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Improving safety and TReatment precision for Acute COPD Exacerbations (TRACE): Feasibility of point-of-care blood testing in community pharmacies. A qualitative study of clinicians' views

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Abstract

Background and aims

Point-of-care blood tests (POCTs) have the potential to improve the targeted prescription of antibiotics and oral corticosteroids (OCS) for the treatment of acute chronic obstructive pulmonary disease (COPD) exacerbations (AECOPDs) in primary care. The ease of access to and key role of pharmacists in chronic disease management make siting the tests in community pharmacies an attractive proposition. This study aimed to explore the opinions of community pharmacists and general practitioners (GPs) on the feasibility and acceptability of a new POCT-based AECOPD pathway in pharmacies.

Methods

Semi-structured interviews with clinicians (pharmacists and GPs) were undertaken to determine the enablers & barriers to implementing a POCT-based COPD pathway within community pharmacies. Interviews were audio-recorded and transcribed verbatim for coding and inductive thematic analysis using a sequential inductive–deductive approach, with emergent themes organised using the Theoretical Domains Framework (TDF).

Results

19 participants (11 pharmacists, 8 GPs) in London and Kent were interviewed. Thematic analysis identified themes included stakeholder factors, inter-professional relationship factors, organisational factors & POCT pathway factors. All participants supported the intervention, deeming it acceptable and feasible. Pharmacists were enthusiastic about expanding their clinical scope and felt confident that the intervention fitted their current role. GPs were willing to support the pharmacists. Proposed benefits of the intervention included more effective guided prescribing; the reassurance for patients and clinicians that would be obtained from objective results; the empowerment of patients and improvement in self-management of COPD; professional recognition of pharmacists' clinical role; and an increased accuracy in the recording and monitoring of AECOPD treatment provision. Potential obstacles to implementing the intervention included data governance and communication challenges, concerns that patients might have preconceived ideas of their need for COPD standby rescue packs; the inconvenience for patients of visiting the pharmacy when they felt unwell; and patients' potential reluctance to change their help-seeking behaviour.

Conclusions

Pharmacists and GPs supported the development and implementation of a POCT-based COPD pathway in community pharmacies, potentially improving patient medication stewardship.

Background

Acute exacerbations of chronic obstructive pulmonary disease COPD (AECOPDs) are a major cause of morbidity and mortality among older adults.[1] Treatment of AECOPDs accounts for over 11% of all antibiotics prescribed in primary care[2] whilst bacteria have been identified in fewer than half of sputum samples during AECOPDs.[3] Up to 40% of COPD patients may be prescribed repeated courses of oral corticosteroids (OCS).[4] These drugs have adverse effects including risks of antimicrobial resistance due to antibiotics and fractures, diabetes and heart failure due to OCS.[5,6] In the absence of objective markers, the decision to prescribe is reliant on symptoms and examination without corroboration from tests.[7] Standby drug treatment packs, often referred to as "rescue packs", of both of these drugs are often issued in primary care[7] without clinical assessment and obtained directly from a community pharmacy. In the clinical trials, point of care tests (POCTs) of serum C-reactive protein (CRP) and blood eosinophil count (BEC) to guide the use of antibiotics and OCS during AECOPD assessments, have led to decreases in the prescription of antibiotics by 22% and of OCS by 33%, with no evidence of harm.[8,9]

Although valuable tools in the campaign for improved antimicrobial stewardship and in the mitigation of OCS-induced adverse effects, POCTs have hardly been adopted in UK National Health Service (NHS) primary care.[10] Time pressures, concerns about test accuracy, risks of excessive or inappropriate testing and erosion of clinical judgement are among the reasons suggested for this.[11,12] In general practice, implementing routine POCTs to guide antibiotic and OCS prescribing in AECOPDs is logistically challenging due to the widespread provision of rescue packs and infrequent in-person clinical evaluation of patients with AECOPDs.

NHS England recommend establishing POCT usage in community pharmacies to improve antibiotic prescription.[13,14] The Pharmacy First scheme in the UK reimburses pharmacists for undertaking assessment and treatment of 7 infectious diseases.[15–17] Although the role of community pharmacists in delivering POCTs has been endorsed,[18] their potential contribution to AECOPD assessment has not yet been investigated. This project aligns with the Community Pharmacy Contractual Framework, reinforcing pharmacists' role in extended healthcare delivery.[19] Prior research into the delivery of CRP POCTs by pharmacists has reported positive opinions on the benefits of testing among pharmacists and high levels of satisfaction among patients who received the tests.[20]

Siting a POCT service for AECOPDs in local community pharmacies could achieve economies of scale by making testing accessible to patients from several local general practices, justifying the allocation of pharmacy staff time to service delivery. A novel AECOPD assessment pathway (Fig. 1) to guide the use of rescue packs has been developed. The pathway includes the use of POCTs delivered in a community pharmacy to improve the targeted provision of drugs for the treatment of AECOPDs, with the aim of reducing the risk of inappropriate use of COPD rescue packs. It would require changes

in how primary care staff (including pharmacists) manage COPD. Therefore, it is essential to explore the views of community pharmacists and general practitioners on the acceptability and feasibility of the proposed novel POCT-based AECOPD pathway.

Key for Fig. 1. POCT: point-of-care blood test; OCS: oral corticosteroid; BEC: blood eosinophil count; CRP: C-reactive protein; GP: general practitioner; AECOPD: acute exacerbation of COPD.

