

## Infection in older adults:

a qualitative study of patient experience

### Abstract

#### Background

Infection is common in older adults. Serious infection has a high mortality rate and is associated with unplanned hospital admissions. Little is known about the factors that prompt older patients to seek medical advice when they may have an infection.

#### Aim

To explore the symptoms of infection from the perspective of older adults, and when and why older patients seek healthcare advice for a possible infection.

#### Design and setting

A qualitative interview study among adults aged  $\geq 70$  years with a clinical diagnosis of infection recruited from ambulatory care units in Oxford, UK.

#### Method

Interviews were semi-structured and based on a flexible topic guide. Participants were given the option to be interviewed with their carer. Thematic analysis was facilitated using NVivo (version 11).

#### Results

A total of 28 participants [22 patients and six carers] took part. Patients (aged 70–92 years) had experienced a range of different infections. Several early non-specific symptoms were described (fever, feeling unwell, lethargy, vomiting, pain, and confusion/delirium). Internally minimising symptoms was common and participants with historical experience of infection tended to be better able to interpret their symptoms. Factors influencing seeking healthcare advice included prompts from family, specific or intolerable symptoms, symptom duration, and being unable to manage with self-care. For some, not wanting to be a burden affected their desire to seek help.

#### Conclusion

Tailored advice to older adults highlighting early symptoms of infection may be beneficial. Knowing whether patients have had previous experience of infection may help healthcare professionals in assessing older patients with possible infection.

#### Keywords

aged; frail elderly; infection; qualitative research.

### INTRODUCTION

The global population is getting older. By 2050, 22% of people will be aged  $>60$  years, nearly double the number recorded in 2015.<sup>1</sup> Older adults commonly present with acute infection; unscheduled admissions with pneumonia and urinary tract infection diagnoses have increased significantly over the last 15 years.<sup>2,3</sup> Serious infection in this age group is associated with functional decline and increased mortality,<sup>4–9</sup> and early treatment in secondary care is associated with improved outcomes.<sup>10,11</sup> Therefore, it is important to be able to diagnose and treat infection in older adults in an accurate and timely manner.

However, recognising infection in older patients can be difficult as a result of atypical presentations and non-specific signs.<sup>6,12</sup> GPs have said that they find diagnosing infection in older adults challenging and are often uncertain about the diagnosis.<sup>13</sup> They have described a number of strategies to manage this diagnostic uncertainty,<sup>13</sup> including using trials of oral antibiotics.<sup>14</sup> GPs have also described an emotional burden associated with uncertainty, particularly for less experienced clinicians.<sup>15</sup>

To add to this challenge, older adults are less likely to report symptoms of infection.<sup>16,17</sup> Little is known about the older adult illness experience in infection nor the cognitive processes that older adults and/

or their carers go through when faced with symptoms of infection.

Being better able to understand the earliest manifestations of serious infection in this population and their rationale for seeking health care may help GPs cope with this diagnostic challenge and support patients to seek health care appropriately. This study uses a qualitative approach to explore the symptoms of infection from the perspective of older adults, and when and why older patients seek healthcare advice for an infection.

### METHOD

#### Recruitment

Older adults aged  $\geq 70$  years with a clinical diagnosis of infection and capacity to consent to an interview were recruited from three ambulatory care units in Oxford. These patients had been escalated from a primary care environment for same-day acute medical assessment and, as such, had a potentially more severe illness.

Sampling was purposive, with an attempt to recruit people across the older age spectrum from different units, with different infections. Potential participants were approached by clinical team members involved in their care. Consent was sought from interested parties for the research team to contact them about the study. Researchers telephoned these potential

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## How this fits in

This study aimed to understand the illness experience and factors that prompt older patients to seek medical advice when they have an infection. Early non-specific symptoms of infection in older adults are described from the patient perspective. Participants with historical experience of infection tended to be better able to interpret their symptoms. Knowing whether patients have had previous experience of infection may help healthcare professionals in assessing older patients with possible infection.

participants within 2 weeks of their clinical contact. If participants agreed to take part, an interview date was arranged within 6 weeks of contact with the research team. There was no monetary incentive to participate.

Recruitment was ongoing until the study team agreed that data saturation had been reached. Data saturation was defined as no amendments to the topic guide, no new codes, and no new significant themes for several consecutive interviews.<sup>18</sup> In addition, analysis had begun and through this the study team believed that there was sufficient explanatory power for the emerging issues.

