emergency care and medicine

MDPI

Article

Pharmacist Review of Medicines Following Ambulance-Attended Falls—A Multi-Methods Evaluation of a Quality Improvement Initiative

William Mulrooney [1], Caitlin Wilson [1,2,*], Richard Pilbery [1], Ruth Fisher [1,2,3], Sarah Whiterod [4], Heather Smith [5,6], Emily Turner [6,7], Heather Edmonds [7,8], Peter Webster [1,5], Graham Prestwich [9], Fiona Bell [1] and Rebecca McLaren [1]

1 Yorkshire Ambulance Service NHS Trust, Wakefield WF2 0XQ, UK
2 School of Health, Medicine and Life Sciences, University of Hertfordshire, Hatfield AL10 9AB, UK
3 Division of Nursing & Paramedic Science, Queen Margaret University, Edinburgh EH21 6UU, UK
4 South West Yorkshire Partnership NHS Foundation Trust, Wakefield WF1 3SP, UK
5 Leeds Teaching Hospitals NHS Trust, Leeds LS9 7TF, UK
6 NHS West Yorkshire Integrated Care Board, Wakefield WF1 1LT, UK
7 Leeds GP Confederation, Leeds LS11 0DL, UK
8 NHS Leeds Clinical Commissioning Group, Leeds LS16 6EB, UK
9 Health Innovation Yorkshire and Humber, Wakefield WF4 3BA, UK
* Correspondence: c.wilson60@nhs.net

Abstract

Background: Falls in older adults are a leading cause of morbidity, particularly when compounded by polypharmacy. There is mixed evidence of the efficacy of medicine reviews, but there is little work exploring this in the ambulance setting. A new referral pathway enabling ambulance staff to connect patients to primary care pharmacists aimed to address this. This study explored staff and patient experiences with the pathway and its potential to improve medication safety after a fall. **Methods**: A mixed-method service evaluation was conducted to assess the implementation and impact of this pathway. Routine data from an ambulance trust and pharmacist proformas were used to address objectives relating to referral rates, clinical appropriateness, and fall recurrence. Patient and staff stakeholder perspectives were gathered through two cross-sectional surveys designed to explore emotional, behavioral, and practical responses to the intervention. Quantitative data were analyzed descriptively and using ordinal logistic regression where appropriate. Free-text responses were analyzed thematically. **Results**: Between May 2019 and March 2020, referrals were initiated for 775 older adults after ambulance attendance for a fall, with pharmacists completing medicine reviews on 340 patients. Survey data revealed improvements in patients' emotional responses to their medicines. Ambulance clinicians identified patient disclosure, stockpiling, and the presence of expired medicines as key indicators of poor medicines management and valued the ability to refer patients. **Conclusions:** Overall, referral to the pathway demonstrates a marginal improvement in recontact rates in the short-term but does not necessarily represent an improvement in overall patient safety. The cost of such an intervention and patient expectations need further exploration to prove efficacy and patient satisfaction.

Keywords: emergency medical services; accidental falls; pharmacists; referral and consultation; medicine review; medicines

Academic Editor: George Notas

Received: 5 June 2025
Revised: 3 October 2025
Accepted: 14 October 2025
Published: 18 October 2025

Citation: Mulrooney, W.; Wilson, C.; Pilbery, R.; Fisher, R.; Whiterod, S.; Smith, H.; Turner, E.; Edmonds, H.; Webster, P.; Prestwich, G.; et al. Pharmacist Review of Medicines Following Ambulance-Attended Falls—A Multi-Methods Evaluation of a Quality Improvement Initiative. *Emerg. Care Med.* **2025**, *2*, 49. https://doi.org/10.3390/ecm2040049

1. Introduction

Falls among older adults (≥65 years) are a major health concern, with 7.6% of falls resulting in moderate or severe injuries [1]. Even without injury, falls often lead to a fear of falling, negatively impacting quality of life [2,3]. Those most at risk—older, frailer individuals, especially those with dementia or a history of falls—represent some of the most vulnerable in society [4]. Reducing falls and their consequences is therefore a national health priority [5].

In England, 42.5% of ambulance attendances for falls result in patients being discharged at the scene [6]. Guidelines recommend that these patients should be referred for further assessment of frailty, social care needs, and fall risk factors [7]. Polypharmacy (≥4 medicines) is a well-established fall risk [8], highlighted in recommendations in the World Guidelines for Falls Prevention and Management for Older Adults [9] and National Institute for Health and Care Excellence guidance [10]. Despite this, no specific guidance exists for managing polypharmacy in the ambulance setting.

Pharmacist-led medicine review is perceived as an important part of managing fall risk, especially in older adults [11]. The existing literature indicates that medicine reviews are effective in reducing the number of medicines prescribed and, therefore, drug costs [12–15]. However, there is conflicting evidence around the impact of medicine review on falls risk, with some authors reporting clear efficacy [16–18] and some reporting little to no benefit [19–24]. While studies have explored the impact of medicine review in inpatient and community populations, limited evidence exists of how medicine reviews may fit within the ambulance service setting [25–27].

In response, a local quality improvement initiative connected ambulance attendances for falls with primary care pharmacists. This study evaluated whether the initiative improved patient safety by reducing recurrent falls. The objectives were to:

- Determine the rate and suitability of referrals and subsequent clinical impact.
- Quantify medicine optimization for patients who underwent medicine review.
- Explore patient experiences and feelings around referrals and their medicines.
- Explore ambulance healthcare professionals' perceptions of the value of referral.

2. Materials and Methods

A multi-method approach was used, combining service evaluation and stakeholder surveys. Reporting followed SQUIRE [28] and CROSS [29] guidelines (Tables S1 and S2).

2.1. Context

This initiative took place in a single, well-resourced, ethnically and socially diverse urban district in northern England (population ~800,000), featuring a teaching hospital trust, intermediate care trust, and a regional ambulance service with five local stations. The local primary care confederation included 87 general practitioner (GP) practices and a coordinated pharmacy team.

2.2. Improvement Initiative

Eligible patients (see Table 1) seen face-to-face by ambulance clinicians after a fall and discharged at home were referred through an existing non-urgent pathway (Figure S1). This pathway excluded nursing home residents, who had setting-specific alternatives, and individuals who fell in public places, as they did not require the home-based adaptations performed as part of the pathway. The improvement initiative described in this report consisted of an additional referral to the primary care pharmacy team. Pharmacists conducted medicine reviews (face-to-face, telephone, or records-based) and made changes at their discretion. Outcomes were shared with the patient's GP and ambulance trust via proforma.

Table 1. Screening criteria.

