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Abstract

Background

Patients later diagnosed with cancer may first be diagnosed with another 'interim' diagnosis based on their clinical presentation. In some cases, interim diagnoses may be missed opportunities to diagnose cancer.

Aim

To explore healthcare professionals' perspectives of when interim non-cancer diagnoses occur, how they impact a cancer diagnosis, and what could trigger their prompt review.

Design and setting

Interviews were conducted between March and November 2024 with 35 General Practitioners (GPs), 3 other clinicians, and 3 practice administrators from 31 general practices in Southern England, UK.

Method

Semi-structured interviews via videocall. Interviews were analysed using Framework Analysis.

Results

Participants reported that interim diagnoses occurred in cases of diagnostic uncertainty, especially when non-specific symptoms were attributed to common differential diagnoses. Remote consultations were thought to increase the likelihood of interim diagnosis by limiting information gathering. Interim diagnoses were suggested to delay cancer diagnoses, although this was not always seen as avoidable. Clinicians hoped to facilitate opportunities to make a cancer diagnosis by using safety-netting to encourage reattendance, and an informal rule of "three strikes and you're in". Colleagues providing a "fresh pair of eyes", discussing diagnostic uncertainty in the clinical team, and using past cases as learning opportunities were suggested approaches to facilitate prompt review of interim diagnoses.

Conclusion

Consistent safety-netting is required to ensure timely review of non-cancer 'interim' diagnoses when there is a possible underlying cancer diagnosis. The range of interim diagnoses and their impact on cancer diagnosis requires further quantification to inform interventions to mitigate their effect.

Keywords

General practice, cancer, diagnostic blind spots, missed diagnosis, qualitative research

How this fits in

- Previous research has shown that cancer diagnosis in primary care is a challenge due in part to undifferentiated symptoms being very common.
- Patients with undiagnosed cancer often present in primary care before the occurrence of specific cancer symptoms, which can lead to clinicians making 'interim' non-cancer diagnoses.
- The findings from this study showed that interim diagnoses are made through attributing non-specific symptoms to the most common differential diagnosis, leading, sometimes unavoidably, to a longer diagnosis journey for the patient.
- Strategies such as consistent safety-netting, an informal rule of three re-attendances triggering the review of a patient with unresolving symptoms and seeking the second opinions of colleagues were suggested as being helpful in limiting missed opportunities to diagnose cancer.

Interim non-cancer diagnoses may affect the time to cancer diagnosis for some patients, but effective communication between the GP, patient, and clinical team, alongside monitoring reattendance, can facilitate diagnosis in the shortest possible timeframe.

Introduction

Early cancer diagnosis is a priority as it is associated with reduced mortality, increased patient satisfaction, and reduced treatment costs (1-4). Most patients with cancer first present to primary care, and in many jurisdictions general practitioners (GPs) act as gatekeepers to secondary care (5, 6), prioritising patients for invasive, possibly distressing, and costly cancer investigation (7, 8). GPs are experts at assessing risk in patients, balancing slower interpretive reasoning with faster probabilistic 'heuristic' thinking when deciding who to refer for cancer investigation (9). However, they are having to manage many competing demands, including limited consultation time (10), managing patients with multimorbidity (11), and limited availability of point of care tests (12). Patients often present before specific and localising cancer symptoms have occurred (6, 7), making the many differential diagnoses that are more common in primary care logical possibilities, especially given the few available specific triage tests for cancer (13-15).

In many cases, diagnosis is iterative; GPs may make an initial non-cancer diagnosis that plausibly explains a patient's symptoms. If over time a cancer is diagnosed, the initial non-cancer diagnosis might be thought of as an 'interim' diagnosis that was made on the clinical information available at the time of consultation. Research indicates that concomitant conditions or symptoms that are readily explained by a more common non-cancer condition that becomes an interim diagnosis may be missed opportunities to start testing for and diagnosing cancer, and extend the time to diagnosis (16, 17). Extended time to diagnosis has been linked to poorer outcomes including survival (18) and so it is important to establish how interim diagnoses might be promptly reviewed, but research has yet to explore how interim diagnoses impact the selection of patients for cancer investigation and cancer diagnosis.

