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Do Pharmacist-Led Prescribing and Deprescribing Improve Patient Outcomes Without Increasing Treatment Burden? A Systematic Review of Controlled Studies, 2017–2025

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ABSTRACT

Pharmacists increasingly undertake medication review, prescribing and deprescribing, but medication-level improvement does not necessarily establish patient benefit. Effects may depend on pharmacist prescribing authority, whether medication is initiated, modified or withdrawn, comparator intensity, outcome definition and the extent to which treatment burden is measured directly. To determine whether pharmacist-led prescribing and deprescribing improve patient-important outcomes without increasing treatment burden, and to identify the intervention and comparator conditions under which quantitative pooling is clinically interpretable. PubMed/MEDLINE-targeted searches covering pharmacist prescribing, deprescribing, medication review, medication reconciliation and controlled trials from 2017–2025 identified 57 records. Citation-chain and publisher verification identified five additional unique records. After removal of two duplicates, 60 records were screened; 26 reports underwent full-text assessment and 18 controlled studies were included. Outcomes were separated into medication exposure/prescribing quality, clinical benefit, medication harm, healthcare use, quality of life and treatment burden. RoB 2 informed risk-of-bias appraisal for randomized trials. Quantitative pooling was prespecified only for clinically compatible outcome families. Thirty-four records were excluded during title/abstract screening. Eight of 26 full texts were excluded, leaving 18 controlled studies. Pharmacist-led interventions more consistently improved medication-level outcomes than distal patient outcomes. D-PRESCRIBE increased targeted inappropriate-medication discontinuation from 12% to 43%. In CHIPPS, independent pharmacist prescribing reduced Drug Burden Index but did not significantly reduce falls. Other studies showed favorable disease-specific, medication-safety or regimen outcomes alongside null effects for hospitalization, adverse events or generic quality of life. Direct treatment-burden measurement was uncommon. No outcome family satisfied all prespecified criteria for a defensible new pooled estimate.Pharmacist-led prescribing and deprescribing can improve medication use, but medication change cannot be assumed to improve all patient-important outcomes or reduce treatment burden. Interpretation depends particularly on decision authority, intervention direction, comparator intensity, outcome construct and follow-up.

Keywords: Pharmacist prescribing, Deprescribing, Medication review, Treatment burden, Patient outcomes, Polypharmacy

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Introduction

Pharmacists now participate in medication optimization through models ranging from patient education and prescriber recommendations to collaborative prescribing and independent prescribing authority. The common description “pharmacist-led” therefore encompasses interventions with substantially different causal pathways.

Systematic evidence on medication review shows considerable variation in patient selection, intervention components, follow-up and measured outcomes [1]. Heterogeneity is also prominent across community-pharmacy medication-review trials, limiting the meaning of a single average intervention effect [2]. Earlier meta-analysis nevertheless suggests that pharmacist-led medication review can improve selected medication and clinical outcomes, although effects on healthcare utilization and broader patient outcomes are inconsistent [3].

Controlled trials illustrate why prescribing authority and outcome level must remain distinct. In the Care Home Independent Pharmacist Prescriber Study (CHIPPS), pharmacist independent prescribers assumed substantial responsibility for medicines management, including medication review, deprescribing and prescription authorization. The intervention reduced Drug Burden Index, yet the primary outcome of falls was not significantly improved [4]. In D-PRESCRIBE, community pharmacists used direct patient education together with evidence-based pharmaceutical opinions sent to physicians; discontinuation of targeted inappropriate medication occurred in 43% of intervention patients compared with 12% of controls [5]. A review focused on Drug Burden Index outcomes similarly found that deprescribing interventions can alter pharmacological burden without consistently translating into broader clinical improvement [6].

Null trials are equally informative. Pharmacist recommendations to deprescribe anticholinergic and sedative medicines in frail community-dwelling older adults did not increase the proportion achieving a clinically specified Drug Burden Index reduction [7]. A separate community-pharmacy trial targeting anticholinergic and sedative exposure also failed to demonstrate a clear primary DBI benefit despite improvement in selected secondary measures [8]. In dementia, pharmacist-led telehealth medication optimization showed that deprescribing and new prescribing can occur simultaneously when care is aligned with patient and care-partner goals; medication-regimen complexity and caregiver medication hassles did not show large short-term improvements [9]. Pharmacist-guided STOPPFrail review in nursing homes reduced medication exposure and prescribing burden but did not demonstrate significant improvement in falls, emergency attendance, hospitalization or quality of life [10].