Inclusion	Exclusion
Aged $\geq$ 65	Aged < 65
Face-to-face assessment by an ambulance clinician	No face-to-face contact
Primary reason for ambulance attendance was fall	Patient conveyed to hospital
Taking $\geq$ 1 medicine (prescribed or otherwise)	Not taking medicines
Fall in a residential address	Fall in public or patient is a care/nursing home resident
Registered with a local confederation GP	Registered with a GP outside the confederation
Non-urgent referral made	No referral made

2.3. Service Evaluation

The first two objectives of the evaluation were addressed using routine data from the ambulance trust and pharmacist proformas (see Table 2). Data were collected from 13 May 2019 to 22 March 2020 (paused due to COVID-19). Fall recurrence was tracked via 30-day follow-up using patients' National Health Service (NHS) numbers. Comparisons were made between referred and non-referred patients in the same geographical area.

Table 2. Objectives and measures.

Objective		Measure
Referral Rate, Suitability, and Clinical Impact	1	Referral rates
	2	Referral appropriateness
	3	Fall and/or ambulance recurrence
Medicine Optimisation	4	Polypharmacy reduction
	5	Deprescribing of fall-risk medicines as per PrescQIPP [30]
Patient Experiences	6	Change in emotions about their medicines post-review
	7	Impact of specific review activities on emotions
Ambulance Staff Perceptions	8	Key indicators of medicine management difficulty
	9	Perceived frequency of such cases
	10	Perceived value of pharmacist referral
	11	Influence of clinician demographics on referral value perception

Measures 1–5 were service level outcomes: referral rates, referral appropriateness (from pharmacist proformas), fall recurrence, and medicines optimization. Measures 6–11 were exploratory survey indicators, capturing patient and staff perspectives, such as changes in emotions about medicines and staff perceptions of referral value and difficulty. Survey items were informed by the existing literature [2,21] and views of the multidisciplinary research team consisting of ambulance staff, pharmacists, and patient representatives to maximize face validity.

Formal psychometric testing was not undertaken; analyses were primarily descriptive, intended to identify trends and inform potential pathway refinements rather than provide generalizable psychometric evidence. By distinguishing service-level outcomes from exploratory indicators, this approach balances pragmatic evaluation of operational impact with preliminary insights into patient and staff perceptions.

2.4. Stakeholder Surveys

To explore the experiences and perceptions of those involved, two cross-sectional surveys were conducted: one for patients referred for medicine review and one for ambulance staff (see Table 2).

2.4.1. Patient Survey

A postal survey was sent to all patients who were referred through the medicine review pathway. Each survey pack contained a covering letter, a participant information sheet, a consent form, a 12-question booklet (Figure S2), and a pre-paid return envelope. Completion of the consent form or return of the survey was accepted as consent to participate.

The survey included four sections: demographics, emotional perspectives about medicines and review, and impact of review activities on emotional outcomes.

Patients selected emotional descriptors (e.g., "safe", "frustrated") before and after review to indicate how they felt about their medicines. A change in emotional direction (e.g., from negative to neutral) was used to assess impact, with statistical significance determined using McNemar's test.

To assess the influence of review features (e.g., setting, communication style, shared decisions) on emotional outcomes, ordinal logistic regression (R Statistical Software, v4.0.2) using a proportional odds model was used [31] and assumptions determined by Harrell's [32] method, adjusting for age, gender, ethnicity, review format, and key review activities.

A free-text field allowed participants to identify what they intended to change post-review. Responses were thematically analyzed.

Data were anonymized and entered into a digital format for analysis, including incomplete questionnaires. A sample size of 132 was targeted based on detecting a 20% increase in positive emotion with 90% power and 5% significance [33].

2.4.2. Ambulance Clinician Survey

Patient-facing ambulance staff of all grades were invited to complete an online survey promoted through staff bulletins and in-person events. The online survey (Figure S3) consisted of twelve questions covering: demographic profile (e.g., role, working hours), perceived frequency of patients with medicine-related difficulties, indicators used to identify such patients, and perceived value of primary care pharmacy referral option.

Participants ranked ten predefined indicators of medicine-related difficulties (e.g., confusion, medicine errors). Weighted averages were calculated from rankings to prioritize key factors.

Perceptions of referral value were rated using a five-point Likert scale. Correlations between value perception and demographics (e.g., role, working hours) were explored using ordinal logistic regression (R Statistical Software, v4.0.2) and reported as odds ratios with 95% confidence intervals.

A free-text field followed a case study, which was designed to identify a person who was struggling to manage their medicines. Participants were asked to share how they would manage the person's case. Additionally, participants were asked to express what they felt would alert them to someone who was struggling with managing their medicines. Responses were anonymized and then independently coded into themes by two ambulance service researchers (FB [non-clinical], EM [clinical]).

A target sample of 330 responses was set based on a conservative 10% response rate from 3294 eligible staff members.

2.5. Ethical Considerations

Health Research Authority approval was gained for the stakeholder surveys (IRAS 263976). Approval from the Research Ethics Committee and Confidentiality Advisory Group was obtained for the patient survey (19/YH/0211). All data were handled in accordance with the Data Protection Act 2018 and the United Kingdom General Data Protection Regulations. Returned booklets without signed consent were included if the survey was completed, with participation indicating assent.

3. Results

Between 13 May 2019 and 22 March 2020, the ambulance trust received 11,831 fall-related 999 calls, of which 2610 calls were in the study area. For 820 patients, non-urgent falls referrals were made by ambulance crews to the ambulance trust's clinical support line. Of these, 775 were also referred to the primary care confederation, with 340 (43.9%) undergoing a medicine review (Table 3).

Table 3. Summary of cases referred to the medicine review pathway.

Case Demographic	All Referred *n* = 775	Received Medicine Review *n* = 340 (43.9%)	Did Not Receive Medicine Review *n* = 435 (56.1%)
Age *median (IQR)*	84 (77–89)	84 (77–89)	84 (77–90)
Patient fallen in last 12 months			
Yes	573 (73.9%)	243 (71.5%)	330 (75.9%)
No	159 (20.5%)	79 (23.2%)	80 (18.4%)
Not recorded	43 (5.6%)	18 (5.3%)	25 (5.7%)
Patient prescribed ≥ 4 medicines	597 (77.0%)	264 (77.6%)	333 (76.6%)
Ambulance crew concerned about medicines	173 (22.3%)	64 (18.8%)	109 (25.1%)
Time from referral to initial review decision *median days (IQR)*	10 (4–27)	9 (3–21)	28 (10–109)

Among referred cases, 73.9% had experienced a fall in the previous year, and 77.0% met the definition of polypharmacy (≥4 medicines). Demographics were similar across groups, although ambulance crews more frequently flagged medicine concerns in patients who did not receive a review (25.1% vs. 18.8%). The median time from referral to review decision was significantly shorter for those who were reviewed (9 days) compared to those who were not (28 days).

Among non-reviewed cases, 92 had documented reasons, including referral process errors (n = 32), inability to contact patients (n = 12), recent hospitalization (n = 12), review deemed unnecessary (n = 12), care home residency (n = 6), recent review elsewhere (n = 5), and other reasons (n = 13). For most others, no reason was recorded, but this was likely due to capacity constraints. Additionally, 32 referrals from May to July 2019 were lost due to human error and excluded from analysis.