This study explores UK primary care providers' experiences of interim non-cancer diagnoses, their perceptions of them as missed opportunities to diagnose cancer, and ways that interim diagnoses might be promptly reviewed so that patients with an underlying cancer can be referred.

Method

Recruitment

Primary care providers involved in any aspect of patients' diagnostic pathway (including the administration or conduct of triaging, assessment, follow-up, and referral) were eligible to participate in the study. Roles could include GPs, practice nurses, allied health professionals working within the primary care team, and administrative staff, as research has shown that the wider team plays an important and active role in cancer detection (19). Invitations were emailed to practices by Thames Valley and South West Peninsula Clinical Research Networks. All participants were reimbursed for their time.

Participants

Table 1. Participant characteristics (n=41)

	Median	**IQR**
Age (years)	44	(37 – 51)
	N	**%**
Gender		
Male	23	56
Female	18	44
Ethnicity		
White	36	88
Asian	5	12
Role within practice		
GP	35	85
Other staff member	6	15
Region of practice		
Devon	17	41
Oxfordshire	13	32
Cornwall	6	15
Berkshire	4	10
Not recorded	1	2
Practice deprivation score[1,2]		
1 – 4	7	17
5 – 7	15	37
8 – 10	18	44
Not recorded	1	2
Practice size[2]		
5000 - < 12000	11	27
12000 - < 16000	11	27
16000 - < 19000	11	27
19000 - > 40000	7	17
Not recorded	1	2

[1] Deprivation score of 1 = most deprived, 10 = less deprived.

[2] Data collected from National General Practice Profiles.

Seventy-seven expressions of interest were received and 41 participants from 31 general practices were interviewed (Table 1). Thirty-six individuals submitted an expression of interest but were not interviewed because a completed consent form was not received within the study recruitment window (n = 27), consented but did not respond to invitations to be interviewed (n = 7), or declined the interview (n = 2). The median age of participants was 44 years (IQR = 37 – 51). Most participants were GPs (n=35, 85%), reported their ethnicity as White (n=36, 88%), and were male (n=23, 56%). Seven participants (17%) worked in practices with above average levels of social deprivation.

Data collection

Semi-structured interviews were conducted by videocall between March and November 2024 and lasted 28 to 62 minutes (median = 45 minutes, IQR = 41 to 49). A vignette (Box 1) was used to start discussions about situations where an interim diagnosis might lead to missed or delayed diagnoses to avoid participants feeling criticised about their own practice. However, some participants also shared their own experiences of interim diagnoses during the interviews.

The vignette was developed using interviews from a previous qualitative study (20). A topic guide (Supplementary Box 1) developed from the study aims and Patient and Public Involvement (PPI) group priorities, and informed by the Safer Dx Framework (21) was used during the interviews. The vignette was reviewed by three GPs, and both the vignette and topic guide were reviewed by the Patient and Public (PPI) advisory group.

Box 1. Vignette

Sami is 50 years old and works in IT. He presents to his GP with pain around his shoulders. He is otherwise fit and well. His GP prescribes non-steroidal anti-inflammatories for a muscle strain. He comes back for review because the pain is much worse and the treatment has not worked. He finds it hard to sit for long periods of time. Sami is referred for a chest x-ray, which comes back clear. His pain is ongoing and he notices that he has lost quite a bit of weight, which he thinks is the pain putting him off his food. Sami sees a different GP, who takes a detailed history and makes a referral for suspected cancer. Following all tests, he is diagnosed with secondary bone metastasis from kidney cancer.