Outcome definition is therefore central. A deprescribing core outcome set distinguishes medication discontinuation and dose reduction from adverse drug events, hospital use, mortality and quality of life [11]. Treatment burden adds a further construct: the work patients or caregivers must perform to obtain, organize, administer, monitor and live with treatment. Population data show that this burden can remain substantial even when conventional disease outcomes appear satisfactory [12]. Medication count may contribute to burden but cannot fully represent it.

The present review consequently evaluates pharmacist-led prescribing and deprescribing using a mechanism-sensitive approach. Medication modification is treated as a proximal outcome; patient-important clinical and safety outcomes are treated separately; and treatment burden is evaluated only when directly represented by regimen complexity, medication-specific patient-reported outcomes, administration workload or related measures. This avoids equating successful medication change with net patient benefit.

Aim

The primary aim was to determine whether pharmacist-led prescribing and deprescribing interventions improve patient-important outcomes without increasing treatment burden in controlled studies published from 2017 through 2025.

Secondary aims were to determine whether observed effects differed according to pharmacist decision authority, direction of medication change and comparator intensity; to distinguish medication-level from clinical, safety, healthcare-use, quality-of-life and treatment-burden outcomes; and to establish whether any sufficiently homogeneous outcome family supported a defensible pooled effect estimate.

Materials and Methods

Eligibility, intervention authority and review unit

The review included controlled studies published from 1 January 2017 through 31 December 2025 in adults receiving a pharmacist-led intervention capable of changing medication treatment. Eligible interventions included independent prescribing or deprescribing, collaborative medication change, structured pharmacist recommendations requiring another prescriber to enact the change, and medication-review services in which medication modification was an explicit intervention mechanism.

The review unit was the controlled study, not the individual publication. Multiple publications describing the same allocation were linked to the parent study. Protocols, process evaluations and feasibility reports were not counted as separate controlled studies when a definitive trial report existed.

Pharmacist authority was classified as independent authority; collaborative authority; recommendation-mediated change requiring authorization by another clinician; or multicomponent medication review in which pharmacist recommendations were one element of a broader service. This distinction was necessary because person-centred pharmacist medication review may improve medication appropriateness without providing independent prescribing authority [13]. The LeMON study, for example, evaluated enhanced training in deprescribing-oriented medication review against an active medication-review comparator [14], whereas community-pharmacy feasibility work examined a lower-intensity review-and-follow-up service [15].

Eligible settings included community pharmacy, primary care, hospital care, care homes and disease-specific outpatient services. Cardiovascular medication-review trials were included where pharmacists actively generated or facilitated medication change [16]. Collaborative hospital medication reconciliation was eligible when medication appropriateness or regimen simplification formed part of the intervention rather than reconciliation being purely documentary [17].

Studies were excluded if they were uncontrolled; examined education or adherence without a medication-change mechanism; evaluated prescribing performed predominantly by another profession; were protocols, qualitative studies or secondary reviews; or did not provide a concurrent comparator relevant to effectiveness.

Search, screening and study linkage

The literature search used four linked concept families: pharmacist-led prescribing or independent prescribing; pharmacist-led deprescribing; pharmacist medication review or medication reconciliation with medication-change capability; and controlled or randomized evaluation. Searches were restricted to the 2017–2025 publication window and supplemented with disease- and setting-specific terms for polypharmacy, care homes, transitions of care, hypertension, cardiovascular disease, stroke, heart failure and dementia.

Across the PubMed/MEDLINE-targeted searches, 57 records were retrieved. Citation chaining from relevant trials and contemporary syntheses and targeted publisher searches identified five additional unique records, giving 62 records identified. Two duplicate records retrieved across overlapping searches were removed, leaving 60 unique records for title/abstract screening.

Thirty-four records were excluded at title/abstract screening because they were clearly reviews, protocols, qualitative or process studies, uncontrolled evaluations, outside the publication window, or lacked a pharmacist-led medication-change mechanism. Twenty-six reports proceeded to full-text assessment.

Eight full-text reports were excluded: two lacked an eligible controlled comparator; three did not contain a sufficiently defined pharmacist-led medication-change mechanism; one fell outside the 2017–2025 publication window after bibliographic verification; and two were companion or duplicate reports linked to a parent study already represented by the definitive controlled report. This yielded 18 controlled studies for systematic synthesis.