3.1. Referral Rate, Suitability, and Clinical Impact

Among reviewed patients (see Table 4), most medicine reviews were conducted remotely—36.8% via notes and 22.6% by telephone—while only 2.1% were face-to-face. However, the review method was not recorded in 38.5% of cases, limiting interpretation.

Frailty data showed a bimodal distribution, with most patients categorized as either not frail or moderate/severely frail. Only 1.8% were identified as mildly frail—potentially due to limitations in frailty assessment tools or reporting practices.

Of the patients who received a medicine review, 77.4% were considered appropriate. As this was only recorded for reviewed cases, comparisons with non-reviewed patients—who made up 56.1% of referrals—are limited.

Recontact rates (Table S3) were assessed by comparing the 127 patients who received a review and could be matched on their NHS number, with 2483 local over-65s who had called the ambulance service for falls. No referred participants recontacted the ambulance trust within a week of discharge, compared to 2.1% of the reference group. The difference at 30 days was not statistically significant (98.0% vs. 94.0%, $p = 0.11$).

Table 4. Demographics of reviewed patients.

Case Demographic	n (%)
Frailty	
Severe	86 (25.3%)
Moderate	106 (31.2%)
Mild	6 (1.8%)
Not frail	128 (37.6%)
Not recorded	14 (4.1%)
Pharmacist review type	
Face-to-face	7 (2.1%)
Telephone	77 (22.6%)
Notes based	125 (36.8%)
Not recorded	131 (38.5%)
Referral considered appropriate	
Yes	263 (77.4%)
No	67 (19.7%)
Not recorded	10 (2.9%)

3.2. Medicine Optimisation

Polypharmacy was prevalent, with 91% (n = 308) of reviewed patients prescribed ≥4 medicines (Table 3). The median number of medicines (Table 5) remained unchanged before and after review (9; IQR 6–12). However, 272 patients had adjustments to their prescriptions, including 122 with medicines deprescribed and 11 prescribed new ones. Pharmacists recommended 149 additional changes (43.8%), such as dose/timing adjustments, medicine switches, or referrals for further review.

Table 5. Summary of changes to medicine during review.

Proforma Field	n (%) or Median (IQR)
Number of medicines	
Prior to review	9 (6–12)
After review	9 (6–12)
Stopped by pharmacist	0 (0–0)
Changes recommended by pharmacists	149 (43.8%)
Pharmacist categorization of medicine fall risk as per PrescQIPP	
Yes	76 (22.2%)
High risk	43 (12.6%)
Medium risk	11 (3.2%)
Possible risk	13 (3.8%)
Risk present but level not recorded	9 (2.6%)
No	51 (15.0%)
Not recorded	213 (62.6%)

Pharmacists identified medicines as a likely contributor to falls in 22.2% of cases (Table 5), with 12.6% considered high risk. However, this was not recorded in 62.6% of reviews, limiting broader analysis. Pharmacists changed medicines related to fall risks for 46 patients, of which 28 were high-risk medicines.

3.3. Patient Experiences and Feelings

Of 265 patients referred for a medicine review between 7 August 2019 and 23 March 2020, 218 were sent a postal survey; 48 responded (22%), representing a third (36.4%) of the target sample size. Table 6 provides a breakdown of the demography of respondents.

Table 6. Demographic summary of patient experience survey.

Survey Question	n (%) or Mean (SD)
Age	83.59 (9.99)
Gender	
Male	26 (54.2%)
Female	21 (43.8%)
N/A	1 (2.1%)
Ethnic group	
Asian/Asian British Indian	1 (2.1%)
White British	44 (91.7%)
White Irish	2 (4.2%)
N/A	1 (2.1%)
How many medicines were you taking?	
0	1 (2.1%)
1 to 4	14 (29.2%)
5 or more	30 (62.5%)
Don't know	1 (2.1%)
N/A	2 (4.2%)
How was your medicines review undertaken?	
Face-to-face	15 (31.2%)
Telephone	13 (27.1%)
Don't know	14 (29.2%)
N/A	6 (12.5%)

Respondents were predominantly older adults (mean age 83.59) with a slight female bias (54.2%). Most identified as White British (95.9%). Given the lack of ethnic diversity, ethnicity was excluded from the statistical model.

Most respondents (91.7%) took medicines (n = 44), with 62.5% taking five or more. Respondents reported that their reviews were undertaken face-to-face (31.2%), via telephone (27.1%), or could not recall the method (29.2%), which was inconsistent with Table 4, where most reviews appeared to be notes-based. This discrepancy may stem from patients being unaware that a review occurred if it was a notes review with no observable changes—indeed, four participants were unaware that they had had a medicine review at all.

A third of respondents (n = 16) reported no medicine change (Figure 1); many described adjustments, including stopping or switching medicines, or changes in dose/timing. Additionally, 23 received advice or information. Outcomes were broadly similar across review types.

Free-text responses (n = 30) indicated that nearly half reported no change in behavior post-review. Others mentioned using aids (e.g., alarms, dosette boxes), falls prevention strategies (e.g., mobility aids, reducing hazards, increasing light levels), or awaiting specialist input (e.g., hospice, pain clinic, or ear, nose, throat).

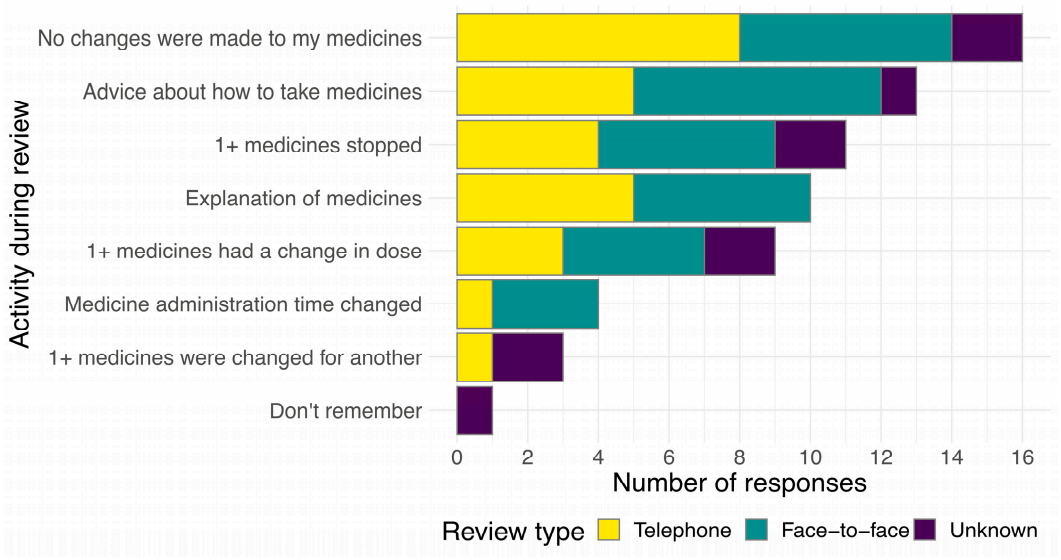

Figure 1. Breakdown of medicine review activity by method of review.

