

Why Do Pharmacist-Led Transitions-of-Care Interventions Work in Some Contexts but Fail in Others? A Realist Review of Context, Mechanisms, Patient Complexity, Interprofessional Integration, and Sustainability, 2017–2026

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Received: 29 March 2026; Revised: 18 June 2026; Accepted: 21 June 2026

ABSTRACT

Pharmacist-led transitions-of-care interventions can improve medication processes, yet effects on downstream utilization and sustainability vary across settings and patient groups. Conventional intervention labels do not adequately explain why apparently similar services produce different outcomes. To develop and refine a realist programme theory explaining how patient complexity, interprofessional integration, information continuity, patient capability, and organizational capacity condition mechanism activation in pharmacist-led transitions of care. A realist review of peer-reviewed evidence published during 2017–2026 used iterative, programme-theory-driven evidence identification and selection for relevance and rigour. Evidence was examined as context, intervention resource or opportunity, mechanism, outcome, rival explanation, and boundary condition. Contradictory and null findings were retained to test and refine explanatory configurations. The synthesis indicates that pharmacist involvement is not a mechanism in itself. Benefits are more plausibly generated when pharmacist resources produce usable medication information, timely opportunities for collaborative action, patient understanding and confidence, and continuity across care boundaries. These mechanisms may be weakened by regimen and patient complexity, fragmented responsibility, poor information transfer, workflow constraints, or insufficient organizational support. Improvement in medication discrepancies may therefore coexist with little change in utilization, while some higher-need subgroups may derive greater benefit. A context-sensitive explanation accommodates variable transition outcomes better than a uniform intervention-effect assumption. The refined theory identifies clinically and organizationally important activation conditions while remaining an explanatory synthesis rather than a validated prediction rule. Transferability depends on setting, population, intervention fidelity, outcome definition, and the evidence supporting individual context–mechanism–outcome configurations.

Keywords: Transitions of care, Pharmacists, Medication reconciliation, Realist review, Medication safety, Interprofessional collaboration

How to Cite This Article: Wiśniewski K, Nowak M, Adamczyk T. Why Do Pharmacist-Led Transitions-of-Care Interventions Work in Some Contexts but Fail in Others? A Realist Review of Context, Mechanisms, Patient Complexity, Interprofessional Integration, and Sustainability, 2017–2026. *Ann Pharm Pract Pharmacother*. 2026;6(1):178-88. <https://doi.org/10.51847/GW1WaUZlfy>

Introduction

Transitions between hospital and community care create a concentrated period of medication risk because treatment plans, professional responsibility, and information move simultaneously. Qualitative implementation work on pharmacist discharge care shows that delivery is experienced through the work of pharmacists, nurses, and physicians rather than as an isolated pharmacy activity [1]. Patient accounts similarly indicate that post-discharge medication-management services are interpreted through their own experiences of medication change

and follow-up, making acceptability and perceived usefulness part of the intervention context rather than incidental outcomes [2].

Cross-setting medication reconciliation illustrates the same problem. In Singapore primary care, stakeholder experiences identified practical challenges surrounding reconciliation after tertiary-hospital discharge and supported movement toward more comprehensive medication review [3]. In a pragmatic Slovenian study, pharmacist-led reconciliation substantially reduced clinically important discharge medication errors but did not reduce subsequent healthcare utilization [4]. Thus, an intervention can improve a proximal medication-safety process without producing the same pattern in a downstream health-service outcome.

This review therefore asks a different question from whether pharmacist-led transitions-of-care interventions work on average. It examines what resources these interventions introduce, what reasoning or responses those resources may activate, for whom, and under which interprofessional and organizational circumstances. The aim is to explain variable success, non-response, and sustainability without treating association as mechanism or local effectiveness as universal transferability.

Initial programme theory and realist review questions

The initial programme theory treated pharmacist-led transitional care as a bundle of resources rather than a single causal ingredient. Evidence from county hospitals in China indicates that pharmacist-led medication reconciliation can be implemented in less established clinical-pharmacy environments, making health-system capacity an important candidate context [5]. Work on medication-change decision-making across transitions highlights opportunities for greater patient and family engagement, suggesting that participation may alter how medication changes are understood and acted on [6]. A systematic synthesis of pharmacist-led medication reviews further identified collaborative working, goal setting, action planning, additional support, and follow-up as recurring components associated with favorable outcomes [7]. Post-discharge discrepancies generated by patients themselves also show that continuity depends on what occurs after formal reconciliation, not only on the accuracy of the discharge list [8].