The resulting study-selection sequence was 62 records identified, 2 duplicates removed, 60 unique records screened, 34 records excluded at title/abstract screening, 26 full-text reports assessed, 8 full-text reports excluded and 18 controlled studies included. The included-study identities are listed in **Table 1**, and the selection process is summarized according to PRISMA 2020 [18] in **Figure 1**.

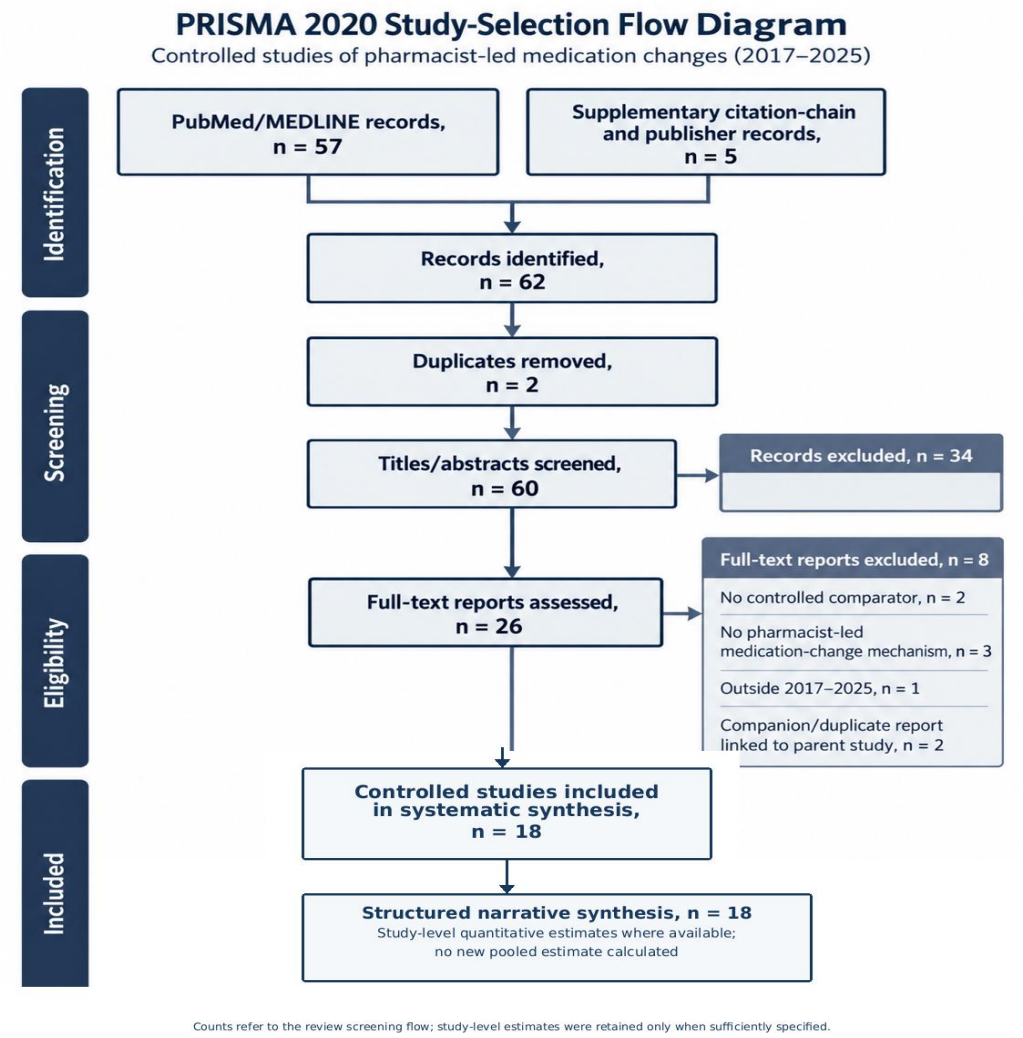

Figure 1. Study identification and selection for pharmacist-led prescribing and deprescribing evidence, 2017–2025

Outcome classification and treatment-burden operationalisation

Outcomes were classified according to the construct actually measured rather than the terminology chosen by study authors. Six domains were prespecified: medication exposure and prescribing quality; patient-important clinical benefit; medication harm; healthcare use; quality of life; and treatment burden.

Medication count, medication discontinuation, Drug Burden Index, potentially inappropriate medication resolution, Medication Appropriateness Index and medication-regimen complexity were considered medication-level outcomes unless the measure directly represented patient experience. Improvements in medication appropriateness among people with dementia, for example, were not interpreted as equivalent to improvements in function or quality of life [19]. Willingness to deprescribe was treated as a preference or acceptability construct rather than evidence that deprescribing occurred or improved health [20].

