using this convenient and time-saving strategy, however, remains to be investigated further.

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REFERENCES

1. Freeman GK, Olesen F, Hjortdahl P. Continuity of care: an essential element of modern general practice? *Fam Pract* 2003; **20(6):** 623–627.

2. Haggerty JL, Reid RJ, Freeman GK, *et al*. Continuity of care: a multidisciplinary review. *BMJ* 2003; **327(7425):** 1219–1221.

3. Hjortdahl P. The influence of general practitioners' knowledge about their patients on the clinical decision-making process. *Scand J Prim Health Care* 1992; **10(4):** 290–294.

4. Hjortdahl P, Borchgrevink CF. Continuity of care: influence of general practitioners' knowledge about their patients on use of resources in consultations. *BMJ* 1991; **303(6811):** 1181–1184.

5. Maarsingh OR, Henry Y, van de Ven PM, Deeg DJ. Continuity of care in primary care and association with survival in older people: a 17-year prospective cohort study. *Br J Gen Pract* 2016; DOI: https://doi.org/10.3399/bjgp16X686101.

6. Saultz JW, Albedaiwi W. Interpersonal continuity of care and patient satisfaction: a critical review. *Ann Fam Med* 2004; **2(5):** 445–451.

7. Saultz JW, Lochner J. Interpersonal continuity of care and care outcomes: a critical review. *Ann Fam Med* 2005; **3(2):** 159–166.

8. Heneghan C, Glasziou P, Thompson M, *et al*. Diagnostic strategies used in primary care. *BMJ* 2009; **338:** b946.

9. Doust J. Using probabilistic reasoning. *BMJ* 2009; **339:** b3823.

10. Norman G, Barraclough K, Dolovich L, Price D. Iterative diagnosis. *BMJ* 2009; **339:** b3490.

11. Donner-Banzhoff N, Seidel J, Sikeler AM, *et al*. The phenomenology of the diagnostic process: a primary care-based survey. *Med Decis Making* 2017; **37(1):** 27–34.

12. Elstein AS, Shulman LS, Sprafka SA. *Medical problem solving: an analysis of clinical reasoning*. Cambridge, MA: Harvard University Press, 1978.

13. Miles MB, Huberman AM, Saldana J. *Qualitative data analysis: a methods sourcebook*. 3rd edn. Thousand Oaks, CA: Sage Publications, 2014.

14. Donner-Banzhoff N, Hertwig R. Inductive foraging: improving the diagnostic yield of primary care consultations. *Eur J Gen Pract* 2014; **20(1):** 69–73.

15. Deveugele M, Derese A, van den Brink-Muinen A, *et al*. Consultation length in general practice: cross sectional study in six European countries. *BMJ* 2002; **325:** 472. http://www.bmj.com/content/325/7362/472.1 (accessed 21 Mar 2017).

16. Green LA, Fryer GE Jr, Yawn BP, *et al*. The ecology of medical care revisited. *N Engl J Med* 2001; **344(26):** 2021–2025.

17. Wadsworth M. Health and sickness: the choice of treatment. *J Psychosom Res* 1974; **18(4):** 271–276.

18. McWhinney IR. Beyond diagnosis: an approach to the integration of behavioral science and clinical medicine. *N Engl J Med* 1972; **287(8):** 384–387.

19. Mechanic D. The concept of illness behavior. *J Chronic Dis* 1962; **15(2):** 189–194.

20. Bösner S, Hartel S, Diederich J, Baum E. Diagnosing headache in primary care: a qualitative study of GPs' approaches. *Br J Gen Pract* 2014; DOI: https://doi.org/10.3399/bjgp14X681325.

21. Brorsson A, Råstam L. The patient's family history: a key to the physician's understanding of patients' fears. *Fam Pract* 1993; **10(2):** 197–200.

22. Campbell SM, Roland MO. Why do people consult the doctor? *Fam Pract* 1996; **13(1):** 75–83.

23. Burgess C, Hunter MS, Ramirez AJ. A qualitative study of delay among women reporting symptoms of breast cancer. *Br J Gen Pract* 2001; **51(473):** 967–971.

24. Kettell J, Jones R, Lydeard S. Reasons for consultation in irritable bowel syndrome: symptoms and patient characteristics. *Br J Gen Pract* 1992; **42(364):** 459–461.

25. Andersen R, Newman JF. Societal and individual determinants of medical care utilization in the United States. *Milbank Q* 2005; DOI: 10.1111/j.1468-0009.2005.00428.x.