Thirty-eight participants reported emotions before and after review. Emotional change was reported in eight participants (16.7%), with seven reporting a positive change ($p = 0.07$). Most (n = 23) reported neutrality before and after review (Table 7).

Table 7. Reported patient emotions before and after review.

Reported Emotion Before Review	Reported Emotion After Review (n)		
	Negative	*Neutral*	*Positive*
Negative	2	3	4
Neutral	0	23	0
Positive	0	1	5

Proportional odds modeling revealed wide confidence intervals for all factors except age (1.00, 0.91–1.11) (Table S4).

3.4. Ambulance Healthcare Professional Perceptions

A total of 146 responses (44% of the target sample) were received between May 2019 and May 2020. Table 8 indicates a summary of respondent profiles. Only 12.3% (n = 18) had made a referral to the non-urgent falls pathway for a medicine review. Most respondents were full-time (76.7%), non-specialist paramedics (44.5%), and frequently attended fall-related calls. Despite limited direct experience with the referral process, 85.6% (n = 125) perceived referral for medicine review as "important" or "very important". No significant differences in perceptions were found between those who had made referrals and those who had not.

Self-reported data on clinical practice (Table S5) revealed that, on average, 45.0% of fallen patients were not conveyed to the hospital. Of these, 80.0% were referred to a falls pathway, 30.0% to primary care, and 40.0% were thought to have difficulty managing their medicine.

The most important indicators that patients were having difficulty managing their medicines were: patients stating that they were not taking their medicines as prescribed and the presence of unused and expired medicines around the home. Less influential factors were difficulty in taking or timing medicines or disorganized storage (e.g., keeping medicines in multiple or hard-to-reach locations) (Table S6).

Table 8. Ambulance healthcare professional survey results summary.

Question	Overall n (%)	Referred n (%)	Not Referred n (%)
Total responses	146 (100%)	18 (12.3%)	128 (87.7%)
Respondent role			
Advanced Paramedic	7 (4.8%)	0 (0%)	7 (5.5%)
Emergency Care Assistant	21 (14.4%)	1 (5.6%)	20 (15.6%)
Emergency Medical Technician	9 (6.2%)	3 (16.7%)	6 (4.7%)
Manager	13 (8.9%)	1 (5.6%)	12 (9.4%)
Newly Qualified Paramedic	21 (14.4%)	1 (5.6%)	20 (15.6%)
Paramedic	65 (44.5%)	11 (61.1%)	54 (42.2%)
Specialist Paramedic	6 (4.1%)	1 (5.6%)	5 (3.9%)
Student Paramedic	4 (2.7%)	0 (0%)	4 (3.1%)
Working arrangement			
Full-time (37.5 h a week)	112 (76.7%)	16 (88.9%)	96 (75.0%)
Part-time (including bank)	34 (23.3%)	2 (11.1%)	32 (25.0%)
How frequently do you attend an incident involving a patient over the age 65 years who has fallen, on average?			
More than once a shift	55 (37.7%)	8 (44.4%)	47 (36.7%)
Once a shift	63 (43.2%)	8 (44.4%)	55 (43.0%)
Once a week	12 (8.2%)	1 (5.6%)	11 (8.6%)
Once a month	16 (11.0%)	1 (5.6%)	15 (11.7%)
Have you or your crewmate referred a patient to a pharmacist for a community medicine review?			
Yes	18 (12.3%)	18 (100%)	0 (0%)
No, and work in the study area	22 (15.1%)	0 (0%)	22 (17.2%)
No, but do not work in the study area	102 (69.9%)	0 (0%)	102 (79.7%)
Unsure	4 (2.7%)	0 (0%)	4 (3.1%)
How important do you feel it is to have the option to refer patients who have fallen and who are taking multiple medicines, to a community pharmacist for review?			
Very important	79 (54.1%)	12 (66.7%)	67 (52.3%)
Important	46 (31.5%)	4 (22.2%)	42 (32.8%)
Neutral	16 (11.0%)	1 (5.6%)	15 (11.7%)
Unimportant	2 (1.4%)	0 (0%)	2 (1.6%)
Very unimportant	1 (0.7%)	0 (0%)	1 (0.8%)
N/A	2 (1.4%)	1 (5.6%)	1 (0.8%)

Ordinal regression modeling of staff demographics revealed no apparent correlation with the value placed on referral (Table S7).

Free-text responses supported this: the most common method of identifying difficulties was direct observation of a person's living situation (n = 121), followed by disclosure from the patient or their carer (n = 72), the patient's clinical presentation (n = 44), and observation of the patient (n = 7).

Managing difficulty with medicines, or care planning, overwhelmingly involved referral to another service (n = 110, e.g., primary care, intermediate care, or falls response services). Other strategies included discussing and confirming medicine regimens with patients or carers (n = 32), safety netting advice (n = 27), and immediate mitigations

(n = 19), such as disposing of out-of-date medicines, liaising with care services, and clearly identifying to patients which medicines they should be taking and when.

4. Discussion

4.1. Principal Findings

This study explored the feasibility and impact of pharmacist-led medicines review following ambulance discharge after a fall. Most referrals were considered appropriate by pharmacists (77.4%), suggesting sound clinical judgement by ambulance clinicians in recognizing patients who would benefit from receiving a medication review. However, over half of referrals (56.1%) did not result in a review, largely due to poorly reported process failures. These findings suggest the pathway is feasible in principle but limited in practice by implementation challenges.

4.2. Barriers and Facilitators

The high rate of non-completed reviews mirrors findings from similar initiatives in Norway [34] and Australia [35]. Systemic barriers such as organizational capacity, funding, and information transfer were likely shared contributory factors with this study, especially given that the decision to review study participants took longer for those who were not reviewed (28 vs. 9 days). Evidence from implementation frameworks [36] points to potential solutions, such as public funding, safety-oriented regulatory environments, and the generation of local evidence. In resource-limited settings, more selective referral criteria may help ensure capacity is directed towards patients most likely to benefit.

4.3. Polypharmacy and Falls-Risk-Increasing Drugs

Polypharmacy is a well-recognized risk factor in falls [11,37], but as a broad measure, it may lack specificity for identifying those at highest risk of falls. PrescQIPP [30], STOPPFall [38], and the National Falls Prevention Coordination Group [39] provide lists of falls-risk-increasing drugs (FRIDs), many of which are psychotropics. Given evidence that deprescribing these medicines can reduce fall rates [21,40], targeting patients prescribed FRIDs could optimize resource use and improve outcomes.