Pain, blood pressure, stroke recurrence and other disease outcomes were classified as clinical benefits [21]. Readmission and emergency attendance were healthcare-use outcomes [22]. Drug-related problems and severe iatrogenic events were medication-safety outcomes even when hospitalization did not change [23]. Electronic decision-supported deprescribing was classified according to actual medication discontinuation and adverse-event outcomes [24].

Treatment burden was operationalized as medication-specific workload or disruption, including regimen complexity, medication-administration difficulty, medication-specific quality of life and patient/caregiver burden. Medication number alone was not considered a direct treatment-burden measure. GP-led medication review evidence was retained only as comparator/context evidence and was not reclassified as pharmacist-led [25].

Existing community-pharmacist deprescribing reviews supported terminology and citation chaining but did not substitute for controlled-study extraction [26].

Risk-of-bias and comparator-intensity assessment

RoB 2 [27] provided the appraisal framework for randomized studies, covering bias arising from randomization, deviations from intended intervention, missing outcome data, outcome measurement and selective reporting. Overall study-level judgments required sufficient information across these domains. Cluster trials were additionally considered for recruitment after cluster allocation and whether analysis appropriately accounted for clustering.

Comparator intensity was evaluated separately from risk of bias. Comparators were classified as routine or usual care; usual care with some pharmacist involvement; active medication review; or structured multidisciplinary medication optimization. The distinction was essential because a trial comparing enhanced pharmacist deprescribing against another medication review estimates a narrower incremental effect than a trial comparing pharmacist intervention against minimally augmented usual care.

Effect extraction and synthesis rules

Dichotomous effects were extracted as risk ratios, odds ratios or risk differences according to reported analyses. Continuous outcomes were retained as mean differences when common scales were used. Cluster-adjusted estimates were preferred in cluster-randomized studies.

A pooled estimate required compatibility in four dimensions: pharmacist authority and intervention mechanism; comparator intensity; outcome definition; and follow-up period. Prescribing and deprescribing were not pooled simply because both altered medication treatment. Likewise, targeted inappropriate-medication discontinuation, DBI change, medication count and appropriateness scores were not collapsed into one "medication optimization" effect.

Random-effects pooling was prespecified for clinically coherent outcome families with at least two sufficiently comparable estimates. After extraction, no outcome family satisfied all prespecified conditions for a defensible pooled estimate. Available study-level quantitative estimates were therefore retained where reported or derivable, and the full set of 18 included studies was synthesized using a structured narrative approach.

Certainty was appraised qualitatively at outcome-family level using the GRADE domains of risk of bias, inconsistency, indirectness and imprecision [28, 29]. Formal high, moderate, low or very-low certainty categories were not assigned. Potential publication bias was considered descriptively because outcome families were too sparsely populated for reliable funnel-plot or small-study-effect testing [30].

Heterogeneity and certainty assessment

The major prespecified heterogeneity variables were independent versus recommendation-mediated pharmacist authority, prescribing versus deprescribing direction, comparator intensity, setting, population complexity, follow-up and outcome level.

A medication-level improvement accompanied by a null patient outcome was treated as outcome discordance, not analytical failure. Likewise, disease-specific improvement without direct evidence of lower treatment workload was not interpreted as reduced treatment burden. Independent prescribing expertise also depends on regulatory context, training and accumulated clinical experience [31].

Results and Discussion

Study distribution and pharmacist decision authority

Eighteen controlled studies met the eligibility criteria. They spanned care homes, community pharmacies, primary care, hospitals and disease-specific services.

Independent prescribing authority was clearest in CHIPPS, where pharmacist independent prescribers could authorize prescriptions, deprescribe and alter medicines within the intervention [4]. In contrast, D-PRESCRIBE relied on pharmacist education of patients plus recommendations to physicians [5]. Jamieson and colleagues similarly evaluated pharmacist recommendations requiring GP enactment [7]. Telehealth deprescribing in dementia incorporated patient and care-partner goals while recommendations remained connected to primary-care prescribing [9].

CHIPPS was judged as having some concerns under RoB 2 because its cluster-randomized, open-care design could introduce bias related to deviations from intended intervention or outcome measurement. Comparator intensity was assessed separately.