Data analysis

Interviews were audio recorded and transcribed verbatim. Transcripts were checked against the audio recordings for accuracy and analysed using framework analysis (22). The first set of interviews were

coded by LR into anticipated and emergent codes in NVivo 14. These codes were grouped into initial themes that addressed the research questions and were discussed and refined during meetings with the research team and PPI advisory group. These themes formed a working analytical framework, which was used to code subsequent transcripts.

Reflexivity

Interviews were conducted by LR who has a PhD in Applied Psychology and experience conducting qualitative interviews. Participants were not known to him before interviews commenced. LR informed participants that he was a non-clinical researcher and that the purpose of the interviews was not to assess their clinical knowledge but to explore their understanding of interim diagnoses as missed opportunities to diagnose cancer.

Results

Three main themes covering how interim diagnoses happen, how they might impact cancer diagnoses and what helps and hinders their re-examination were generated in the analysis. Supporting quotations are attributed to the participant. Due to the small number of other clinical and administrative staff, we have grouped these into 'Other Staff Member' to protect the participants' anonymity.

Theme 1: How do interim diagnoses happen?

We derived two sub-themes around the use of probabilistic reasoning, and how interim diagnoses may be more likely when the GP's ability to gather information is limited.

Interim diagnoses as a product of complex pattern recognition

Participants described diagnosis as a process of evolving pattern recognition, where '*it's not always possible to diagnose everything on that first presentation*' (MODE 24, GP). Interim diagnoses could occur when the most likely cause of symptoms is attributed at the time of first presentation in cases of diagnostic uncertainty.

For example, participants discussed shoulder pain in a 50-year-old as an example of a complaint in primary care that would most likely relate to a musculoskeletal condition, especially given the lack of alarming symptoms and the age of the patient:

'I think if he was sixty, sixty plus I think you would have a much higher [lower] threshold probably for the cancer diagnosis earlier, but because he's fifty there's probably more that tendency to lean towards it being a musculoskeletal problem first rather than thinking about cancer as a first line.' (MODE 9, GP)

Participants discussed how pattern recognition based on a patient's presentation including their symptom(s) as well as social history could lead them to make a more common, benign interim diagnosis. This may be especially true if the GP has experience of the presentation pattern where the common, benign diagnosis was correct:

'I think [for] an experienced GP pattern recognition is very important, and that the pattern of benign pain is one that we see a lot, and that's why we talk about the notion of red flags, and so you know if someone in IT who is getting aching shoulders at the end of the day but with no other worries, the pattern is that this isn't concerning, at least at first.' (MODE 12, GP)

Limitations of remote consultations

Participants discussed how remote consultations and the limitations they place on the ability to gather information could affect the GP's pattern recognition and probabilistic reasoning. This could make an interim diagnosis more likely:

'…we're doing a lot of consultations over the phone, so I can see this being an over the phone consultation, very easy to go down the, the common things, the common route versus actually being able to do a physical examination on the patient.' (MODE 4, GP)

The main limitation was the inability to physically examine the patient, forcing clinicians to make a clinical decision based on the information that the patient chose to share:

'[patients] ring up and say, "I've just got this, just give me some antibiotics," but you've not listened to their chest, you can't tell if it's fluid, if it's crackles' (MODE 14, GP)

Theme 2: Impact of interim diagnoses on cancer diagnosis

Some participants shared their own experiences of interim diagnoses and how multiple, protracted investigations to try to verify the interim non-cancer diagnosis could prevent consideration of cancer as an alternative explanation for the patient's symptoms.

'[…] a 39-year-old person who came in with some just non-specific right upper quadrant pain, no other sort of red flag symptoms, […] my colleague quite rightly suspected potential gallstones, and the patient was put through for a routine ultrasound scan and the ultrasound scans showed some unusual sort of what they thought was cysts and suggested a CT scan, their CT scan still was unremarkable and they couldn't really see what it was, so they suggested an MRI. And whilst the patient was waiting for the MRI the pain worsened and they came in to see me again. […] It turned out that they had multiple metastatic liver lesions, and then also it turned out to be an undiagnosed pancreatic cancer that took sort of three or four months to get to that stage with the diagnosis' (MODE 8, GP)

Investigating the interim diagnosis, even if cancer was being considered, was described as delaying a cancer diagnosis when the investigations were carried out in different organs to the site of the cancer and came back as all clear giving false reassurance.