4.4. Measuring the Effectiveness of Referrals

This study found a limited impact of the referral intervention on medicines or outcomes, with no change in median number of medicines prescribed pre- and post-review (n = 9 [6–12]), and few adjustments to medicines associated with fall risk (13.5%). Only 28 high-risk medicines were altered across 775 referrals, suggesting that the intervention had minimal influence on pharmacotherapy.

Evidence from previous studies is mixed. Some trials have shown no effect on recontacts or healthcare costs [41,42], while others have demonstrated reductions in hospital admissions [43]. Our findings align with several studies of ED-based medicine reviews [34,44–46], which reported statistically non-significant improvements in recontact rates. In contrast, several ward-based medicine review studies have shown consistent benefits, including fewer ED revisits [47–50], readmission [48–50], and lower healthcare costs [48]. Collectively, these findings raise questions as to whether urgent and emergency care settings are the most appropriate environment for medicines optimization.

Moreover, the reliance on recontact as a primary outcome is questionable. Short-term reductions may reflect system processes rather than meaningful improvements in health [42,43]. In our study, recontact did not necessarily imply ambulance attendance, as many calls were managed through urgent care pathways or specialist responders. More clinically relevant outcomes—such as admissions, injury and fall rates, fear of falling,

reattendance outcomes, and costs associated with these events—were not captured, yet are likely to offer a clearer picture of patient benefit. Although, previous work suggests these outcomes may also show limited gains; for example, Mikolaizak et al. [35] found no quality of life improvement following multifactorial reviews.

4.5. Patients' Emotional Response

Patients in this study showed little emotional engagement with their medicines, and many did not recognize that a review had taken place. This suggests that the intervention did not align with patient expectations, which often center on discussing lived experiences such as side effects, treatment efficacy, and concerns [51]. Instead, reviews were perceived as administrative, with limited visibility of pharmacists' expertise, echoing findings from previous work [51,52].

Adherence to follow-up may also be influenced by patient perceptions of pharmacists' roles. Previous studies have suggested that limited recognition of pharmacists' clinical expertise beyond medicines supply can reduce engagement [34,35,53]. However, since data were collected for this study, the NHS strategy has triggered an increase in the number of pharmacists working in primary care [54], with a focus on medicine reviews for patients who have fallen or are frail [55]. This shift may enhance public awareness of pharmacists' clinical contributions and strengthen patient engagement in medicine reviews.

Low awareness and limited follow-up engagement highlight a missed opportunity to deliver more patient-centered care. Local initiatives, such as multi-language resources [56] and educational videos [57], represent important steps toward strengthening this patient-facing dimension.

4.6. Ambulance Staff Perceptions and Behavior

Ambulance staff valued pharmacist-led medicine reviews, particularly given their first-hand insights into patient behaviors, such as stockpiling or expired medicines. This supports the potential role of paramedics in identifying medication-related risks that may not be apparent in hospital settings [26,34,58]. However, acute use of the referral pathway was low: despite frequent falls-related attendances and high rates of non-conveyance, only 12% of surveyed staff reported making a referral. This discrepancy between positive attitudes and limited action likely reflects implementation challenges, including time pressures, pathway visibility, and competing clinical priorities, as well as known biases in self-reported practices [59,60]. These findings highlight the gap between intention and behavior, raising questions about the true scale of under-referral and the feasibility of relying on self-report for evaluation. Embedding pharmacists more visibly in falls pathways, alongside system-level monitoring of referral activity, may help reduce this gap. Importantly, future work should consider how referral processes can be simplified and aligned with paramedics' workflow to translate support into consistent practice.

4.7. Limitations

All elements of this project were suspended in March 2020 due to the COVID-19 pandemic response in the United Kingdom. Redeployment of clinical staff to frontline roles and national reprioritization of research capacity delayed the analysis of results significantly. Given the delay between data acquisition and analysis presented in this article, the authors invite readers to share the careful consideration applied during the interpretation and evaluation of results.

Key statistical analyses, including regression models and McNemar's test, did not produce statistically significant results—possibly due to small sample sizes and low event rates, which limit external validity and generalizability. Improving participant recruitment, such as through multi-modal contact methods or incentivization [61], could enhance re-

sponse rates for both patients and professionals. Many proformas were returned with incomplete data, with 62.6% of reviews lacking recorded medicine risk levels. Similar challenges with incomplete data capture and low sample sizes have been reported in previous studies [52]. Ethnicity data were not collected, preventing examination of differences across ethnic backgrounds. Future research should explore electronic data capture and stricter methods to improve completeness. Medicine reviews now benefit from a dedicated code on NHS primary care systems, which may aid future identification of participants and review activities.

Surveys asked patients how many medicines they were taking before the review, but responses were not categorized based on the study definition of polypharmacy (0, 1–4, 5+ vs. $\geq$4), preventing comparison of polypharmacy rates between referred and responding participants. Recontact rates, while pragmatic, may underestimate broader clinical impact. The control group may have included patients requiring hospital conveyance, unlike the more selectively referred group, and referral decisions may reflect selection bias, with high-risk patients more likely to be referred than isolated falls.

An additional limitation relates to the study measures themselves. While service-level outcomes were derived from routine data and exploratory survey items were informed by prior literature and the expertise of the multidisciplinary research team to maximize face validity, formal psychometric testing (e.g., reliability or construct validity) was not undertaken. Consequently, measures of patient emotions and staff perceptions should be interpreted cautiously, and findings may not be generalizable beyond this service evaluation context. Future work could incorporate validated instruments or pilot survey items to strengthen reliability and comparability.

The study's urban setting within a public health system limits generalizability to low-resource settings, rural and coastal environments, or private sector care systems. Rural regions often suffer from a city-centric approach to service prioritization and require bespoke approaches to managing cases in these communities [52].

4.8. Future Research

While the causative nature of falls is unlikely to have changed significantly since these data were collected, it should be considered that there are emergent stakeholders in the management of adults who fall. Virtual wards and frailty services, non-medical prescribers (including specialist paramedics), and non-clinical falls services all have a key role to play in managing these patients. Exploration of patients managed by these stakeholders may yield further information about effectiveness and potential opportunities to intervene with these skillsets, especially considering there may be an existing reluctance to adhere to recommendations by subject matter experts (pharmacists).

The economic impact of such an intervention should be further explored to understand the cost of achieving specific measures, which should also be more carefully selected. Specific changes to medicines (e.g., changes to dosage, changes to timing) should be mapped against meaningful patient outcomes (e.g., serial falls, fracture within months, fear of falling) to more clearly understand whether medicine review has an impact on patients' lives, which may be achievable through the use of new medicine review coding practices.

Further research should explore how those taking medicines feel about their medicines, especially in the context of fall risk, to help better understand patient expectations and needs. Additionally, given that medicine review as an isolated intervention may not prove effective, further research should consider the exploration of longitudinal and holistic approaches to shared management of medicines between the patient and the healthcare professional.

Finally, research in a more diverse range of settings may reveal demographic patterns, especially in rural and coastal communities. Investigation of participant feelings should focus on a more ethnically diverse range of perspectives.