From these observations, the review asked: when do pharmacist resources improve medication continuity; when do they activate trust, understanding, capability, or collaborative action; when are those mechanisms blocked; and what organizational conditions allow early gains to persist? The programme theory remained deliberately provisional and open to refinement. Medication reconciliation, counselling, communication, and follow-up were treated as intervention resources or opportunities unless evidence supported a distinct reasoning or response process.

Materials and Methods

A realist review design was used because the evidence base comprises complex interventions delivered across heterogeneous patients, professions, workflows, and health systems. The analytic objective was explanatory: to connect context, intervention resources, mechanisms, and outcomes rather than aggregate unlike intervention labels. The evidence base itself illustrates this heterogeneity. The Pharmacy Integrated Transitions trial protocol represents a pragmatic, multi-component transition programme evaluated across routine-care conditions [9]. Co-design research shows that intervention development and evaluation can involve multiple stakeholder groups and that process, context, system, and sustainment require separate consideration [10]. A discharge-intervention scoping review found that readmission-reducing programmes often combined several pharmacist activities or involved broader multidisciplinary programmes, limiting attribution to a single component [11]. Economic evaluation in chronic kidney disease adds another dimension by examining medication reconciliation plus review in a population with high susceptibility to drug-related problems [12].

The review therefore used abductive and retroductive reasoning. Candidate explanations were generated from empirical patterns and challenged against contradictory, null, and contextually dissimilar evidence. A mechanism was coded only when the interpretation concerned a reasoning, response, or generative process enabled by an intervention resource; activities such as reconciliation, counselling, or referral were not relabelled as mechanisms. Causal language was restricted to explanatory propositions and was not used to imply experimentally established mediation.

Search strategy and iterative evidence identification

Evidence identification followed the initial programme theory and was iteratively refined as candidate explanations developed. Early searches combined pharmacist, transition of care, discharge, medication reconciliation, medication review, post-discharge follow-up, readmission, discrepancy, patient engagement, interprofessional communication, and implementation concepts. Subsequent searches tested emerging explanations across different populations, settings, and intervention forms. Evidence concerning older adults in Jordan was retained to examine whether age and medication burden altered reconciliation outcomes [13]. A hospital-based post-discharge pharmacist clinic provided a contrasting service model in which pharmacist follow-up occurred after the transition itself [14]. An emergency-department co-design protocol was relevant because it addressed development of a pharmacist-led transition programme in a rapid-care environment with distinctive workflow and stakeholder requirements [15].

Methodological searching also examined how realist explanations can remain rigorous while being useful to decision-makers. Recent realist-method work emphasizes balancing methodological integrity with outputs that remain interpretable to policy and practice audiences [16]. Evidence identification therefore cycled deliberately between programme theory, empirical findings, rival explanations, negative cases, and context-specific questions. This theory-driven searching strengthened the ability to examine why the same transition resource could operate differently across patients, professions, and organizations.

Selection for relevance and rigour

Selection was based on whether a source could test, refine, or bound the developing programme theory, not on study design hierarchy alone. Evidence was considered relevant when it informed a context, intervention resource, candidate mechanism, outcome pattern, rival explanation, or sustainability condition. Rigour was judged in relation to the inference being drawn. A national Slovenian medication-reconciliation programme was useful for examining routinization, reimbursement, and system embedding rather than for inferring universal effectiveness [17]. Co-designed work on medicine-information handover was relevant to how discharge communication resources might be made usable across professional and patient boundaries [18].

Sources were also retained when they challenged simple success narratives. A scoping review of emergency-department transitions found variation in intervention characteristics and reporting, making intervention fidelity and transfer important analytical considerations [19]. Most importantly, the PHARM-DC randomized trial did not detect an overall reduction in 30-day unplanned hospital or emergency-department utilization, although a subgroup with low medication adherence and literacy appeared to benefit [20]. The overall finding was used productively to test whether patient capability and baseline need condition mechanism activation rather than being treated simply as intervention failure. Evidence adequacy was therefore configuration-specific: a source could strongly support one inference while remaining insufficient for another.