The Theoretical Domains Framework[21]is a widely used behavioural framework in implementation research.[22,23] The TDF identifies 14 types of factor that may influence health professionals' behaviours when applying evidence-based recommendations and is commonly used to examine barriers and facilitators to implementation.[23] The TDF is valuable for organising complex qualitative data. It can also guide the design of interventions to change behaviour and improve implementation outcomes, making use of expert consensus evidence regarding which behaviour change techniques are most likely to be effective for changing each of the TDF domains.[24]

To inform the development of a feasibility study of the implementation of an AECOPD POCT-based pathway sited within community pharmacies, we planned a qualitative study to explore relevant clinicians' views and map them to the TDF.

Aims:

- To explore the views of community pharmacists and general practitioners regarding the potential acceptability and feasibility of the novel POCT-based AECOPD pathway
- To map identified barriers and enablers to the Theoretical Domains Framework, as a basis for refining the implementation of the intervention.

Methods

Study design

Semi-structured interviews with community pharmacists and GPs. Ethical approval was provided by KCL Research Ethics Office Minimal Risk Registration Number: MRA-23/24-45254.

Participant selection

Pharmacists were recruited from academic pharmacists, pharmaceutical representative bodies (Local Pharmaceutical Committees) and other groups for community pharmacists. General practitioners were recruited via direct approach to local general practices. Prospective participants were informed that the interviewer was a GP researcher investigating the feasibility and acceptability of a community pharmacy-based POCT-based pathway for COPD exacerbations. A purposive sampling strategy was used as participants were recruited for their ability to provide relevant perspectives on the intervention. The pharmacists worked as independent contractors and as employees of small independent pharmacies and of large chain pharmacies. The GPs comprised partners and practice employees. Participants were invited to take part by email or by a face-to-face invitation from the first author. Written, informed consent was obtained from each participant.

Data collection

A choice of interview locations, either face-to-face at their work or virtually via Microsoft Teams, was offered to participants. Semi-structured interviews, guided by a topic guide (supplementary data), explored the enablers and barriers to implementing an AECOPD POCT-based pathway within community pharmacies. Follow-up interview questions and prompts were tailored to the individual participant's responses with the purpose of clarifying and expanding on areas of importance to the participant or of relevance to the research objectives. Interviews were digitally recorded and transcribed verbatim. The transcripts were checked against the audio files to ensure accuracy. Field notes were not made during the interview. Interview transcripts were not returned to participants for comment or correction.

The interviews were conducted by TH, a male General Practitioner and Clinical Lecturer with a PhD and previous experience conducting qualitative research in COPD.[25] TH had a professional interest in improving the management of COPD exacerbations and was involved in the development of the proposed POCT-based pathway. He was well placed to answer the questions of interviewees regarding how the pathway would work, where this was required. The researchers recognised that these experiences and interests could influence data collection and interpretation. To minimise this risk, interviews were guided by a semi-structured topic guide and participants were encouraged to express both positive and negative views of the proposed intervention.

Analytic approach

The interview data were thematically analysed in an iterative and reflexive manner, acknowledging the researcher's active role in interpreting the data in relation to the study population.[26] Two researchers (TH and RM) contributed to the analysis using NVivo (v14) for data management.[27] RM is an academic General Practitioner with experience in conducting qualitative research. She was not involved in the pathway design. Analysis proceeded in two

stages, combining inductive and deductive strategies. During the first stage, the lead analyst checked the transcripts against the digital recordings and was familiarised with the data. Open coding was then conducted to identify themes emerging from the data, with codes and themes refined through ongoing discussion with the second analyst to challenge interpretations and enhance analytical rigour. In the second stage, given the focus on exploring the feasibility of implementing a new AECOPD POCT-based pathway, the codes were organised according to the Theoretical Domains Framework (TDF), serving as a deductive lens to structure and interpret the findings.[21] Combining inductive and deductive analysis allows for both data-driven discovery and theory-guided interpretation, helping to organise qualitative datasets into meaningful findings.[28]

Results

19 participants across North and South London (London boroughs of Camden, Lambeth, Merton, Wandsworth, Croydon) and Kent were interviewed. 22 potential participants were approached. 3 clinicians were unavailable for interview. 11 community pharmacists (9 male, 2 female; 5 independent pharmacy owners, 4 employees for large chain pharmacies, 2 employees for small chain pharmacies; clinical experience range 6 months-40 years), 8 GPs (2 male, 6 female; 2 GP partners, 6 salaried GPs; clinical experience 6 months-40 years), were interviewed. The pharmacists were not previously known to the researcher. Two of the GPs were colleagues of the researcher. Interviews took place in pharmacies (7), general practices (1) or remotely over Microsoft Teams (11). Interviews lasted between 30 & 60 minutes. No one other than the participant and the researcher was present during the interviews. Repeat interviews were not undertaken. Participant feedback was not provided as the study sought to explore collective implementation barriers rather than individual accounts. Interviews were completed over a 10-month period (September 2024-June 2025).