'[…] she was having pelvic pain, bloating, and heavy periods basically. […] She'd had I think one episode of rectal bleeding many months ago, which she thought was a haemorrhoid or a fissure, but hadn't had any more since, and we worked her up as kind of an abdo pelvic pain with query cause, so we'd done some urgent blood tests including a CA125 which is an ovarian tumour marker, and we'd done an urgent ultrasound to check her ovaries. […] that was all normal. The ultrasound came back normal, and I think she'd had a gynae exam with one of my female colleagues which was all fine. So we'd kind of were reassured that we couldn't find any pelvic cancer, […] then she came back, I think a few months

later and said, "Oh, I've had another episode of rectal bleeding," […] We'd done a Qfit test which is mandatory now for any colorectal referrals, which is looking for microscopic blood in their poo, but it came back positive […] in the end she had anal cancer.' (MODE 24, GP)

Interim diagnoses had the potential to facilitate or delay a cancer diagnosis, dependent on the investigation. One GP gave an example of when an interim diagnosis helped a cancer diagnosis be made by triggering investigations in the relevant organ.

'A patient had come in to see me basically with like left arm weakness that had been going on for a few months […] I basically was just really worried he'd had a stroke that had sort of hadn't been diagnosed, and I phoned up the stroke consultant with that in mind, and they got him in and did a scan, but I was almost certain he'd had a stroke but he'd actually has a, had a massive brain tumour. […] he'd actually had two or three contacts prior to seeing me, and had been diagnosed with other conditions, you know for example like carpal tunnel syndrome, causing weakness of his hand and grip strength.' (MODE 13, GP)

Theme 3: Re-evaluating an interim diagnosis

Much of the discussions covered what would prompt or prevent the re-evaluation of an interim diagnosis. Participants described ways of working that could prevent interim diagnoses misleading future clinicians, consultation patterns that suggested the interim diagnosis was not correct, and getting a fresh perspective.

Coding an interim diagnosis can make it appear certain

Participants discussed entering a diagnosis code into the patient's electronic health record (EHR) when there was uncertainty. They voiced concerns that coding could reinforce interim diagnoses and that these could '*follow them [patients] around*' (MODE 41, GP), potentially misleading clinicians and delaying an alternative diagnosis being made:

'[…] once things are coded and in the bold different coloured text they do feel fairly confirmed. So I think yes, I have come across these interim diagnosis [sic] that have misled and delayed the diagnosis.' (MODE 5, GP)

Some participants said that they would code the patient's symptoms rather than a diagnosis as these allowed consultations for the same problem to be linked. However, this approach could *'clog up the patients note'* (MODE 22, GP) and make the problem list chaotic:

'[…] that's where coding a symptom can sometimes be very helpful. It's, it does make your, the problem list sometimes a little bit chaotic, within EMIS but by coding a symptom it helps to group it, […] to collate all of that, those presentations together.' (MODE 4, GP)

Another approach described was to record the differential diagnoses they were considering and next steps in the free text to highlight the uncertainty for future consultations. Highlighting uncertainty was raised as important as it could be difficult to rethink an initial diagnosis unless there was a significant change in the patient's illness. This difficulty was increased if a more senior colleague had made the initial diagnosis:

'I think one of the hardest things in medicine is challenging an initial diagnosis. It's psychologically very difficult and very tiring to do to go back and say 'Did I get this right?' (MODE 30, GP)

'We do tend to just go along with what the initial, the initial clinicians said until or unless there's a massive change in the symptoms or signs.' (MODE 16, GP)

Safety-netting an interim diagnosis to facilitate re-evaluation

To minimise the potential harms of an interim diagnosis, participants discussed the need to provide clear and specific safety-netting advice if symptoms did not progress or resolve as expected:

'I would happily make a diagnosis of the mechanical pain and treat them for that. But then, what you would always do is safety net and say, look, if this does not get better with a combination of the anti-inflammatories then I'd normally advise people about rehab exercise and say that if in two to three weeks it doesn't get better or if at any point it gets worse […] then I would ask them to come back.' (MODE 30, GP)

Participants described giving safety-netting advice about timeframes in which the symptoms should resolve, or the prescribed treatment should work if the interim diagnosis was correct and concerning new developments to look out for. How actively patients were followed-up was described as dependent on how reliable or at risk the patient was deemed to be, as well as the GP's ability to complete the follow-up, for example if they were a locum GP:

[…] as a locum, sometimes you do move through practices a bit quicker and if there isn't that ability to follow them up with myself, […] usually I would send a message to the reception […] [or] that named doctor for that patient.' (MODE 4, GP)

One participant also mentioned, however, that despite intentions to safety-net patients wherever there was uncertainty, there may still be those for whom a cancer diagnosis following an interim diagnosis is unexpected:

'I made sure I safety-netted this patient against any sort of, you know, to come back if there's a change in circumstances. But these interim diagnoses they always come as a surprise, […] you weren't going out of your way that day to miss somebody's early, you know their, their cancer presentation.' (MODE 3, GP)

Patient initiated reattendance and the rule of three can trigger re-evaluation of an interim diagnosis

Participants discussed how reattendance could differentiate between correct initial diagnoses and ones that warranted re-evaluation and investigation:

'[…] what varies from sort of an interim diagnosis to a cancer diagnosis […] is if, if people re-present and are not improving' (MODE 1, Other Staff Member)

Participants discussed how they would revisit an interim diagnosis if a patient continued to reattend with the same symptoms, with some saying that reattendance would raise suspicion, and give an opportunity to "*really explore the symptoms and really question your initial diagnosis"* (MODE 36, GP).

A number of the participants highlighted an informal 'rule of three' where the third attendance for the same problem would trigger investigation:

'[…] if a patient comes back three times with a symptom then we'll refer, and so, three strikes and you're referred if you like.' (MODE 15, GP)

A balance between benefits of continuity of care and a fresh pair of eyes

Interviewees frequently spoke of how important continuity of care was for noticing subtle changes in the patient and for knowing what was unusual for their health. However, participants also discussed how when they saw patients on multiple occasions with the same symptoms or an ongoing condition, there was a risk that the clinician would '*assume it's the same as last time*' (MODE 23, Other Staff Member) with little or no critical reassessment. Some participants noted that making a final diagnosis relied on questioning the interim diagnosis and reconsidering the available information, for which a fresh pair of eyes could be beneficial:

'*[…] it's a, a privilege of general practice where we you know get to know people really well […] but then on another hand you wonder whether if you see the same person perhaps there's the possibility although others might disagree completely whether you get stuck in a diagnosis and it takes someone else to come in and maybe put the pieces together in a different way.*' (MODE 1, Other Staff Member)

The benefit of a second opinion was noted as allowing for the patient's symptoms to be examined '*from scratch'* (MODE 13, GP) by a clinician with different and perhaps more up to date knowledge, and without the impressions and biases of the previous clinician:

'However occasionally a fresh set of eyes is helpful. […] you know we all have these sub-conscious biases and one of your sub-conscious biases might be that you or your previous opinion was correct.' (MODE 5, GP)

A range of expertise within the clinical team also enabled different opinions to be obtained from clinicians with different knowledge. Participants discussed how patients presenting with common musculoskeletal symptoms, such as in the vignette, would be advised to see a First Contact Physiotherapist (FCP). FCPs were considered to safeguard against incorrect interim diagnoses:

'First contact physio would be, ours are very good […] [if] they think there's something not MSK going on, […] then they will bounce it back in to see their own GP.' (MODE 39, GP)