## Data collection

Two researchers (an academic clinical fellow/GP trainee and a salaried GP/researcher) who were both trained in qualitative methods conducted the interviews in participants' homes. The researchers did not know any of the participants. Interviews were carried out between March 2017 and August 2018.

All participants were told the aims of the study and gave written informed consent before the interview. All participants were given the option to invite a carer to contribute to the interview. Participants were asked to talk about their most recent experience of infection. Interviews were semi-structured following a flexible topic guide developed and piloted by the research team (see Supplementary Box 1 for details). The topic guide was initially constructed with some a priori issues based on the team's clinical experience, existing literature,<sup>19,20</sup> and a previous interview study with GPs,<sup>13-15</sup> which oriented the two interviewers to broad areas around the experience of infection. However, at all times during the interviewing process the participants had the opportunity to raise issues of their

own, in their own words. Consequently, the topic guide evolved during the study period following team discussions of emerging themes.

Interviews lasted 40-60 minutes, and were audio-recorded and transcribed verbatim by a professional transcriber. Field notes were made by the researchers after the interviews.

## Data analysis

A pragmatic approach to thematic analysis was used.<sup>21</sup> Coding and analyses of the data were completed by two authors using NVivo (version 11) to support data management. The interview transcripts were open coded, with initial double coding to check for consistency between the two authors. Related codes were combined to create categories. Material in the categories was subsequently reviewed for explanation, before looking at how the categories combined to support emerging narratives. Earlier interviews were re-coded in the light of ongoing analysis and early analysis brought out topics that were added to the topic guide.

Two researchers established an audit trail from the raw data of the interview transcripts through coding to development of themes to ensure dependability. The research team discussed the initial coding framework, as well as ideas for categories emerging from the data, and subsequently the final themes to ensure their credibility and confirmability. Group meetings were also used to reflect on personal experience and field notes to improve reflexivity.

## RESULTS

### Sample

A total of 35 eligible patients who were approached agreed to be contacted by the study team; 22 patients consented to participate and were interviewed, six of them with a carer, making a total of 28 participants (Figure 1). Patient participant characteristics are summarised in Table 1.

### Analysis

Themes emerging from discussion with participants about the initial presentation of their recent infection are summarised in Box 1 and are explored in more detail throughout the paper.

### Theme 1: Symptom experience

Early symptoms of infection described by most participants included fever or rigors, feeling generally unwell, lethargy, vomiting, and pain. However, combinations of symptoms and reported symptom severity

## Box 1. Themes and subthemes emerging from discussion about initial presentation of recent serious infection

### Symptom experience

- Fever
- Feeling unwell
- Lethargy
- Confusion/delirium
- Nausea, vomiting, or loss of appetite
- Pain
- Symptoms specific to infection source

### Interpreting symptoms

- Previous experience
- Minimising symptoms

### Seeking healthcare advice

- Influence of family/friend
- Tipping points

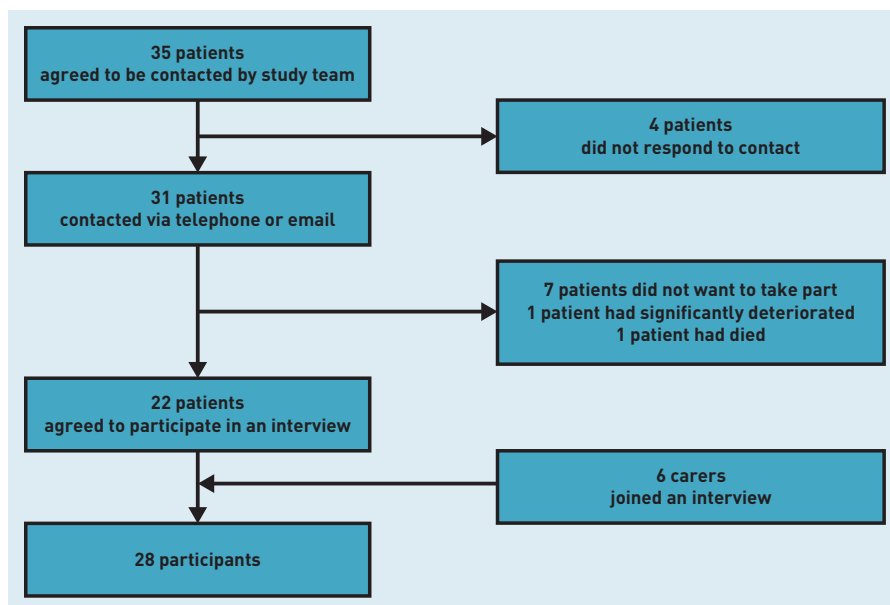


Figure 1. Recruitment of 28 participants to interview.

varied between participants and infection type.