No new themes, patterns or insights were identified in the transcripts of the final three interviews. As interviews progressed, redundancy in responses became evident, indicating that the range of perspectives relevant to the research questions had been sufficiently captured. The decision to cease data collection was therefore based not on a predetermined sample size, but on the point at which additional data no longer contributed meaningful variation or depth to the findings, ensuring both richness and rigor in the analysis. Data were reported according to the Consolidated criteria for Reporting Qualitative research (COREQ) checklist.[29]

Summary of themes

Table 1 provides the coding tree for the study. There were 4 major themes. In theme 1, there were 4 subthemes, which were mapped to 7/12 TDF domains. In theme 2, there were 2 subthemes, which were mapped to 2/12 TDF domains. In theme 3, there were 2 subthemes, which were mapped to 2/12 TDF domains. In theme 4, there were 2 subthemes, which were mapped to 3/12 TDF domains.

Table 1
coding tree for implementation of a COPD POCT-based pathway within community pharmacies

Major theme	Sub-theme	TDF domain
Stakeholder factors (influence of clinician expertise on pathway delivery)	Acceptability of POCT-based pathway to pharmacists	*Environmental context/Resources*
		Beliefs about capabilities
		Skills
	Acceptability of POCT-based pathway to GPs	*Social/professional role/identity*
		Goals
		Skills
		Beliefs about consequences
	Acceptability of POCT-based pathway to patients: opinions of pharmacists & GPs	*Social influences*
	Collaboration/ confrontation with patients	*Social influences*
Inter-professional relationship factors (influence of professional interactions on pathway delivery)	Professional recognition of pharmacists	*Social/professional role/identity*
		Memory, attention & decision processes
	Professional relationships between clinicians	*Memory, attention & decision processes*
Organisational factors (influence of primary care infrastructure on pathway delivery)	Communication between pharmacists & GPs	*Environmental context/Resources*
	Clinician opinions of Pharmacy First initiative	*Beliefs about consequences*
POCT pathway factors (influence of pathway-specific factors on pathway delivery)	Safety-netting within POCT-based pathway	*Beliefs about consequences*
	Benefits of POCT-based pathway	*Beliefs about capabilities*
		Beliefs about consequences
		Social influences

Table 2 summarises the themes, grouped as enablers or barriers to pathway implementation, and how these were mapped to the Theoretical Domains Framework. The themes included:

Table 2: Enablers and Barriers to implementing a COPD POCT-based pathway within community pharmacies

Stakeholder factors

TDF domain	Enablers	Barriers
Skills	Pharmacists and GPs feel that pharmacists have the expertise to deliver the new pathway. *"Pharmacists are very adaptable and we are capable now of delivering this. We are all capable of doing the tests easily and of interpreting the results. Pharmacists have the knowledge and the background skills to provide an assessment like that." (Community pharmacist 5)* *"Well, I mean pharmacists assess patients for other things. They do it for ears and throats and blood pressure. And you know, why wouldn't they do it for this?" (GP 8)*	
Belief about capabilities	Pharmacists have the consultation skills to deliver a AECOPD POCT-based pathway. *"Pharmacists are used to consulting with patients." (Community pharmacist 9)*	Some pharmacists may need additional training in use of POCTs. *"I think doing a point of care test is not new in pharmacies, but may be new to a lot of pharmacists, so training is key." (Community pharmacist 9)*
Goals (I want to)	GPs would want to monitor & follow up high risk COPD patients who are seen at the pharmacy. *"If someone with COPD had a CRP over 100 and was short of breath, I think I'd want to assess them potentially. Because I don't think I can necessarily convince myself that that was related to the COPD exacerbation." (GP 2)*	GPs would want to undertake an holistic assessment which they feel would not be done in a pharmacy. *"When we see a patient with COPD, we would listen to the chest and I think the pharmacist presumably wouldn't necessarily do that. That's the only thing I can think of really is that would everybody be prepared to sort of accept the assessment of a pharmacist?" (GP 8)*
Social influences (influenced by others)	Pharmacists and GPs feel that COPD patients would welcome the improved access to assessment provided by the POCT pathway *"I think they'll (patients) be first amazed that we're doing something like this and secondly really happy because it's going to be saving a lot of time not sitting around in the GP waiting room." (community pharmacist 9)* *"I think if anything patients would welcome that there's an easier access for them to get the rescue pack as opposed to the GP surgery. Having the test done, I don't think it'll be a hindrance." (GP 8)* Pharmacists feel that awareness of rescue pack side effects varies amongst patients, and that patients want to know how their medicines work and to take charge of their care. *"The steroids. I think patients are less aware of the risks of taking multiple courses of steroids. They're probably more keen to take them." (Community pharmacist 7)* *"It (the pathway) really does go in line with the patients taking more charge, taking more responsibility in their care. It's like they want to find out the reasons why they're doing it, they're receptive to some sense about, you know, the mode of action of their medicines and the interactions with other medicines they take, not just, you know, "the prescriber says that they're taking this for this"." (Community pharmacist 8)*	Pharmacists and GPs feel that patients may have an habitual reliance on COPD rescue packs and that there may be patient reluctance to change their help-seeking behaviour. *"It might be challenging initially simply because of habit. In our population it has been hard at times to encourage change in behaviour or a routine in what patients do." (Community pharmacist 7)* *"There is a psychological element to it as well, where if a patient knows they have something to take when they feel unwell that is quite reassuring and self-soothing so you can see how patients might get into the habit of taking these rescue packs even if there isn't a true clinical indication." (GP 4)* Pharmacists and GPs describe patients' perceived expectations of receiving antibiotics at the onset of symptoms or in reserve in case of an exacerbation. *"You do get difficult patients who from the assessment I can see they don't need antibiotics but they are really pushing towards it. They know that the service is there for me to give them this. They feel like they can now demand it." (Community pharmacist 9)* *"It could be difficult to convince patients that they don't need antibiotics, even if a blood test says they don't because they've been suffering with this for years and they've had their rescue packs for a long time." (GP 7)*