Data extraction and context–mechanism–outcome coding

Extraction captured study setting, population, intervention resources, timing, professional roles, information flows, outcomes, and reported implementation conditions. For each potentially explanatory passage or result, coding separated context from mechanism. A systematic review of post-discharge continuity strategies in older adults was used to identify how continuation of in-hospital medication changes depends on processes extending beyond the hospital boundary [21]. A pharmacist–doctor discharge model contributed evidence about collaboration and timing as features of the medication-reconciliation process [22]. Rural COPD transition services contributed multilevel sustainability information from stakeholders working in two Veterans Affairs settings [23]. Patient complexity was not reduced to medication count. The definitional literature shows substantial variation in how polypharmacy itself is operationalized [24], so the review treated number of medicines as one possible marker rather than a universal threshold for complexity. Mechanism coding focused instead on responses such as increased understanding, confidence, trust in the medication plan, willingness to act on recommendations, perceived role legitimacy, or clinicians’ ability to coordinate action. When such responses represented realist inference rather than an explicitly measured mechanism, they were treated as explanatory propositions and tested against outcomes, contradictory evidence, negative cases, and alternative explanations.

Programme-theory refinement

Refinement proceeded by comparing configurations rather than accumulating only favorable findings. Post-discharge medication-related harm among older adults provided a clinical rationale for focusing on the transition period while also showing that vulnerability can extend beyond the point of discharge [25]. Earlier Cochrane evidence found that medication reconciliation can reduce discrepancies, while effects on downstream clinical outcomes were less consistent [26]. Community-based pharmacist reconciliation after hospital discharge likewise demonstrated the importance of distinguishing discrepancy resolution from broader utilization outcomes [27]. A scoping review of pharmacist-led discharge reconciliation documented considerable heterogeneity in intervention components and outcome assessment [28].

These patterns revised the initial theory in two ways. First, accurate medication information was repositioned as an important resource but not, by itself, a sufficient explanation for reducing later utilization. Second, post-discharge benefit was hypothesized to require conversion of information into coordinated action: patients or caregivers must understand and use the plan, clinicians must recognize and act on pharmacist input, and organizational processes must preserve continuity after discharge. The refined theory therefore accommodates both mechanism activation and mechanism non-activation. It also allows proximal success—such as fewer discrepancies or clearer medication lists—to coexist with unchanged readmission when later clinical events arise through pathways the intervention does not modify.

Results and Discussion

Across the evidence, three recurrent explanatory patterns emerged. First, pharmacist-led reconciliation and review were more consistently associated with medication-process outcomes than with downstream healthcare utilization. An overview of systematic reviews concluded that reconciliation can reduce medication discrepancies while its relationship with subsequent health outcomes remains less established [29]. Second, implementation depended on multilevel conditions. Irish healthcare professionals described barriers and facilitators spanning individual practitioners, tasks, teams, organizational arrangements, and wider systems [30]. These findings support treating context as an active part of explanation rather than a list of background characteristics.

Third, explanatory evidence was distributed across intervention forms, patient groups, and care settings. Methodological examination of realist searching shows that iterative searching is used to pursue and test developing programme theories [31]. In this review, that structure supported deliberate examination of contradictions and contextual variation. The synthesis therefore privileges configuration-level explanation over simple classification of studies as positive or negative. Apparent “failure” can represent at least three analytically different states: an intervention resource may not be delivered as intended; it may be delivered but fail to activate the expected reasoning or response; or the mechanism may activate while the measured distal outcome remains dominated by other causes.

Patient complexity as a contextual condition

Patient complexity was interpreted as a configuration of needs and constraints, not a stable high-risk label. Guidance for complex interventions emphasizes interactions between intervention, context, implementation, and outcomes, supporting analysis of complexity as relational rather than purely individual [32]. Pharmacy-led transition programmes also vary in their effect on readmission across designs and service combinations, which cautions against assuming that identical intervention intensity is appropriate for every patient [33]. Realist implementation work similarly argues that contextual conditions influence whether implementation strategies can generate the processes required for benefit [34].