Carers who participated in interviews were able to help describe the illness experience of the participant. Some

corrected the timeline of events, some prompted forgotten symptoms, and some helped fill in gaps in memory, particularly if the participant had been delirious or confused during the infection. Several carers brought out symptoms that participants had underplayed:

*'I, I think, my husband will have to tell the exact, exactly what happened. From my point, because we, we tend to differ.'* (Participant [P]4, female [F], aged 75–79 years, chest infection)

**Fever.** Many participants noticed a fever as one of the first symptoms of their recent infection, and an early indicator that something was wrong. Some participants described feeling at the extremes of temperature or noticing that they were sweating. Others described shivering or shaking:

*'I felt cold all day. I just didn't seem to feel warm and good... I didn't feel at all good and we came home about 7 o'clock and I was just shaky and shivery, and I went straight*

Table 1. Characteristics of patient participants

Patient ID	Sex	Age, years	Diagnosis	Social circumstances	Number of long-term health conditions (self-reported)	Number of medications (self-reported)	Carer present in interview
P1	F	70–74	Cellulitis	Lives alone with local family support	1	5–9	N
P2	F	80–84	RTI	Lives with child	1	1–4	N
P3	F	>90	RTI	Lives alone with local family support	2	1–4	N
P4	F	75–79	RTI	Lives with partner	1	1–4	Y
P5	M	75–79	Cellulitis	Lives with partner	2	1–4	Y
P6	M	70–75	Cellulitis	Lives with partner	1	1–4	N
P7	F	>90	UTI	Lives alone	1	5–9	N
P8	F	70–74	RTI	Lives alone	3	10–14	N
P9	F	75–79	UTI	Lives alone	0	1–4	N
P10	M	70–74	IECOPD	Lives with partner	1	1–4	Y
P11	M	70–74	RTI	Lives with partner	1	5–9	N
P12	M	80–84	RTI	Lives with partner with local family support	1	10–14	Y
P13	F	75–79	RTI	Lives with partner	1	1–4	N
P14	M	80–84	IECOPD	Lives with partner	3	5–9	Y
P15	F	70–74	Abscess	Lives with partner	0	1–4	N
P16	F	70–74	RTI	Lives alone	2	1–4	N
P17	M	70–74	Cellulitis	Lives alone	0	10–14	N
P18	M	80–84	UTI	Lives with child	3	5–9	Y
P19	F	70–74	Cellulitis	Lives with partner	2	≥15	N
P20	M	75–79	RTI	Lives with partner	1	5–9	N
P21	M	85–89	Gastroenteritis	Lives alone with local family support	2	5–9	N
P22	F	70–74	Abscess	Lives with partner	0	1–4	N

F = female. IECOPD = infective exacerbation of chronic obstructive pulmonary disease. M = male. N = no. P = participant. RTI = respiratory tract infection. UTI = urinary tract infection. Y = yes.

to bed.’ (P10, Male [M], aged 70–74 years, infective exacerbation of chronic obstructive pulmonary disease [IECOPD])

However, few participants reported actually measuring their temperature. Some felt that a measurement was unnecessary and others said that they did not own a thermometer, or that their thermometer was broken.

Some participants reflected that they ought to own a thermometer to be better prepared in the future:

*‘I haven’t got a thermometer to know but you know when you’ve got a temperature.’* (P13, F, aged 75–79 years, respiratory tract infection [RTI])

**Feeling unwell.** Feeling generally unwell was another commonly reported early symptom of illness. When probed, participants further described this experience by using negative language — ‘dreadful’, ‘rotten’, ‘awful’ — or by citing specific symptoms, which are outlined below, or symptom combinations. Some carers also described their family member as ‘generally unwell’ at the onset of their infection:

*‘My partner is not one for complaining unless there’s something wrong and he was feeling unwell and I could see that he was unwell by his general demeanour and yes just saying, “I really don’t feel well” and I thought, “No, you are not well.”’* (F carer of P14, M, aged 80–84 years, IECOPD)

**Lethargy.** Many participants described extreme tiredness as one of the first symptoms of illness. For some this meant feeling weak, some lost motivation, and others said they could not manage their usual activities.