Knowledge-sharing can alert practitioners to possibility of cancer

Many participants spoke of the importance of having opportunities to share uncertainties and learn from past cases to improve timely diagnosis of cancer, including having practice meetings to discuss missed diagnostic opportunities so that future similar presentations would be viewed with more suspicion:

'*That's a really useful thing because […] we all learn from it and the next time a patient comes in with that symptom it does immediately something triggered in your brain*.' (MODE 15, GP)

One clinician mentioned using materials from a cancer charity to increase awareness of when patient characteristics should reduce the GP's confidence in making a benign interim diagnosis:

'[…] *they [ovarian cancer charity] just sent out little pens with like pull out reminders about ovarian cancer red flags, and like there's this big thing about don't diagnose IBS or irritable bowel syndrome in women over the age of 50 without excluding other causes such as ovarian cancer*.' (MODE 13, GP)

Some participants highlighted the difficulty of learning from delay caused by interim diagnoses where no clinical mistakes were made. However, knowledge sharing was viewed positively and suggested to inform clinical practice:

'So, I often I've come out of those meetings and thought, what's the point of that then? There is a huge point in that […], [discussion] sharpens your mind and it keeps your clinical brain in check. […] the key is not to allow that discussion to in time make you think everybody who has got rectal bleeding now has to have colorectal cancer and needs all the tests in the book. That's the balance.' (MODE 28, GP)

Discussion

Summary

Participants described interim diagnoses as occurring via complex pattern recognition process, opting for the most likely cause especially when alarm symptoms suggesting cancer are absent. Remote consultations were suggested to increase the likelihood of making interim diagnoses by limiting the information available to GPs, particularly the absence of physical examination. Participants suggested that entering a diagnosis code for the interim diagnosis into the patient's EHR coding increased certainty in it and could discourage clinicians from considering alternative diagnoses. A 'fresh pair of eyes' were suggested as helpful when reconsidering how well symptom patterns fit with the interim diagnosis. To mitigate some uncertainty, participants provided patients with clear and specific safety-netting advice and timelines to ensure that they returned within a suitable timeframe. Patients reattending with the same symptoms increased clinicians' suspicions and an informal rule of three where the third consultation would trigger a referral was discussed. Opportunities to discuss uncertainties in diagnoses increased awareness of alternatives to interim diagnoses.

Strengths and limitations

We sought to recruit a varied sample and to include the views of the wider, clinical and non-clinical, primary care team who play a role in the gathering, processing, and communication of information within the practice and with patients. This was achieved for participant ages and geographical locations. However, years in practice was not collected and most participants were White GPs working in practices with relatively low deprivation. The experiences described may therefore not reflect those of all primary care staff, particularly those from other ethnicities or working in highly deprived areas. A small number of participants noted the difficulty of discussing interim diagnoses using a fictional vignette with a known outcome, as consultations are often complex and play-out over time. Knowledge of the eventual cancer diagnosis may also have limited discussion of scenarios in which cancer would not be considered. However, participants were aware that the study focused on interim diagnoses' impact on cancer diagnoses, and much discussion concerned how diagnoses evolve as new information emerges; we therefore do not believe that this substantially affected discussion quality. Much of the discussion on how interim diagnoses come about and how they might impact cancer diagnoses were based on clinicians' recollections of past patients and so could be vulnerable to recall bias.

Comparison with existing literature

Our findings align with research highlighting the GP's role in some diagnostic delays, including failure to consider cancer or dismissal of it as a differential diagnosis, potentially due to premature diagnostic closure. Contributing factors include limited information gathering, incomplete history taking, the absence of physical exam, anchoring to prior diagnoses, and availability or confirmation biases (23). Pattern recognition and heuristics are also often relied upon to make a quick assessment of incomplete clinical information in high-volume time-limited primary care (24). While these approaches often lead to correct diagnoses because symptoms commonly reflect benign causes, they may also produce, as described herein, interim diagnoses that may delay identification of an underlying cancer. Our study adds to the evidence supporting robust safety-netting processes to encourage re-attendance and review of cases that do not progress or resolve as expected (25, 26).