5. Conclusions

Referral to a pharmacist-led medicine review pathway following ambulance attendance for a fall demonstrated a marginal improvement in recontact rates in the short-term, with limited evidence of improved patient safety. While reviews were often clinically appropriate, their impact was constrained by low completion rates, unclear communication with patients, and minimal emotional engagement. Despite strong paramedic support for the referral pathway, actual referral rates were lower than expected, suggesting a disconnect between reported and actual practice. To realize the pathway's potential, future work should address efficacy, implementation barriers, costs, and alignment with patient expectations.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/ecm2040049/s1, Figure S1: Non-urgent falls pathway; Figure S2: Patient survey booklet; Figure S3: Staff survey; Table S1: SQUIRE checklist; Table S2: CROSS checklist; Table S3: Recontact rates; Table S4: Proportional odds model (patients); Table S5: Self-reported practices by ambulance healthcare professionals when managing falls; Table S6: Perceived risk factors for patients having difficulty managing their medicine ordered by weight mean; Table S7: Ordinal regression for staff characteristics.

Author Contributions: Conceptualization, H.S., E.T., H.E., P.W., G.P., F.B., and R.M.; Data curation, R.P.; Formal analysis, W.M., C.W., and R.P.; Funding acquisition, F.B. and R.M.; Methodology, W.M., C.W., R.P., and F.B.; Project administration, R.P., R.F., and F.B.; Validation, R.P., R.F., and S.W.; Writing—original draft, W.M., C.W., and R.P.; Writing—review and editing, W.M., C.W., R.P., R.F., S.W., H.S., H.E., P.W., G.P., and F.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the National Institute for Health Research (NIHR) Yorkshire and Humber Patient Safety Research Collaboration (PSRC) Safety Innovational Challenge Fund, number SICF19/03/3a. The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki. The surveys completed were approved by the Health Research Authority (IRAS 263976, 19 July 2019) and the National Health Service Research Ethics Committee (19/YH/0211, 19 July 2019). The service evaluation aspect was registered with the Yorkshire Ambulance Service NHS Trust.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The datasets generated and analyzed during the current study are not publicly available as sharing the raw data would violate the agreement to which participants consented; however, the datasets are available from the corresponding author on reasonable request.

Acknowledgments: We would like to thank the patients, pharmacists, and ambulance staff for participating in this study. We would also like to extend thanks to Elisha Miller, who supported the study through data coding and processing, and Dawn Teare, who advised on statistical analysis.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Abbreviations

The following abbreviations are used in this manuscript:

SQUIRE	Standards for Quality Improvement Reporting Excellence (2.0)
CROSS	Checklist for Reporting of Survey Studies
CI	Confidence Interval
FRIDs	Fall-Risk-Increasing Drugs
GP	General Practitioner
NHS	National Health Service
OR	Odds Ratio
IQR	Interquartile Range

References

1. Stevens, J.A.; Mahoney, J.E.; Ehrenreich, H. Circumstances and outcomes of falls among high risk community-dwelling older adults. *Inj. Epidemiol.* **2014**, *1*, 5. [CrossRef] [PubMed]
2. Jørstad, E.; Hauer, K.; Becker, C.; Lamb, S. Measuring the psychological outcomes of falling: A systematic review. *J. Am. Geriatr. Soc.* **2005**, *53*, 501–510. [CrossRef] [PubMed]
3. Schoene, D.; Heller, C.; Aung, Y.; Sieber, C.; Kemmler, W.; Freiberger, E. A systematic review on the influence of fear of falling on quality of life in older people: Is there a role for falls? *Clin. Interv. Aging* **2019**, *14*, 701–719. [CrossRef] [PubMed]
4. Hollinghurst, R.; Williams, N.; Pedrick-Case, R.; North, L.; Long, S.; Fry, R.; Hollinghurst, J. Annual risk of falls resulting in emergency department and hospital attendances for older people: An observational study of 781,081 individuals living in wales (united kingdom) including deprivation, frailty and dementia diagnoses between 2010 and 2020. *Age Ageing* **2022**, *51*, afac176. [CrossRef]
5. Public Health England. *Falls and Fracture Consensus Statement: Supporting Commissioning for Prevention*; Public Health England: London, UK, 2017.
6. O'Cathain, A.; Knowles, E.; Bishop-Edwards, L.; Coster, J.; Crum, A.; Jacques, R.; James, C.; Lawson, R.; Marsh, M.; O'Hara, R.; et al. Understanding variation in ambulance service non-conveyance rates: A mixed methods study. *Health Serv. Deliv. Res.* **2018**, *6*, 45. [CrossRef]
7. Joint Royal Colleges Ambulance Liaison Committee (JRCALC); Association of Ambulance Chief Executives (AACE). Falls in older adults. In *Jrcalc Clinical Guidelines*; Class Publishing Ltd.: Bridgwater, UK, 2022.
8. Dhalwani, N.; Fahami, R.; Sathanapally, H.; Seidu, S.; Davie, M.; Khunti, K. Association between polypharmacy and falls in older adults: A longitudinal study from england. *BMJ Open* **2017**, *16*, e016358. [CrossRef]
9. Montero-Odasso, M.; van der Velde, N.; Martin, F.; Petrovic, M.; Tan, M.; Ryg, J.; Aguilar-Navarro, S.; Alexander, N.; Becker, C.; Blain, H.; et al. World guidelines for falls prevention and management for older adults: A global initiative. *Age Ageing* **2022**, *51*, 1501. [CrossRef]
10. National Institute for Health and Care Excellence (NICE). Falls: Assessment and Prevention in Older People and in People 50 and Over at Higher Risk. NICE Guideline ng249. 2025. Available online: https://www.nice.org.uk/guidance/ng249 (accessed on 13 October 2025).
11. Smith, H. Role of medicines management in preventing falls in older people. *Nurs. Older People* **2022**, *34*, 16–22. [CrossRef]
12. Crawford, P.; Plumb, R.; Burns, P.; Flanagan, S.; Parsons, C. A quantitative study on the impact of a community falls pharmacist role, on medicines optimisation in older people at risk of falls. *BMC Geriatr.* **2024**, *24*, 1–10. [CrossRef]
13. Curtin, D.; Jennings, E.; Daunt, R.; Curtin, S.; Randles, M.; Gallagher, P.; O'Mahony, D. Deprescribing in older people approaching end of life: A randomized controlled trial using stoppfrail criteria. *J. Am. Geriatr. Soc.* **2019**, *68*, 762–769. [CrossRef]
14. Marvin, V.; Ward, E.; Poots, A.; Heard, K.; Rajagopalan, A.; Jubraj, B. Deprescribing medicines in the acute setting to reduce the risk of falls. *Eur. J. Hosp. Pharm.* **2017**, *24*, 10–15. [CrossRef]
15. Wright, D.; Holland, R.; Alldred, D.; Bond, C.; Hughes, C.; Barton, G.; Poland, F.; Shepstone, L.; Arthur, A.; Birt, L.; et al. *The Care Home Independent Pharmacist Prescriber Study (Chipps): Development and Implementation of an Rct to Estimate Safety, Effectiveness and Cost-Effectiveness*; National Institute for Health and Care Research: Southampton, UK, 2023.
16. Ming, Y.; Zecevic, A.; Hunter, S.; Miao, W.; Tirona, R. Medication review in preventing older adults' fall-related injury: A systematic review & meta-analysis. *Can. Geriatr. J.* **2021**, *24*, 237–250. [CrossRef]
17. Zermansky, A.; Alldred, D.; Petty, D.; Raynor, D.; Freemantle, N.; Eastaugh, J.; Bowie, P. Clinical medication review by a pharmacist of elderly people living in care homes—Randomised controlled trial. *Age Ageing* **2006**, *35*, 586–591. [CrossRef]
18. Pit, S.; Byles, J.; Henry, D.; Holt, L.; Hansen, V.; Bowman, D. A quality use of medicines program for general practitioners and older people: A cluster randomised controlled trial. *Med. J. Aust.* **2007**, *187*, 23–30. [CrossRef] [PubMed]