	Pharmacists and GPs believe that patients would not expect to receive antibiotics as readily from a pharmacist as from a GP. *"Patients understand that they cannot get them (antibiotics) easily from us, in a way that they could get them from the doctor." (Community pharmacist 3)* *"I think we're far too liberal with them (antibiotics). I think we've forgotten, actually, that humans can recover without them, even if it is bacterial." (GP 5)* • GPs emphasized the need for education and trust among patients for pathway delivery *"I think it's about trust. It's the patient sort of trusting that they're still getting a good service. They're still getting a medical opinion. And it's just the way the service is being carried out, but the message isn't any different." (GP 6)* *"I think in this instance, the education, it'd probably be quite important for it to come from the doctor. Again, it's that degree of trust, and I think as long as you're telling patients, you know, if their doctor's telling them this is what I think we should be doing, it's fine to do it this way. I think most patients, if they trust their doctor or they feel like it's coming from the right person, they'll be happy enough to carry that out." (GP 4)* GPs feel that, time allowing, an explanation of the benefits of the pathway to patients would increase acceptance among patients. *"If we had the time to explain to patients how actually reducing antibiotic use will help them in terms of antibiotic resistance and side effects and actually using antibiotics when needed will make them more effective when they work, I think that people would be receptive to that and the same for steroids. There's a number of side effects that people may not realise they get from those." (GP 3)*	GPs expressed concern about potential loss of patient autonomy if patients feel they have been denied the COPD rescue pack. • *"They (patients) may not like not having the antibiotics and steroids at home because it takes away some of their autonomy and reassurance that it's there." (GP 2)* GPs feel patients may prefer to see a GP when they are unwell rather than a pharmacist. *"Some patients tend to be quite sort of traditional in how they consult. You know, they don't want to speak to the pharmacist, they want to speak to the doctor. And they might feel that, you know, we're sort of shirking responsibility for them or sort of discounting their symptoms or the severity of their symptoms if we're deferring by sending them to the pharmacist." (GP 4)* Some GPs would prefer to assess respiratory patients themselves. *"I think any kind of respiratory illness, you always try to do your own assessment. I think GPs would generally rather just have more GPs to be able to do this job without having to sort of farm it out. I think generally that's how most GPs feel, certainly the GPs that I know." (GP 5)* Pharmacists raised concerns about the potential for patient confrontation. *"I think there might be a pushback from patients. I can't lie to you there. There might be a slight pushback. Especially antibiotics." (Community pharmacist 8)*
Social/ professional role/identity	Pharmacists follow strict prescribing guidance. *"As pharmacists we are able to prescribe antibiotics and we have to follow set criteria." (Community pharmacist 3)*	GPs express some concern about the transfer of clinical responsibility. *"it's not really my risk to hold, you know, it's actually the pharmacist's clinical risk to hold, because they've seen the patients and made the assessment and had the outcome." (GP 1)*
Environmental context/ Resources		Concerns were raised about time pressures & additional workload for pharmacists, and staffing availability. *"Now the question is going to be time. It's not going to be 10 minutes to do this, I guarantee that." (Community pharmacist 1)* *"The only concern with the introduction of any new service, really is just the pressure in terms of workload for community pharmacists" (Community pharmacist 4)* *"I don't know if we have enough people in the pharmacies to handle the number of these requests." (Community pharmacist 5)*

Beliefs about consequences	• GPs feel that assessment of AECOPD is complex both when done in person and remotely. Clinicians may assume that prescribing is safer. The pathway may improve this process. *"I think on the surface, at first it seems straightforward, but when I think about the decision to actually use both antibiotics and steroids, that's more complex. And I think it's very easy to just treat with everything to be safe, but that may not always be the right thing to do." (GP 5)* *"I think that doing those blood tests will help with the differential diagnosis and allow us to understand which medicines they need, if any, because sometimes they just don't need them." (GP 4)*	GPs worry that alternative diagnoses could be overlooked from use of the pharmacy-based pathway. *"Breathlessness and cough could be a number of other diagnoses. So that's why that's the role of the GP. But a clinical pharmacist can obviously assess, so long as they've got quite a strict sort of pathway. We need to ensure that other things aren't missed and we're not assuming just because this patient has COPD, that the symptom is definitely an exacerbation just for safety reasons. I wouldn't want that to be missed." (GP 6)*