Within this review, complexity can increase both the need for pharmacist input and the difficulty of converting that input into benefit. Polypharmacy is variably defined [24]; medication burden alone therefore does not capture cognitive load, health literacy, adherence difficulty, caregiver support, multimorbidity, renal impairment, or instability of the medication plan. The PHARM-DC subgroup signal among patients with low adherence and literacy is consistent with the possibility that baseline capability modifies benefit [20], but it does not establish a universal targeting rule. Post-discharge medication harm in older adults further supports the clinical importance of vulnerability after discharge [25]. The proposed interpretation is consequently conditional: complexity matters when it changes the likelihood that information, counselling, follow-up, or coordination will activate usable understanding and sustained medication management.

Interprofessional integration and mechanism activation

Interprofessional integration was interpreted as a context for mechanism activation rather than an outcome in itself. Because realist inference depends on the relevance and rigour of evidence for each explanatory claim, apparent collaboration was not assumed to generate benefit unless the underlying data supported a plausible professional response [35]. This distinction is important because medication-related readmission is influenced by multiple patient, treatment, and care-process factors; coordinated pharmacy input cannot reasonably be expected to modify every pathway leading to rehospitalization [36]. Emergency-department transition programmes nevertheless demonstrate that pharmacists can contribute across the hospital-to-home boundary when their role is incorporated into discharge processes rather than appended after decisions have been completed [37].

Across the wider evidence, integration appeared most plausible when pharmacists had timely access to medication information, opportunities to communicate with prescribers, and recognized authority to clarify or resolve discrepancies [1]. Collaborative pharmacist–doctor discharge reconciliation similarly illustrates how professional interaction can become part of the working intervention rather than a parallel activity [22]. The proposed mechanism is therefore not “teamwork” itself. It is clinicians’ recognition of pharmacist-generated information and their practical ability and willingness to act on it. When responsibilities are unclear, communication is delayed, or recommendations cannot enter the evolving treatment plan, the intervention resource may be present while the intended mechanism remains inactive.

Information continuity, trust, and capability mechanisms

Information continuity was more than transmission of a discharge medication list. Patient and family engagement research indicates that medication changes must be interpreted and negotiated across the transition if patients are to understand what has changed and why [6]. Post-discharge patient-generated discrepancies further show that an accurate list at discharge does not guarantee that the regimen subsequently taken at home remains concordant with the intended plan [8]. Strategies designed to maintain in-hospital medication changes after discharge likewise emphasize continuity beyond the immediate handover event [21].

The synthesis therefore distinguishes three related mechanisms. Comprehension concerns whether patients or caregivers can make sense of the medication plan. Trust concerns whether advice is sufficiently credible and coherent to be acted upon. Capability concerns whether the person can carry out the intended regimen in daily life. Patient experiences of pharmacist-led transition services are consistent with the importance of understandable medication management and follow-up [2]. The subgroup finding in PHARM-DC is also consistent with greater benefit among patients with lower adherence and health literacy [20], although it does not establish those characteristics as validated selection criteria. These mechanisms are proposed as interacting rather than sequential: understanding without practical capability may fail, while capability can deteriorate when contradictory information undermines trust.

Organizational capacity and sustainability

Organizational capacity determined whether initially successful practices could be repeated after the novelty or protected conditions of implementation diminished. Nationally reimbursed medication reconciliation in Slovenia illustrates how financing and formal integration can embed pharmacist activity within routine care rather than leaving continuation dependent on temporary project resources [17]. Rural stakeholder perspectives on a pharmacist-led COPD transition service highlight the importance of staffing, local workflow, leadership support, and contextual fit when maintaining a service over time [23]. Implementation research in Ireland similarly identified barriers and facilitators extending from individual practitioners to teams, organizations, and the broader system [30].

Sustainability was therefore treated as a distinct explanatory problem. A post-discharge clinic may demonstrate usefulness under one staffing model [14], yet transfer to another setting may be constrained if referral pathways, protected pharmacist time, information access, or organizational ownership differ. Emergency-department transition evidence also shows that intervention description and fidelity matter when programmes are compared or transferred [19].

Table 1 separates conditions that may help initiate an early medication-management benefit from those needed to preserve it.