19. Phelan, E.; Williamson, B.; Balderson, B.; Cook, A.; Piccorelli, A.; Fujii, M.; Nakata, K.; Graham, V.; Theis, M.; Turner, J.; et al. Reducing central nervous system–active medications to prevent falls and injuries among older adults: A cluster randomized clinical trial. *JAMA Netw. Open* **2024**, *7*, e2424234. [CrossRef] [PubMed]
20. Seppala, L.; Kamkar, N.; van Poelgeest, E.; Thomsen, K.; Daams, J.; Ryg, J.; Masud, T.; Montero-Odasso, M.; Hartikainen, S.; Petrovic, M.; et al. Medication reviews and deprescribing as a single intervention in falls prevention: A systematic review and meta-analysis. *Age Ageing* **2022**, *51*, afac191. [CrossRef] [PubMed]
21. Gillespie, L.; Robertson, M.; Gillespie, W.; Sherrington, C.; Gates, S.; Clemson, L.; Lamb, S. Interventions for preventing falls in older people living in the community. *Cochrane Database Syst. Rev.* **2012**, *2021*, CD007146. [CrossRef]
22. Cameron, I.; Dyer, S.; Panagoda, C.; Murray, G.; Hill, K.; Cumming, R.; Kerse, N. Interventions for preventing falls in older people in care facilities and hospitals. *Cochrane Database Syst. Rev.* **2018**, *9*, CD005465. [CrossRef]
23. Almutairi, H.; Stafford, A.; Etherton-Beer, C.; Flicker, L. Optimisation of medications used in residential aged care facilities: A systematic review and meta-analysis of randomised controlled trials. *BMC Geriatr.* **2020**, *20*, 1–19. [CrossRef]
24. Lee, J.; Negm, A.; Peters, R.; Wong, E.; Holrbook, A. Deprescribing fall-risk increasing drugs (frids) for the prevention of falls and fall-related complications: A systematic review and meta-analysis. *BMJ Open* **2021**, *11*, e035978. [CrossRef]
25. Acquisto, N.; Cushman, J.; Rice, A.; Edwards, C. Collaboration by emergency medicine pharmacists and prehospital services providers. *Am. J. Health-Syst. Pharm.* **2020**, *77*, 918–921. [CrossRef]
26. Crockett, B.; Jasiak, K.; Walroth, T.; Degenkolb, K.; Stevens, A.; Jung, C. Pharmacist involvement in a community paramedicine team. *J. Pharm. Sci.* **2016**, *30*, 223–228. [CrossRef] [PubMed]
27. Hayball, P.; Elliot, R.; Morris, S. Ambulance pharmacist—Why haven't we thought of this role earlier? *Pharm. Pract. Res.* **2015**, *45*, 318–321. [CrossRef]
28. Ogrinc, G.; Davies, L.; Goodman, D.; Batalden, P.; Davidoff, F.; Stevens, D. Squire 2.0 (standards for quality improvement reporting excellence): Revised publication guidelines from a detailed consensus process. *BMJ Qual. Saf.* **2016**, *25*, 986–992. [CrossRef] [PubMed]
29. Sharma, A.; Duc, N.T.T.M.; Thang, T.L.L.; Nam, N.H.; Ng, S.J.; Abbas, K.S.; Huy, N.T.; Marušić, A.; Paul, C.L.; Kwok, J.; et al. A consensus-based checklist for reporting of survey studies (cross). *J. Gen. Intern. Med.* **2021**, *36*, 3179–3187. Available online: https://pubmed.ncbi.nlm.nih.gov/33886027/ (accessed on 13 October 2025). [CrossRef]
30. PrescQIPP. Bulletin 87. Care Homes—Edication and Falls. 2014. Available online: https://www.prescqipp.info/media/1206/b87-care-homes-medication-and-falls-21.pdf (accessed on 13 October 2025).
31. Agresti, A. *Analysis of Ordinal Categorical Data*, 2nd ed.; Wiley: Hoboken, NJ, USA, 2010.
32. Harrell, F. *Regression Modeling Strategies: With Application to Linear Models Logistic Regression, and Survival Analysis*; Springer: New York, NY, USA, 2001.
33. Julious, S.; Campbell, M.; Altman, D. Estimating sample sizes for continuous, binary, and ordinal outcomes in paired comparisons: Practical hints. *J. Biopharm. Stat.* **1999**, *9*, 241–251. [CrossRef]
34. Nymoen, L.; Flatebø, T.; Moger, T.; Øie, E.; Molden, E.; Viktil, K. Impact of systematic medication review in emergency department on patients' post-discharge outcomes—A randomised controlled clinical trial. *PLoS ONE* **2022**, *17*, e0274907. [CrossRef]
35. Mikolaizak, A.; Lord, S.; Tiedeman, A.; Simpson, P.; Caplan, G.; Bendall, J.; Howard, K.; Webster, L.; Payne, N.; Hamilton, S.; et al. A multidisciplinary intervention to prevent subsequent falls and halth service use following fall-related paramedic care: A randomised controlled trial. *Age Ageing* **2017**, *46*, 200–208. [CrossRef]
36. Al Bulushi, S.; McIntosh, T.; Grant, A.; Stewart, D.; Cunningham, S. Implementation frameworks for polypharmacy management within healthcare organisations: A scoping review. *Int. J. Clin. Pharm.* **2023**, *45*, 343–354. [CrossRef]
37. Seppala, L.; van de Glind, E.; Daams, J.; Ploegmakers, K.; de Vries, M.; Wermelink, A.; van der Velde, N. Fall-risk-increasing drugs: A systematic review and meta-analysis: Iii. Others. *J. Am. Med. Dir. Assoc.* **2018**, *19*, 372.e1–372.e8. [CrossRef]
38. Seppala, L.; Petrovic, M.; Ryg, J.; Bahat, G.; Topinkova, E.; Szczerbińska, K.; van der Cammen, T.; Hartikainen, S.; Ilhan, B.; Landi, F.; et al. Stoppfall (screening tool of older persons prescriptions in older adults with high fall risk): A delphi study by the eugms task and finish group on fall-risk-increasing drugs. *Age Ageing* **2021**, *50*, 1189–1199. [CrossRef]
39. Alićehajić-Bečić, Đ.; Smith, H. Medicines and Falls—What does the audience participation indicate about future learning needs. *Age Ageing* **2024**, 53. [CrossRef]
40. Campbell, A.; Robertson, M.; Gardner, M.; Norton, R.; Buchner, D. Psychotropic medication withdrawal and a home-based exercise program to prevent falls: A randomized, controlled trial. *J. Am. Geriatr. Soc.* **2015**, *47*, 850–853. [CrossRef] [PubMed]
41. Bonner, M.; Capsey, M.; Batey, J. A paramedic's role in reducing number of falls and fall-related emergency service use by over 65s: A systematic review. *Br. Paramed. J.* **2021**, *6*, 46–52. [CrossRef]
42. Shaya, F.; Chirikov, V.; Rochester, C.; Zaghab, R.; Kucharski, K. Impact of a comprehensive pharmacist medication-therapy management service. *J. Med. Econ.* **2015**, *18*, 828–837. [CrossRef] [PubMed]
43. Siddle, J.; Pang, P.; Weaver, C.; Weinstein, E.; O'Donnell, D.; Arkins, T.; Miramonti, C. Mobile integrated health to reduce post-discharge acute care visits: A pilot study. *Am. J. Emerg. Med.* **2018**, *36*, 843–845. [CrossRef] [PubMed]