26. Grilli R, Ramsay C, Minozzi S. Mass media interventions: effects on health services utilisation. *Cochrane Database Syst Rev* 2002; **(1):** CD000389.

27. Kristiansen CM, Harding CM. Mobilization of health behavior by the press in Britain. *J Mass Commun Q* 1984; **61(2):** 364–370.

28. O'Brien K, Cadbury N, Rollnick S, Wood F. Sickness certification in the general practice consultation: the patients' perspective, a qualitative study. *Fam Pract* 2008; **25(1):** 20–26.

29. Westhead JN. Frequent attenders in general practice: medical, psychological and social characteristics. *J R Coll Gen Pract* 1985; **35(276):** 337–340.

30. Hodgson P, Smith P, Brown T, Dowrick C. Stories from frequent attenders: a qualitative study in primary care. *Ann Fam Med* 2005; **3(4):** 318–323.

31. Butler CC, Evans M. The 'heartsink' patient revisited. The Welsh Philosophy And General Practice discussion Group. *Br J Gen Pract* 1999; **49(440):** 230–233.

32. O'Dowd TC. Five years of heartsink patients in general practice. *BMJ* 1988; **297(6647):** 528–530.

33. Patel S, Kai J, Atha C, *et al*. Clinical characteristics of persistent frequent attenders in primary care: case-control study. *Fam Pract* 2015; **32(6):** 624–630.

34. Kersnik J, Svab I, Vegnuti M. Frequent attenders in general practice: quality of life, patient satisfaction, use of medical services and GP characteristics. *Scand J Prim Health Care* 2001; **19(3):** 174–177.

35. Bösner S, Haasenritter J, Keller H, *et al*. The diagnosis of coronary heart disease in a low-prevalence setting: follow-up data from patients whose CHD was misdiagnosed by their family doctors. *Dtsch Arztebl Int* 2011; **108(26):** 445–451.

Appendix 1. Interview guideline for research staff

I. Introduction at the beginning of the session
As we have mentioned before, the objective of this study is to find out how physicians arrive at their [diagnostic] decisions. We are interested to learn how you personally make your decisions; this is not about 'right' or 'wrong'.
We are going to videotape each consultation. After each consultation I am going to ask you a few questions. Please elaborate on all the thoughts, feelings, and impressions you had during the consultation. Try to avoid any judgement regarding an idea or impression as being 'important' or 'unimportant', even if seems as if it had no rational justification or appears unimportant. After the interview I will ask you to fill in a brief questionnaire on the medical background of the patient.

II. Interview after each consultation
We will go through the consultation together. Please try to tell me about all the the thoughts, emotions, and impressions you had [it had been made clear before that these referred to diagnostic reasoning]. Please do not judge; just tell me all that went through your mind, even if it seems irrational or not important.

- 1. Please go back to the beginning of the consultation and describe what happened initially. Why did the patient come to see you?
- 2. After the patient had mentioned the reason for his/her visit, did you have an explanation by then already, perhaps more than one [an explanation for the signs and symptoms of what constitutes a diagnosis]? If not, when did the first explanation (a hypothesis for a diagnosis) come to your mind?
    a. Was there a particular piece of information (or several) inducing the hypothesis?
    i. Please elaborate on the information (cues).
    ii. What was your final diagnosis? What made you favour this particular one?
    b. If there were several explanations, when did you consider each [explanations for the patients' complaints and symptoms]?
- 3. Try to describe the kind of hypotheses (specific versus general, somatic versus psychological).
- 4. What were your thoughts on how to proceed from there?
- 5. Was there anything else during this consultation that you have not mentioned but might be important here?
- 6. At which point in time did you decide that you had sufficient information?
- 7 Optional: If interviewer has observed any of the GP's behaviour not addressed during interview, ask for elaboration.

Appendix 2. GP characteristics (*N* = 12)

GP (ID)	Sex	Age, years	Years in practice	Practice[a]	Settings
1	M	52	20	Group	Urban
2	F	51	23	Single	Urban
3	M	48	9	Group	Urban
4	F	51	12	Group	Small-town
5	M	62	28	Group	Rural
6	M	49	12	Group	Rural
7	M	59	25	Group	Urban
8	M	62	28	Group	Urban
9	F	58	30	Group	Rural
10	F	54	17	Group	Urban
11	F	57	26	Group	Rural
12	M	53	20	Single	Small-town

[a]Group practice or single-handed practice.