Table 1. Conditions that distinguish short-term activation from sustained pharmacist-led transition mechanisms

Capacity condition	Mechanism enabled or disabled	Early outcome	Sustainability outcome	Failure signal	Transferable boundary
Reliable pharmacist access to current medication information	Enables timely sense-making and discrepancy resolution	More actionable medication plan	Repeated use becomes feasible	Workarounds or delayed reconciliation	Depends on information-system access
Recognized interprofessional role	Enables trust and action on pharmacist input	Recommendations can influence discharge decisions	Collaboration becomes routine	Advice remains peripheral	Role authority varies by setting
Protected staffing and workflow time	Enables consistent delivery	Intervention reaches intended patients	Fidelity can persist	Missed referrals or abbreviated contacts	Resource intensity may not transfer
Stable referral and follow-up pathways	Enables continuity after discharge	Patients receive planned support	Transition support extends beyond one encounter	Patients are lost after discharge	Requires reachable downstream services
Organizational ownership or reimbursement	Enables routinization	Service can operate beyond pilot conditions	Greater structural durability	Dependence on temporary champions or funding	Financing and governance are system-specific

Note: The table represents a proposed realist synthesis. “Early outcome” and “sustainability outcome” are explanatory states rather than quantified effects.

Context–mechanism–outcome configurations explaining success and failure

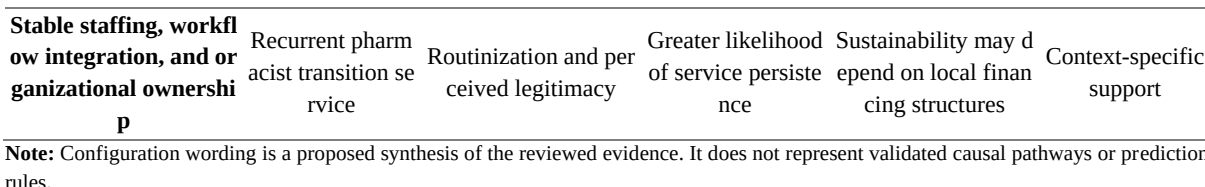
The evidence was most coherent when success and failure were expressed as configurations rather than intervention categories. Where medication complexity or limited capability creates substantial need, structured reconciliation plus understandable follow-up may activate comprehension and practical medication management; this interpretation is consistent with the PHARM-DC subgroup signal but remains conditional [20]. Where pharmacist recommendations are produced within integrated discharge work, timely professional recognition may support action on discrepancies [22]. Conversely, fragmented information or unclear ownership can prevent otherwise appropriate pharmacist input from altering the medication plan [30].

Another configuration concerns the distinction between proximal and distal outcomes. Pharmacist reconciliation can reduce important medication discrepancies while leaving 30-day utilization unchanged [4]. A plausible rival explanation is that readmissions arise partly through illness severity, social circumstances, or other pathways that medication reconciliation does not modify. At the organizational level, embedding and reimbursement may support persistence [17], whereas staffing fragility or poor contextual fit can threaten sustainability even when stakeholders value the service [23].

Table 2 makes these explanatory propositions and their rival explanations explicit.

Table 2. Proposed context–mechanism–outcome configurations explaining variable transition-of-care performance

Context	Resource or opportunity introduced	Mechanism reasoning or response	Outcome pattern	Rival explanation	Evidence adequacy
High medication burden plus limited adherence or literacy	Reconciliation with patient-oriented follow-up	Greater understanding and ability to act	Benefit may concentrate in higher-need patients	Apparent subgroup benefit may reflect unmeasured differences	Suggestive; requires prospective confirmation
Integrated pharmacist–prescriber discharge work	Timely access to pharmacist assessment	Professional recognition and action on recommendations	Discrepancies more likely to be addressed	Effects may depend on staffing or local workflow	Moderate explanatory support
Fragmented handover or unclear ownership	Pharmacist input delivered into weak coordination	Mechanism fails because information is not converted into action	Persistent discrepancies or limited downstream effect	Illness severity may dominate outcome	Recurrent contextual support
Accurate reconciliation but limited post-discharge continuity	Corrected medication information	Proximal accuracy improves without sustained capability	Fewer medication errors with unchanged utilization	Utilization may be driven by non-medication causes	Strong for proximal/distal distinction



Refined programme theory

The refined programme theory proposes that pharmacist-led transitions-of-care interventions produce variable outcomes because their resources must cross several activation boundaries. First, medication information must be sufficiently accurate and timely to be useful. Second, professionals must recognize and be able to act on pharmacist input. Third, patients or caregivers must understand, trust, and practically implement the medication plan. Fourth, organizational arrangements must preserve these processes beyond a single discharge encounter. Failure can therefore occur at different points without implying that the intervention was wholly absent or ineffective. Medication accuracy may improve while utilization remains unchanged [4]; patient-facing benefit may be greater where capability deficits are substantial [20]; and services that function during initial implementation may become fragile when staffing, referral pathways, or institutional ownership weaken [23]. The theory also permits reciprocal effects: successful collaboration can strengthen role legitimacy, whereas repeated communication failures may reduce subsequent reliance on pharmacist input.