Some participants described going to bed when they felt lethargic or falling asleep more readily:

*‘If I say mobility, it didn’t stop me from moving around. It stopped me from moving around at the pace that I was used to. I couldn’t be bothered. I felt lethargic. Everything was an effort. Everything was an effort. Going to bed. Getting up. Everything was an effort.’* (P16, F, aged 70–74 years, RTI)

**Nausea, vomiting, or loss of appetite.** Several patients noticed nausea or vomiting early on in the illness. Some participants also noted that they did not want to eat, or that it was a struggle to eat

the food that they were offered while they were unwell. One participant felt that this was a marker of the severity of the illness:

*‘I could tell when it had turned to something worse which was after 2 weeks, I, immediately you can’t eat easily. It makes you feel you can’t, you don’t want to eat say for a week after.’* (P13, F, aged 75–79 years, RTI)

**Pain.** Pain was sometimes described as an early feature of an infection. For some, it was general myalgia, others had a headache, and some participants experienced more localised pain at the site of infection. Pain was often described as severe:

*‘I had, had, had the most excruciating pain. Feel as if I’ve been kicked by a horse.’* (P4, F, aged 75–79 years, RTI)

**Confusion/delirium.** Some participants described ways in which their cognitive function was altered as part of the infective process. A spectrum of confusion was described. Some participants described the events of the illness as a ‘blur’ or a ‘haze’, which made it difficult to recollect exactly what had happened. Others talked of feeling muddled or not in control of themselves while they were unwell. One participant was able to describe the frightening visual hallucinations she experienced when delirious:

*‘This awful gunge was just seeping through, through the walls and, and everywhere I looked and, and then when I, I tried to walk and I looked down and there were rows and rows and rows of minute creatures lying on the ground, just like, like little bed soldiers ... There, there were tigers, there were all sorts of queer animals that I couldn’t, I have no idea now what they were but they, rows of almost like little sausages. Just all in a row, lined up like that. Couldn’t put my feet anywhere and I was sitting on this roundabout just going round and round and round.’* (P7, F, aged >90 years, urinary tract infection [UTI])

**Symptoms specific to infection source.** Some early symptoms were specific to particular infection sources. RTIs and IECOPD were associated with shortness of breath and cough. The duration of the cough was notable and marked the illness out as significant. Excessive sputum or sputum changing colour was also remarked on. Any difficulty in breathing tended to cause panic in those who experienced it. One participant

was able to articulate what being short of breath felt like for him:

*'Well, it's like sort of, you're struggling to breathe and it's almost like you're breathing through cotton wool, you know, [makes a sound] and it's not wheezing. It's, it's, yeah, it's like breathing through cotton wool.'* (P11, M, aged 70–74 years, RTI)

Cellulitis and abscesses were distinguished by significant pain, swelling, and redness at the infection site. The only indicator of illness for one patient with a UTI was the presence of visible haematuria.

## Theme 2: Interpreting symptoms

**Previous experience.** Participants cross-referenced symptoms in their most recent illness with other experiences of infection. Participants with experience of similar infections were able to compare with previous illness trajectories and note any deviation:

*'The cough was bad and I was comparing it to, I'd had the similar symptoms but not anything like so severe in September, just a couple of months before. But I had pneumonia before 8 years ago and that was handled quite differently at that time.'* (P13, F, aged 75–79 years, RTI)

Participants with experience of recurrent severe infection or sepsis were better able to interpret their symptoms. These 'expert patients' were more cautious and tended to act quickly on early symptoms:

*'Well, I've had three episodes this year of flare-up of E. coli and it has manifest itself by the rigors ... They're a new beastie to me but I've learnt to identify them which is when I'm very cold, very shaky, and very ache-y. Almost insupportably so ... But I know now and the nurses have told me, that if I get that, I've got to get intervention quickly because that for me is a trigger, which shows that there's an onset of infection.'* (P19, F, aged 70–74 years, cellulitis)

However, some participants with chronic lung disease found it harder to know when they were unwell, even if they had had multiple previous exacerbations, due to persistent baseline symptoms:

*'I mean, well look at this way, I'm puffy [short of breath] most of the time. I might get a little bit more puffy but I don't, can't relate the two to having pneumonia, you know what I mean?'* (P12, M, aged 80–84 years, IECOPD)

Participants who had no previous experience of infection or no similar infections found it harder to interpret symptoms. For this reason, some participants were only retrospectively able to identify things that they had experienced as part of the infective process. Others were aware that they were unwell, but not that their illness was serious or was likely to progress.