Inter-professional factors

TDF domain	Enablers	Barriers
Social/ professional role/identity	Pharmacists feel they should deliver more clinical services. *"I think we need to provide more clinical services in community pharmacies to be able to meet the health needs of the patients, and provide the right advice and information in a timely way." (Community pharmacist 10)* The POCT-based pathway has the potential to strengthen collaboration between pharmacists and GPs and to enhance pharmacists' clinical recognition. *"I think as with the sort of development of Pharmacy First and different initiatives where we're using or recognising pharmacists also as clinicians, I think that this pathway would help to harness those relationships more, as you're feeling like you're working alongside them a bit better. If you're having this collaborative approach, or both accessing the same workspace I think it will also do a lot for those doctor-pharmacist relationships as well." (GP 4)* *"I think this would be a good candidate for not just clearing the desks of GPs, but also I think it would be a potentially good thing for community pharmacies as well. And it will be a good one to slightly further up skill a cohort of community pharmacists as well." (GP 2)* GPs feel they have a strong relationship with pharmacists and value their work. *"If I see someone for a blood pressure review and I think they would benefit from a 24 hour assessment then actually the pharmacist next door offers that as part of a really good service." (GP 3)* *"We have a good relationship with the pharmacy next door." (GP 1)*	Pharmacists feel that their clinical skills are not recognised sufficiently within primary care. *"As pharmacists we always believe we are kind of ignored clinically or undervalued clinically." (Community pharmacist 4)*
Memory, attention & decision processes		Some pharmacists feel GPs do not make thorough COPD treatment pack prescribing decisions. *"I think from a safety perspective as well I've seen in community pharmacy that blindly, sometimes unfortunately, patients have been prescribed antibiotics and steroids, probably just because of demand. GPs are busy so they just sign the prescription when it's not really needed." (Community pharmacist 9)*

Organisational factors

TDF domain	Enablers	Barriers
Environmental context/ Resources	• Pharmacists feel that a specific limited access to the electronic patient record (EPR) would be most effective method of communication between pharmacist and primary care clinician. • *"It's going to be important to have up to date real time information about the patient and the only way I can see that happening is by an EMIS web (EPR) application." (Community pharmacist 10)* Pharmacists feel that integration of data into the existing Pharmacy First platforms could be used. *"You can add it (the POCT pathway results) to Sonar or to PharmOutcomes, where again you have a record of everything that you did. Just a regular routine record. We have the platforms to put them on, which is fine." (Community pharmacist 4)* EPR access is provided to some pharmacists & other clinicians (non-GPs) currently. *"I always log on and see how we can help out patients. So if there's any consultations that we do, I can always put it on there. If there's any queries, especially with the dosset boxes, we're not necessarily told by the GP that there are changes, but we don't need to because I have access to EMIS web where I can check if there are any changes." (Community pharmacist 9)*	
Beliefs about consequences	GPs would agree to sharing access to the EPR if they were provided with governance and security assurances. *"I think some GPs would see the benefit of it. We need to be reassured of the governance arrangements and guarantee of the security of the laptops, the security of the whole system and the patient information as well." (GP 3)* The pharmacists can provide this reassurance. *"So we already have the IT infrastructure, we all signed it up to ICO. We are looking after patient data for thousands of patients. You know for day in a way. So we are part of the NHS primary care team. And we know what our responsibilities are." (Community pharmacist 11)* Pharmacists and GPs feel that Pharmacy First is working well, and the COPD POCT-based pathway could be integrated into existing services. *"Pharmacy First has had massively positive feedback. I mean, we're saving GP time for things that for sure most pharmacists can diagnose, and reducing their burden as well at the same time." (Community pharmacist 3)* *"We're under a lot of pressure to basically see patients and I certainly found the pharmacy first scheme a helpful tool, to essentially keep appointments free when I'm triaging for, you know, more complex things." (GP 7)* *There are lots of different conditions that can be part of Pharmacy First. This COPD pathway could become one of them. (Community pharmacist 2)*	GPs had some concerns about sharing access to the EPR as they retain responsibility for inputted data. *"There's this EMIS write back function so that other providers can write back into the patient record. There's been quite a lot of pushback locally on that, on the basis that the data controller still remains the GP." (GP 2)*

POCT pathway factors

TDF domain	Enablers	Barriers
Belief about capabilities	Pharmacists found the pathway straightforward. *"The algorithm is just straightforward, the pathway sort of in the way mirrored the pharmacy first pathway. So you're going through stages and you are sort of going through different pathways depending on the answers to the questions. So that in itself it was easy to understand and to navigate." (Community pharmacist 10)* Pharmacists approve of the principal of guided treatment from the POCT pathway. *"It sounds like something that pharmacists should do. I think that it is a good idea to try and identify individuals who would actually benefit from them rather than I think, from the start, providing everyone with antibiotics regardless of what their needs might be." (Community pharmacist 2)*	
Social influences (influenced by others)	• GPs feel the pathway may empower patients & improve self-management of COPD. *"I think it (the AECOPD pathway) sounds really interesting and really good. The reason is that I think it's so helpful to have an objective measure for helping patients manage their own conditions." (GP 7)* • *"They (the patients) will probably find it (the AECOPD pathway) empowering and they'll feel like experts of their own COPD. That might also change health seeking behaviours in other ways and across other conditions, or comorbidities. If they have a better understanding of their health, that will probably inform other choices to do with their health as well." (GP 4)*	Pharmacists are concerned that patients may feel that visiting the pharmacy is inconvenient. *"if the patient is not well they may not come themselves. They might send a family member or somebody to collect" (Community pharmacist 2)*
Beliefs about consequences	Pharmacists and GPs feel the pathway would provide objective results that supported the improved guiding of treatment and improved accuracy of recording & monitoring of COPD rescue packs. *"When it comes to antibiotics and steroids in this case, it would just be so cut and dried where you know you have the point of care test result. You have the reference values for what needs to be prescribed, when it needs to be prescribed." (Community pharmacist 10)* *"When I've prescribed five antibiotic courses, but I don't know if they have taken five courses or if they've got three in their cabinet, and they've only ever taken two. You really have no idea what they're taking. So it would be good to have more information. Having a CRP test may be helpful in terms of reassuring the patient that they don't need antibiotics" (GP 1)* *"A record of actually how many times they (patients) get the antibiotics or steroids from the pharmacy, would make it easier to workout how many courses of antibodies they are having each month, or each year." (GP 1)* GPs recognise the potential of the pathway to reduce their workload and to improve antibiotic stewardship. *"I don't think the pathway would add to workload, if anything, it would reduce it potentially if you're not seeing the COPD patients every time they're having an exacerbation." (GP 4)* *"I am interested to see how this could be implemented because it might help to reduce antibiotic prescriptions that are unnecessary, if it is just a re-exacerbation, requiring steroids." (GP 6)*	Pharmacists feel that repeat attendance at the pharmacy for the pathway would prompt a referral to the GP *"if they come back and their symptoms haven't improved and the test is saying that their markers aren't high then I would have to refer them to the GP." (Community pharmacist 8)*