Figure 1 depicts these interacting levels and the boundaries at which mechanism activation can be enabled, interrupted, or sustained.

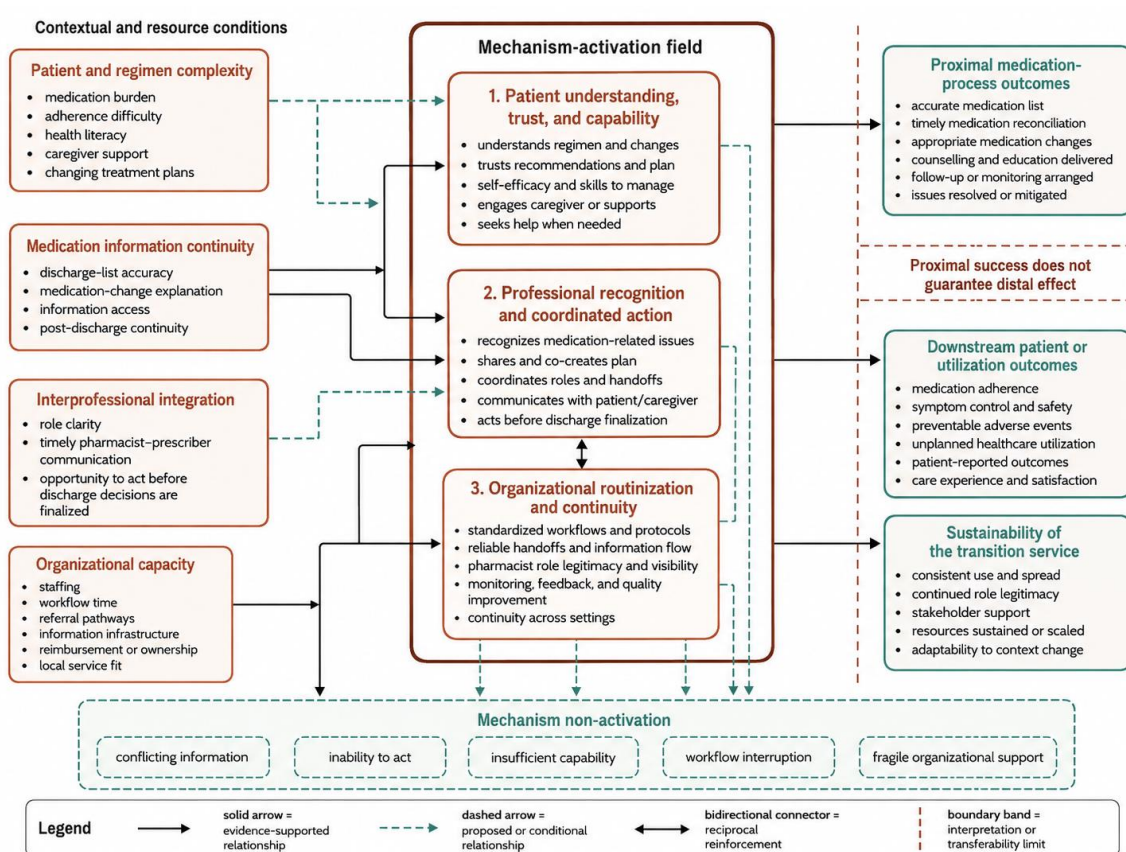


Figure 1. Activation boundaries that separate pharmacist transition resources from sustained patient-level benefit

This realist review offers an explanation for a persistent feature of pharmacist-led transitional care: interventions with apparently similar labels can produce different medication-process, utilization, and sustainability outcomes. The synthesis does not support treating “pharmacist involvement” as a uniform active ingredient. Instead,

reconciliation, review, counselling, communication, and follow-up provide resources whose consequences depend on whether patients, clinicians, and organizations can respond to them.