**Minimising symptoms.** Some participants internally played down their symptoms, initially explaining them away as something minor or relating them to a pre-existing condition. For some participants this resulted from an optimism that things were going to get better, whereas others described themselves as having a stoical attitude. Some participants said they did not want to admit to themselves that they were unwell:

*'I was sweating a lot, enough to damp the bed and my jim jam top. But mouth was dry. But it was that damp ... Never would have thought, just thought somebody had turned the radiators up.'* (P8, F, aged 70–74 years, RTI)

*'You know, I automatically come to conclusions that it's, it's an existing problem rather than some, a new one. 'Cos I think you know, "Well, there, there, there aren't any new ones that I could have."''* (P5, M, aged 75–79 years, cellulitis)

Some participants felt that minimising symptoms was typical of their generation, although many participants did not consider themselves an older person:

*'I think old people in general seem to think, "Oh, couple of days and I'll be as right as rain", but you're not always.'* (P10, M, aged 70–74 years, IECOPD)

*'I still think of myself as a, you know, young, young at heart anyway. No, no and it comes as a bit of, as a bit of shock to read, "this elderly lady" ... or, you know, as the paramedics said, you know, "Can we admit this elderly lady?"'* (P15, F, aged 70–74 years, abscess)

Several participants described how having the infection had made them feel their age and become aware of their own mortality for the first time:

*'I don't, I don't feel old. I mean, I have these last 4 weeks, I've looked old and obviously lost loads of weight but no, normally I don't feel [age].'* (P22, F, aged 70–74 years, abscess)

In contrast, there were some participants who were anxious about their symptoms at onset. This was more common in those who did consider themselves to be older people and were aware of the physiological limitations of their body. As a result, these participants were more cautious of early symptoms or were aware that illnesses would take longer to get over:

*'Yeah, as you get ol-, older you think, "Well, OK, I'm not taking any chances with this. Here we go."'* (P4, F, aged 75–79 years, RTI)

*'Well, I think it's ... I think it takes longer to, to get over things nowadays. And, you know, and, and, and I can understand that and accept it.'* (P5, M, aged 75–79 years, cellulitis)

### Theme 3: Seeking healthcare advice

*Influence of family/friend.* Many participants described being prompted by a family member or friend to seek advice from the GP. Some family/friends were said to be more concerned than the participant about their illness. Some participants sought advice from specific acquaintances if they were employed in the healthcare sector:

*'She just looked at me and said, "Oh Mum, you really are poorly, have you phoned the doctor?" and I said, "No," I said, "I thought I might leave it until tomorrow." She said, "No, I think you ought to phone the doctor now", and I did.'* (P16, F, aged 70–74 years, RTI)

Some participants identified that others may be able to better recognise illness than they were themselves. Their ability to notice deviation from the norm was also acknowledged by some of the participating carers:

*'Because she [daughter] can see it whereas I can't. It's so gradual, I don't take any notice and every time she does that, I ends up in hospital.'* (P8, F, aged 70–74 years, RTI)

*'I know what normal is. If it deviates from normal, then, you know, you ought to get Dad some assistance to try and help him.'* (M carer of P18, M, aged 80–84 years, UTI)

*Tipping points.* Most participants recognised at some point during their illness that they needed to seek professional help; however, this was balanced against the desire not to be a burden on the healthcare service or risk wasting a doctor's time:

*'But it is, they're very busy people and you don't want to be one always turning up and are you really ill or not, you know. It's very tricky to decide for yourself if you're really ill.'* (P13, F, aged 75–79 years, RTI)

Some participants (both patients and carers) cited specific symptoms as their reason for seeking help. These were either extreme or intolerable, a visible marker that something was wrong or something that they had previously experienced or had been told to act on:

*'I always know when he sort of goes a bit grey and he's gasping for his breath and he just can't get his breath. That's when I know to get help.'* (F carer of P12, M, aged 80–84 years, chest infection)

Some participants described self-monitoring some of their vital signs and using measurements as a prompt for seeking help. In particular, some participants with chronic lung disease had an oxygen saturation probe for use at home. One participant had been advised to do this and been given thresholds by his secondary care team:

*'I monitor my sats [peripheral oxygen saturation], blood pressure. Blood pressure was all right but the sats were dropping. Normally, I've checked back through my records and it's 96/97/98 and it was down 90. I think when I went to see the doctor it was 91.'* (P11, M, aged 70–74 years, RTI)

Another participant purchased an oxygen saturation probe after experiencing an infection because of the concern expressed by his GP at the time of his examination. This participant hoped it would prompt him to seek help earlier in the future.