The POCT results will support the clinical opinion of the pharmacist regarding the use of COPD rescue packs and decrease the risk of confrontation.

"you don't have to have this confrontation, because the patient has the results and can understand that OK, they took my blood, they did the test and, actually, the results show that I don't need the antibiotics." (Community pharmacist 5)

Stakeholder factors (the influence of clinician expertise on pathway delivery)

Pharmacists and GPs reported confidence in the ability of pharmacists to deliver a COPD POCT-based pathway (skills). Pharmacists and GPs thought that COPD patients would welcome the improved access to assessment provided by the POCT pathway (social influences). Pharmacists and GPs were in agreement that patients would not expect to receive antibiotics as readily from a pharmacist as from a GP (social influences). Potential barriers, perceived by pharmacists and GPs, to implementing the pathway, included a risk of habitual reliance on rescue packs by patients (social influences); patients' perceived expectations of receiving antibiotics at the onset of symptoms or in reserve in case of an exacerbation (social influences); and concerns about loss of autonomy if patients were denied the rescue packs (social influences).

Pharmacists expressed concerns that time pressures, staffing availability (environmental context & resources), the potential need for additional training (beliefs about capabilities) and the potential for patient confrontation (social influences) were possible barriers to pathway implementation.

Although the majority of GPs recognised the potential for the pathway to reduce their workload and to improve antibiotic stewardship (beliefs about consequences), a small subset expressed concerns around possible missed diagnoses (beliefs about consequences) and the transfer of clinical responsibility (social/professional role & identity).

Despite the majority of GPs being in favour of the assessment being undertaken by pharmacists, a small number of GPs expressed concerns that the patient may prefer to be examined by a doctor (social influences). These GPs also felt that an holistic clinical assessment of the patient was warranted, demonstrating that clinicians' tolerance of risk and clinical uncertainty may be an important moderator of the feasibility of the AECOPD pathway.

Inter-professional relationship factors: (the influence of professional interactions on pathway delivery)

Pharmacists and GPs were in agreement that more clinical services could be delivered by pharmacists. They considered that the POCT-based pathway had the potential to strengthen collaboration between pharmacists and GPs and to enhance pharmacists' clinical recognition (social/professional role & identity). Although GPs expressed their admiration for the work of their pharmacist colleagues, a small proportion of the pharmacists felt that their clinical skills were undervalued. The provision of the AECOPD pathway may ameliorate this concern.

Organisational factors (the influence of existing primary care infrastructure on pathway delivery)

Pharmacists and GPs agreed that joint use of the electronic patient record (EPR) would be the most effective method of communication between them. The majority of GPs were in favour of sharing the EPR with pharmacists, with appropriate governance assurances, which pharmacists were able to provide. A small number of GPs expressed concerns about their ongoing responsibility for medical records (beliefs about consequences). This demonstrates that a clear delineation of clinical responsibility between the professional groups, will be needed for pathway implementation. Pharmacists and GPs felt that the pathway aligned well with Pharmacy First and could be integrated into existing services using current digital platforms (environmental context & resources).

POCT pathway factors (the pathway-specific factors which may influence its delivery)

Pharmacists and GPs viewed the assessment protocol as straightforward and felt that the pathway would provide objective results that supported the improved guiding of treatment, antibiotic stewardship, care continuity, and patient empowerment (beliefs about consequences). Although the GPs felt that the pathway may improve their patients' self-management of COPD, some pharmacists questioned how convenient visiting the pharmacy may be for patients when the patients felt unwell (social influences).

Discussion

This qualitative study explored the behavioural, organisational and relational determinants which influence the feasibility of implementing a community pharmacy–based point-of-care testing (POCT) pathway to direct the use of rescue pack medication for acute exacerbations of chronic obstructive pulmonary disease (AECOPD). Guided by the Theoretical Domains Framework (TDF), the findings demonstrated that the pathway was clinically valuable and potentially capable of improving antimicrobial stewardship, although its successful adoption and implementation is dependent on addressing interacting barriers at individual, professional, organisational and patient levels. Barriers relate to concerns about resources, changing professional identities and beliefs about the consequences arising from these new clinical roles.