This interpretation is consistent with evidence showing stronger and more reproducible effects on medication discrepancies than on broader downstream outcomes [26]. The overview of systematic reviews similarly supports a distinction between reconciliation-related process improvement and less consistent effects on health outcomes [29]. Reviews of pharmacy-led transition programmes also show substantial heterogeneity in service combinations and readmission effects [33]. Such heterogeneity should not automatically be dismissed as methodological noise; some of it may reflect genuine variation in the contexts needed for mechanism activation. The proposed theory additionally explains why increasing intervention intensity may not always improve outcomes. A patient with limited medication understanding may benefit from repeated explanation and follow-up, whereas additional contacts may add little when baseline capability is already high and the principal readmission risk lies outside medication management. Likewise, adding a pharmacist to a discharge process will not necessarily change decisions if recommendations arrive too late or professional responsibilities remain fragmented. The negative overall PHARM-DC result, combined with its higher-need subgroup signal, is particularly informative because it challenges uniform-effect assumptions while avoiding the opposite error of claiming a validated targeting rule [20].

Finally, sustainability should be separated from initial effectiveness. A service can generate valued early outcomes yet remain dependent on staffing arrangements, local leadership, referral pathways, financing, or organizational ownership. The relevant realist question is therefore not merely whether a service produced an outcome, but which contextual conditions reproduced the mechanisms required for that outcome to persist.

Implications for transitions-of-care design

The principal practical implication is to design pharmacist-led transitional care around mechanism requirements, not intervention labels. If the intended mechanism is patient understanding, the service must provide intelligible explanations, opportunities for questions, and support that persists beyond discharge where needed. Co-designed handover work suggests that medicine-information transfer should be shaped around the needs of those who must subsequently use it [18]. If the intended mechanism is coordinated clinical action, pharmacists require timely access to information and a route for recommendations to influence prescribing before responsibility disperses across settings.

Targeting may also be preferable to uniform intensity. The PHARM-DC subgroup finding suggests that patients with adherence or literacy difficulties may represent one population in whom additional transition support is particularly relevant [20], but prospective validation is required before operational thresholds are adopted. Continuity strategies for older adults further indicate that medication changes need reinforcement after the hospital episode when responsibility shifts to community clinicians and patients [21].

For implementation, service designers should specify staffing, referral, communication, information-access, and ownership conditions rather than describe only pharmacist tasks. Rural sustainability evidence shows why local capacity and workflow fit matter [23]. Emergency-department evidence also supports clear reporting of intervention components and fidelity when programmes are compared or transferred [19]. These implications provide mechanism-oriented design priorities while remaining appropriately conditional on population and setting.

Review Limitations

Several limitations should qualify interpretation of the programme theory. Realist synthesis requires interpretive judgment when moving from reported intervention processes and outcomes to generative explanations. To reduce this risk, evidence was appraised according to its relevance and rigour for individual explanatory claims, and review-derived mechanism interpretations were distinguished from relationships directly reported by study authors [35].

The underlying literature also varied in care setting, intervention composition, patient characteristics, outcome definition, follow-up duration, and implementation reporting. Emergency-department transition studies, for example, demonstrate variation in intervention characterization and fidelity reporting [19]. Mechanisms such as trust, capability, professional recognition, and routinization were not uniformly measured directly; some therefore remain realist explanations requiring further empirical testing.

Transferability also depends on health-system organization, pharmacist scope of practice, financing, information infrastructure, patient mix, and availability of downstream services. Future evaluations can strengthen or challenge the proposed configurations by prospectively specifying candidate mechanisms and contextual conditions, measuring proximal and distal outcomes separately, examining negative cases, and testing whether similar configurations recur across different transition settings.

Conclusion

Pharmacist-led transitions-of-care interventions are best understood as context-dependent packages of resources rather than uniform treatments. Their effects depend on whether medication information becomes usable, whether clinicians can act collaboratively, whether patients and caregivers can understand and implement the plan, and whether organizations sustain the processes that support continuity.

The refined programme theory explains how medication-process improvement can occur without the same pattern in downstream utilization, why patients with different capability needs may respond differently, and why early benefit may weaken when organizational support changes. These explanations remain testable and context-sensitive rather than universally predictive.

The practical value of the realist approach is diagnostic and explanatory: it identifies where mechanism activation can be strengthened, interrupted, or sustained and provides a structured basis for understanding why pharmacist-led transition programmes produce different outcomes across patients, teams, organizations, and health systems.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

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