Some participants described waiting for a certain length of time to see if their illness would get better without any professional input. The delay ranged from a few hours to a few weeks, and this was frequently influenced by previous experience of infection or modified by any symptom progression. In particular, symptoms that worsened after an initial period of improvement were a prompt to seek advice:

*'So, I sort of got to a stage where I was sort of saying 90% better and then that, that was, that stayed at that level and then suddenly it started to go back down again.'* (P11, M, aged 70–74 years, RTI)

Reasons cited by participants for the delay in seeking healthcare advice included the belief that they were already getting better, the belief that the illness would get better at some point, the belief that they could manage their infection themselves, or not wanting to bother healthcare professionals. In hindsight for several participants, including carers, the delay was a source of regret:

*'I think based on what I've been through, and as I say, going back and looking, I wouldn't have left it so long because I virtually went for a week, you know. I wouldn't have left it so long before actually went to a doctor.'* (P22, F, aged 70–74 years, abscess)

*'I mean we, we thought he was all right 'cos he could struggle about. And I think I was wrong 'cos I didn't do anything. I just, he just went back to bed.'* (F carer of P5, M, aged 75–79 years, cellulitis)

Some participants described seeking help only when they or their care network were no longer able to manage a certain symptom themselves and/or when self-initiated treatments had failed (including homely remedies, nebulised therapy, and rescue antibiotics/steroids):

*'I try, if I've got antibiotics and steroids I'll go on them which I didn't have this last time. That's why I had, had to see the doctor. But normally I just carry on and get on with it.'* (P8, F, aged 70–74 years, RTI)

Having previously experienced an infection (as described in the 'Previous experience' section under 'Theme 2: Interpreting symptoms') gave participants a reference point to know when things were no longer manageable.

## DISCUSSION

### Summary

Older people experience a range of non-specific symptoms at the onset of infection. Having a fever and feeling generally unwell were the most commonly reported earliest symptoms of infection among study participants. Having previous experience of a similar infection was helpful in accurate self-assessment; participants without such experience had trouble recognising that they were unwell. Severe or intolerable symptoms, prolonged duration of symptoms, or no longer being able to self-manage acted as triggers for seeking healthcare advice, although a prompt from family or friends was sometimes necessary.

### Strengths and limitations

To the authors' knowledge, this is the first study to describe the earliest symptoms of infection in older adults from the patient perspective, and to provide insight into their impact and sometimes disabling nature. Qualitative analysis has allowed in-depth exploration of the topic with this usually under-represented group in research.<sup>22</sup>

However, there are some limitations when considering the transferability of the results. The study sample includes more participants at the younger end of the older spectrum, probably because younger, less frail people were more likely to agree to participate in research. The apparently low proportion of participants with multiple long-term conditions may be a result of reporting error. The study relied on patient recall of health problems and medication because the study team did not have access to the clinical record. In addition, by design none of the participants had a significant cognitive impairment; to be included participants needed to have capacity to consent to the interview. This is because the authors were interested in the experience of the symptoms of the infection; therefore, participants needed to be able to recall and describe these. Despite these limitations, the views of people with more advanced age, multimorbidity, and polypharmacy are captured among the sample (Table 1).

The interviews were conducted with the patients and their carers together. This meant that they produced a shared account of the recent infection and of related issues, where discrepancies did not always emerge. Given the small numbers and the co-created accounts, it was not possible to analyse the carers' views separately.

This study recruited from one local area and only from ambulatory care units. The study was designed to capture the experience of patients with more severe infections (requiring more than just oral antibiotics and observation from the home or primary care setting), while targeting those patients more likely to be able to give an account of their symptoms in a reasonable timeframe from their diagnosis. The diagnosis of infection was a clinical one, rather than based on test results (which the study team did not have access to), although from their accounts many participants did have tests carried out. The experiences of the sample may not be transferable to those with severe infections requiring immediate inpatient or critical care. That said, two participants had previously been admitted with sepsis and were able to discuss this during their interview.