44. Graabæk, T.; Hedegaard, U.; Christensen, M.; Clemmensen, M.; Knudsen, T.; Aagaard, L. Effect of a medicines management model on medication-related readmissions in older patients admitted to a medical acute admission unit—A randomized controlled trial. *J. Eval. Clin. Pr.* **2019**, *25*, 88–96. [CrossRef]
45. Kitchen, S.; McGrail, K.; Wickham, M.; Law, M.; Hohl, C. Emergency department-based medication review on outpatient health services utilization: Interrupted time series. *BMC Health Serv. Res.* **2020**, *20*, 254. [CrossRef]
46. Santolaya-Perrín, R.; Calderón-Hernanz, B.; Jiménez-Díaz, G.; Galán-Ramos, N.; Moreno-Carvajal, M.; Rodríguez-Camacho, J.; Serra-Simó, P.; García-Ortiz, J.; Tarradas-Torras, J.; Ginés-Palomares, A.; et al. The efficacy of a medication review programme conducted in an emergency department. *Int. J. Clin. Pharm.* **2019**, *41*, 757–766. [CrossRef]
47. De Oliveira, G.; Castro-Alves, L.; Kendall, M.; McCarthy, R. Effectiveness of pharmacist intervention to reduce medication errors and health-care resources utilization after transitions of care: A meta-analysis of randomized controlled trials. *J. Patient Saf.* **2021**, *17*, 375–380. [CrossRef]
48. Gillespie, U.; Alassaad, A.; Henrohn, D.; Garmo, H.; Hammarlund-Udenaes, M.; Toss, H.; Kettis-Lindblad, Å.; Melhus, H.; Mörlin, C. A comprehensive pharmacist intervention to reduce morbidity in patients 80 years or older—A randomized controlled trial. *JAMA Intern. Med.* **2009**, *169*, 894–900. [CrossRef]
49. Hawes, E.; Maxwell, W.; White, S.; Mangun, J.; Lin, F. Impact of an outpatient pharmacist intervention on medication discrepancies and health care resource utilization in posthospitalization care transitions. *J. Prim. Care Community Health* **2013**, *5*, 14–18. [CrossRef]
50. Phatak, A.; Prusi, R.; Ward, B.; Hansen, L.; Williams, M.; Vetter, E.; Chapman, N.; Postelnick, M. Impact of pharmacist involvement in the transitional care of high-risk patients through medication reconciliation, medication education, and postdischarge call-backs (ipitch study). *J. Hosp. Med.* **2015**, *11*, 39–44. [CrossRef] [PubMed]
51. McCahon, D.; Duncan, P.; Payne, R.; Horwood, J. Patient perceptions and experiences of medication review: Qualitative study in general practice. *BMC Prim. Care* **2022**, *23*, 1–10. [CrossRef] [PubMed]
52. Peters, A.; Lim, D.; Naidoo, N. Down with falls! Paramedicine scope regarding falls amongst older adults in rural and remote communiies: A scoping review. *Aust. J. Rural Health* **2023**, *31*, 605–616. [CrossRef] [PubMed]
53. Hindi, A.; Schafheutle, E.; Jacobs, S. Patient and public perspectives of community pharmacies in the United Kingdom: A systematic review. *Health Expect.* **2017**, *21*, 409–428. [CrossRef]
54. Chopra, E.; Choudhary, T.; Hazen, A.; Shrestha, S.; Dehele, I.; Paudyal, V. Clinical pharmacists in primary care general practices: Evaluation of current workforce and their distribution. *J. Pharm. Policy Pract.* **2022**, *15*, 1–9. [CrossRef]
55. NHS England. *Structured Medication Reviews and Medicines Optimisation: Guidance*; NHS England: Redditch, UK, 2021.
56. Health Innovation Network. Resources to Support Patients Having a Structured Medication Review. 2022. Available online: https://thehealthinnovationnetwork.co.uk/programmes/medicines/polypharmacy/patient-information/ (accessed on 13 October 2025).
57. Health Innovation Yorkshire & Humber. Resources to Tackle Polypharmacy. 2024. Available online: https://www.healthinnovationyh.org.uk/resources-to-tackle-polypharmacy/ (accessed on 13 October 2025).
58. Hertig, R.; Ackerman, R.; Zagar, B.; Tart, S. Pharmacy student involvement in a transition of care program. *Curr. Pharm. Teach. Learn.* **2017**, *9*, 841–847. [CrossRef]
59. Eccles, M.; Hrisos, S.; Francis, J.; Kaner, E.; Dickinson, H.; Beyer, F.; Johnston, M. Do self- reported intentions predict clinicians' behaviour: A systematic review. *Implement. Sci.* **2006**, *1*, 28. [CrossRef]
60. Hrisos, S.; Eccles, M.; Francis, J.; Dickinson, H.; Kaner, E.; Beyer, F.; Johnston, M. Are there valid proxy measures of clinical behaviour? A systematic review. *Implement. Sci.* **2009**, *4*, 37. [CrossRef]
61. Heffernan, M.; Macy, M. Survey response rates: Reassessing expectations. *J. Pediatr. Infect. Dis. Soc.* **2025**, *14*, piaf031. [CrossRef]