Aids to implementation

Pharmacists were confident in their expertise to undertake the clinical assessment and to deliver the POCT pathway. The shared opinion of pharmacists as highly adaptable practitioners with an expanding clinical scope aligns with their current extended clinical role within primary care.[30] Pharmacists considered the structured nature of the POCT pathway to be intuitive and supportive of clinical reasoning, particularly when combined with objective biomarker results. These findings are consistent with literature indicating the effective contribution of community pharmacists to respiratory care and antibiotic optimisation, when supported by appropriate infrastructure and training.[31–33]

Pharmacists and GPs both extensively considered how patients might react to the novel pathway. Pharmacists perceived wide variation among patients in COPD health literacy, treatment pack understanding and expectations of antibiotic therapy—issues recognised as central to COPD self-management behaviours.[34] Although it was thought that many patients would appreciate the rapid access to pharmacy-based assessment, some GPs felt that others would be more comfortable with the traditional GP-led care, particularly during episodes of acute illness. GPs emphasised trust—both in pharmacists' clinical competence and in the validity of POCT results—as a prerequisite for pathway acceptability. This is consistent with prior evidence that patient trust is a critical determinant of uptake of novel pharmacy-led clinical services.[35] Earlier research has shown that patients value the ease of access to pharmacists, the longer consultations they can provide and have shown a preference to consult with pharmacists over GPs.[36,37]

Inter-professional relationships were viewed as central to implementing the pathway. While GPs valued pharmacists' clinical contributions, a small number of pharmacists described tensions related to differing perspectives on antibiotic appropriateness and a perceived lack of recognition of their clinical expertise. These relational dynamics mirror those documented in the literature on inter-professional collaboration, where mutual trust, role clarity and shared decision-making were essential determinants of effective team-based care.[38] Although primary care pharmacists have reported feeling under-appreciated, GPs do value those recommendations from pharmacists which are perceived to improve patient care.[39] GPs view favourably the integration and positive impact of pharmacists working as part of the primary care team.[40] This is enhanced by interprofessional collaborative discussions between GPs and pharmacists.[41]

Barriers to implementation

The apprehension expressed by GPs about diagnostic completeness, medico-legal responsibility and the consequences of missed alternative diagnoses when patients were assessed in pharmacies, should be considered and have been identified as barriers in studies of inter-professional task-shifting and shared care.[38,42] These concerns may be allayed by the recognition, expressed by all participants, that the provision of the POCT-based pathway within pharmacies, to direct the treatment decision for an AECOPD, would be safer and more effective than the unguided use by patients of COPD rescue packs at home.

Pharmacists' ability to integrate POCTs into routine practice is dependent on adequate staffing, protected assessment time and appropriate training. These concerns accord with evidence demonstrating that workload, stress and resource constraints are major determinants of community pharmacy service uptake and sustainability.[43,44]

The present lack of access for pharmacists to integrated electronic patient records (EPRs) was a barrier to pathway implementation. While pharmacists and GPs agreed that shared access to EPRs would enhance safety, efficiency and continuity, some GPs had reservations about providing this access, centred on data governance, accountability, and the administrative burden to them. These issues accord with digital integration challenges documented in recent UK primary care research.[45]

At the organisational level, the established Pharmacy First service and existing digital platforms (e.g., Sonar, PharmOutcomes) were viewed as facilitators of pathway implementation. The provision of direct access to the patients' electronic records was viewed by the pharmacists and GPs as the most effective communication method for the pathway. These infrastructures provide a foundation for integrating POCTs within existing workflows and established governance frameworks. Persistent structural issues—including variable pharmacy opening hours, insufficient staffing, and the absence of shared clinical governance mechanisms with general practice—represented significant system-level barriers. Successful implementation would require coordinated support from Integrated Care Boards (ICBs), Primary Care Networks (PCNs) and professional bodies to ensure that governance, indemnity, and funding arrangements are robust and clearly delineated. Similar system-level requirements have been identified in other evaluations of extended community pharmacy clinical services.[45]

Strengths and limitations

This study reported consistent positive opinions on the feasibility of implementing the POCT-based pathway in community pharmacies. Both self-employed and employee pharmacists and GPs participated, providing a broader range of experience and perspectives from within the professions. The role of TH as both interviewer and a key designer of the new pathway may have affected the collection of the interview data. However, this role meant that he was well-placed to answer any queries that the interviewees had about exactly how the intervention would be implemented. He also endeavoured to ensure that he sought and fully explored both positive and negative perspectives from interviewees. The analysis conducted by TH was balanced by the contribution from RM.

A weakness of the study included that two of the GPs were colleagues of TH. Their views were very similar to those of GPs who were not colleagues of TH. Participants who volunteered to be interviewed may be more interested in the implementation of an AECOPD POCT-based pathway than those who

did not. Therefore, their opinions may not be representative of the full variation of views within these professions. The opinions of COPD patients or health service commissioners were not explored.

Future steps

Further refinement of the intervention ahead of a future feasibility trial of the implementation of the POCT-based pathway, which this study has informed, will incorporate the views of patients regarding the acceptability and practicality of the pathway. The successful implementation of the new POCT-based pathway will be dependent on its acceptability to patients. A group of stakeholders should be convened to advise on how to maximise facilitators of delivering the pathway and to find ways to overcome the barriers. As both pharmacists and GPs expressed concern about how to ensure the pathway was acceptable and feasible for COPD patients, the development of patient facing materials to explain the pathway will be key. Patient and carer perspectives should be included on the development of these patient-facing materials and also in terms of increasing the acceptability/feasibility of the refined pathway.