Finally, both interviewers are GPs, which may have influenced how participants responded to some questions, particularly relating to care from their own GP. However, the importance of being honest was emphasised at the start of the interview and the data demonstrate that participants felt able to be critical of services, including their GP surgery.

### Comparison with existing literature

Existing qualitative studies in adults (aged 21–89 years) with a recent hospital admission for infection,<sup>23</sup> and older adults (aged 61–81 years) with a recent radiographic diagnosis of community-acquired pneumonia,<sup>24</sup> have described symptom interpretation and health-seeking behaviour, but did not present findings on specific symptoms or symptom burden. A review of ageing and infection highlights the non-specific nature of symptoms of infection in older adults (including falls, delirium, anorexia, and generalised weakness), although the cited literature comes from their presentation to secondary care, rather than at symptom onset.<sup>13</sup>

As patient responses to symptom interpretation were analysed, it became evident that the patients in the present study sample fell into two categories — the infection ‘naïve’ and the infection ‘experienced’ — based on previous experience of a similar significant infection as an older adult. Patients who were categorised as infection ‘naïve’ tended not to associate early symptoms with infection and were sometimes not aware of the significance of these symptoms until their infection had resolved. Such participants tended to only seek help if they had severe or intolerable symptoms, a very prolonged illness, or were unable to self-manage. In contrast, the patients considered to be infection ‘experienced’ tended to recognise and act on symptoms earlier in the infection process, especially if they had previous complications related to severe infection. This is similar to behaviour in the ‘naïve’ and ‘experienced’ groups described by Tonna *et al*<sup>23</sup> among adults of all ages with infection.

However, in the present study some participants with chronic lung disease did not fit the ‘experienced’ category because their chronic respiratory symptoms made new or worsening symptoms harder to recognise. For several such participants, a close family member was reported to be better at picking up an infection than the affected individual. Several participants with chronic lung disease also had access to ‘rescue’ medication that they could

initiate themselves, which could alter the point at which they accessed healthcare advice. The same pattern of behaviour may also be true of patients with other chronic diseases. For example, in a study exploring the experience of UTIs in patients with indwelling catheters, participants talked of not knowing when they were unwell as a result of their comorbidities and delaying advice for a few days while they actioned self-care strategies.<sup>25</sup>

Kelly *et al*<sup>24</sup> described the complexity behind the treatment-seeking delay of older participants with pneumonia in their study. They identified three phases to the delay: is something wrong? (appraisal challenges); do I need medical help? (accepting unwell but trying self-care/monitoring); and do I need medical help right now? (overcoming barriers or personal thresholds for seeking help). Interestingly, participants in their study said that they would likely delay again in similar circumstances, whereas the participants in the present study felt that they would learn from their recent experience and wanted to do things differently next time.

### Implications for research and practice

Interpreting the early non-specific symptoms of infection is challenging for older adults and their carers, and previous experience of infection influences the ability to interpret and act on symptoms in a timely manner. Tailored advice targeted to particular groups of older adults (infection naïve, first episode of infection, people with chronic lung disease or other chronic diseases) may improve recognition of future infection episodes and reduce delays in seeking advice.

The results of this study suggest several targets for intervention. First, older adults who are infection ‘naïve’ may benefit from tailored public health advice. This could cover the non-specific and specific signs and symptoms of infection in themselves or those they care for, as well as dispelling the perception of being a ‘burden’ to the health service and encouraging them to seek timely advice. One challenge to this may be that many of the target audience do not necessarily identify as being older people and may therefore not consider the advice applicable. Older adults who have just had their first experience of significant infection may be particularly receptive to receiving advice on how to monitor themselves for future episodes. The use of technology, such as oxygen saturation monitors, could form one element of this approach. In addition, further work with those with



chronic illness would help to understand how their experiences of infection may differ.

Second, healthcare professionals should be aware of the impact that previous experience of infection might have on an older person's account of current symptoms. A better understanding of the patient experience of early infection may help GPs to make decisions when assessing older

adults with non-specific symptoms and reduce some of their uncertainty. This may be especially important in circumstances when access to urgent care is being triaged over the phone based on a short history. In particular, healthcare professionals should take caution with the infection 'naive' and highlighting any difference in symptoms from the norm in 'experienced' patients.

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### Ethical approval

This study was approved by the London — Fulham Research Ethics Committee (ref: 16/LO/1902).

### Provenance

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### Competing interests

The authors have declared no competing interests.

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