Continuity of care has been associated with improved GP-patient communication and recognition of subtle changes in the patient (20, 27-29). Our participants suggested that a 'fresh pair of eyes' or obtaining a second opinion is helpful to (re)considering cancer as an explanation for symptoms, avoiding attribution of progressing or treatment-resistant symptoms to a previous or interim diagnosis, and to prompt re-examination where the GP might be anchored to these. The literature supporting this finding is mixed with relational continuity of care in patients with ongoing health conditions shown to result in timely diagnosis of some cancers, but slightly delays for others (29-31).

Implications for research and/or practice

Given the low prevalence of cancer in primary care, clinicians described taking a proportionate response when consulting with patients with symptoms relating to several differential diagnoses. Participants referred to a 'three strikes and you're in' rule to guide referral decisions. Recently a '3 strikes and rethink' approach has been formalised in Jess's Rule, an initiative led by NHS England and the Department of Health and Social Care and endorsed by the Royal College of General Practitioners (32) following the tragic case of Jessica Brady, who consulted multiple GPs multiple times before being diagnosed with stage 4 adenocarcinoma with an unknown primary (33). While our findings support the clinical relevance of this rule of thumb, patients at increased risk of delayed diagnosis are also more likely to struggle to attend and miss GP appointments (34). Requiring the patient to consult multiple times could therefore worsen health inequalities. Evaluation of the unintended consequences and effectiveness is needed.

Consistent, agreed ways of using the EHR could reduce potential harms of interim diagnoses and support the robust assessment of their impact on cancer diagnoses. Participants reported avoiding entering a diagnosis code into the patient's EHR if there was uncertainty, consistent with research reporting GPs being reluctant to code when uncertain (35), preferring instead to code patient

symptoms (36). In these studies and our own, recording differential or uncertain diagnoses into the free text of the patient's notes was viewed as highlighting the lack of certainty. Similarly, the use of EHR to support safety-netting varied from a basic record of the advice, to diary reminders and notes to colleagues to ensure the patient was followed-up thoroughly. Consistent use of the EHR can support effective safety-netting (37), and agreed ways of recording diagnostic uncertainty could also help to limit the harmful impact of interim diagnoses on cancer diagnoses. As free text data is not typically available in clinical research databases, studies investigating interim diagnoses are likely to miss the potentially significant proportion recorded in the free-text, limiting our understanding of both their prevalence and impact. Research examining free-text data is needed to establish how uncertainty might be coded consistently, and how free-text data could be safely provided to researchers.

Practice-level interventions to facilitate learning about interim diagnoses using individual case review during practice meetings could facilitate the reassessment of interim diagnoses (38). Such approaches could promote a culture of openness within the clinical team and with patients in situations where there is uncertainty, encourage the constructive discussion of information gathering and clinical reasoning, and could increase awareness of common scenarios in which interim diagnoses prolong time to cancer diagnosis (39).

As one participant noted, it may not always be possible to diagnose cancer at the patient's first consultation. However, careful safety-netting, information sharing within the clinical team, and clear EHR documentation may help to minimise the impact of interim diagnoses on time to cancer diagnosis.

Additional information

Patient and Public Involvement (PPI)

A PPI Advisory Group of seven individuals with related personal experience reviewed the Vignette used in interviews and took part in analysis and interpretation of findings.

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Ethical approval

This study was approved by Medical Sciences Interdivisional Research Ethics Committee, Central University Research Ethics Committee 1, Ethics Approval Reference: R89542/RE001.

Competing interests

The authors have declared no conflict of interests. CFS and BDN are co-investigators of the NIHR Policy Research Programme Unit on Cancer Awareness, Screening and Early Diagnosis (reference PR-PRU-NIHR206132). The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

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