Conclusions

The POCT-based pathway has the potential to introduce greater diagnostic precision, aligning with evidence that CRP and blood eosinophil-guided pathways can reduce unnecessary antibiotic and oral corticosteroid prescribing in COPD exacerbations.[8,9] Collectively, the findings from this study demonstrate that a community pharmacy AECOPD POCT-based pathway holds promise for guiding treatment decisions and enhancing antimicrobial stewardship. Real-world implementation will depend on strengthening professional capability, improving digital interoperability, providing robust organisational support and addressing potentially entrenched patient behaviours. Future research will involve feasibility pilots, informed by the present study and with the aim of overcoming some of the barriers identified, economic evaluation, assessment of patient-reported outcomes and co-designed educational materials to optimise pathway acceptability and safety.

Declarations

Ethics approval and consent to participate

The present study was approved by the KCL Research Ethics Office Minimal Risk Registration (Number: MRA-23/24-45254) and conducted in accordance with the Declaration of Helsinki. All participants provided written informed consent prior to participation in the study.

Data availability

The datasets used and/or analysed during this study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Author's contributions

THH, PW devised the study. THH undertook patient recruitment and data collection. THH, RM, PW, AH undertook the analysis. TH provided the original idea for the study. All authors contributed to the write up. All authors read and approved the final manuscript.

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Figures

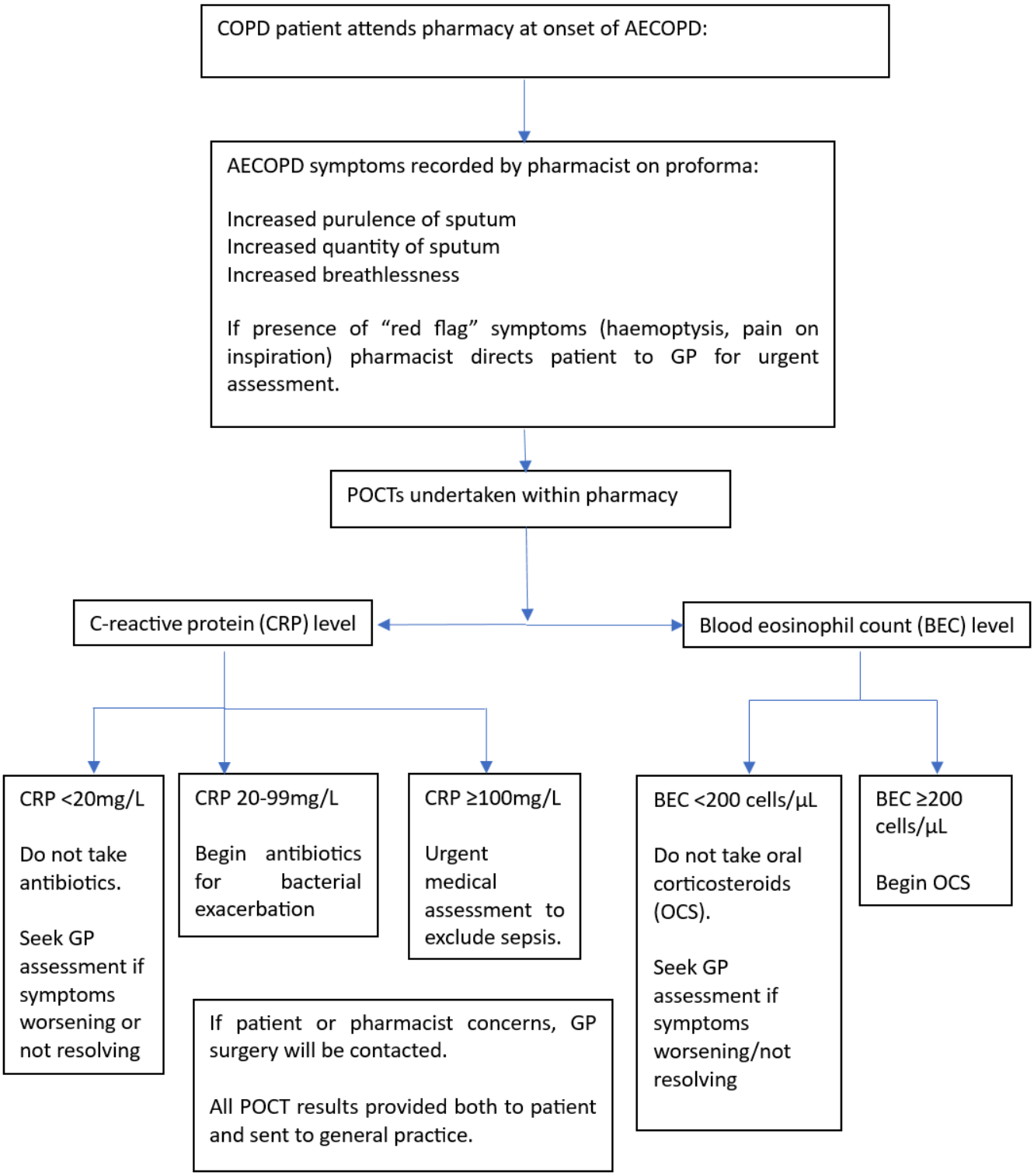


Figure 1

Algorithm for delivery of POCT tests and treatment packs in pharmacies for AECOPD.

Key for Figure 1. POCT: point-of-care blood test; OCS: oral corticosteroid; BEC: blood eosinophil count; CRP: C-reactive protein; GP: general practitioner; AECOPD: acute exacerbation of COPD.

Supplementary Files

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