Other studies evaluated medication-review or pharmaceutical-care models in which pharmacists could trigger medication modification but did not necessarily hold final autonomous authority. The resulting evidence therefore represented several different causal mechanisms rather than one profession-wide intervention.

Table 1 lists the 18 included studies by medication-change authority and comparator structure.

Table 1. Identity-level ledger of included controlled studies differentiated by medication-change authority and outcome emphasis

Study	Setting/population	Pharmacist medication-change role	Comparator	Main outcome emphasis
Independent prescribing authority				
Holland *et al*., 2023	Care homes	Independent prescribing and deprescribing	Usual care	Falls, DBI
Recommendation-mediated deprescribing				
Martin *et al*., 2018	Community older adults	Patient education plus physician recommendation	Usual care	Targeted discontinuation
Jamieson *et al*., 2023	Frail community adults	Deprescribing recommendations requiring GP enactment	Usual care	DBI reduction
Collaborative ambulatory review and optimization				
Abou *et al*., 2025	Primary care	Deprescribing-focused review	Active medication review	Medication discontinuation
van der Meer *et al*., 2018	Community pharmacy	Review with GP collaboration	Control care	DBI, cognition, adverse effects
Green *et al*., 2024	Dementia primary care	Telehealth optimization recommendations	Delayed intervention	Complexity, caregiver burden
Christopher *et al*., 2024	Community pharmacy	Review with follow-up	Control pharmacy	Medication use/DRPs
Martínez-Mardones *et al*., 2023	Primary care	Review plus longitudinal follow-up	Usual care	CVD risk-factor control
Sakthong and Boonyanuwat, 2024	Heart failure	Pharmaceutical-care optimization	Usual care	Treatment-related QoL
Cengiz *et al*., 2025	Stroke clinic	Pharmaceutical care	Usual care	Adherence, QoL, recurrence
Gutierrez and Sakulbumrungsil, 2023	Hypertension	Pharmacist expert-system service	Control	Adherence, BP
Rohla *et al*., 2023	Primary care	Pharmacist assessment/referral	Control	BP control
Kocklaeuner *et al*., 2025	Dementia care	Review with GP recommendations	Control care	Appropriateness
Duarte *et al*., 2025	Primary care pain	Pharmacist medication review	Usual care	Pain, function, QoL
Hospital and transitional-care medication management				
McDonald *et al*., 2022	Hospital	Deprescribing decision support	Usual care	PIM cessation, ADEs
Lee *et al*., 2023	Hospital	Collaborative reconciliation/modification	Usual care	ADEs, complexity
Ravn-Nielsen *et al*., 2018	Hospital	Multifaceted pharmacy intervention	Usual care	Readmission
Pourrat *et al*., 2020	Hospital discharge	Reconciliation plus community liaison	Usual care	DRPs, hospitalization

ADE, adverse drug event; BP, blood pressure; CVD, cardiovascular disease; DBI, Drug Burden Index; DRP, drug-related problem; GP, general practitioner; PIM, potentially inappropriate medication; QoL, quality of life.

Medication exposure and prescribing-quality effects

Medication-level outcomes showed the most consistent evidence of pharmacist effect. D-PRESCRIBE produced inappropriate-medication discontinuation in 106 of 248 intervention participants (43%) compared with 29 of 241 controls (12%), an absolute risk difference of 31 percentage points [5]. CHIPPS reduced Drug Burden Index, with an adjusted rate ratio of 0.83 and 95% CI 0.75–0.92, despite no significant improvement in falls [4].

Null medication-level findings were also present. Jamieson *et al*. observed DBI reduction of at least 0.5 in 12.2% of the intervention group and 12.7% of controls, yielding no evidence of benefit [7]. In LeMON, at least one cardiovascular or antidiabetic medicine was discontinued in 32% of intervention participants and 26% of controls; OR 1.40, 95% CI 0.65–2.82 [14]. The active control medication review likely reduced the incremental contrast.

Medication appropriateness improved in dementia medication review [19], while MedSafer increased deprescribing of potentially inappropriate medicines without reducing short-term adverse drug events [24]. These findings indicate that medication modification is achievable but is neither uniform across contexts nor sufficient by itself to establish patient benefit.

Patient-important clinical and safety outcomes

Clinical outcomes were more variable. Cardiovascular medication review with follow-up improved achievement of hypertension, lipid and diabetes targets and reduced medication number in older primary-care patients [16]. Stroke pharmaceutical care was associated with better adherence, higher stroke-specific quality of life and lower recurrence at one year [32]. Hypertension interventions also produced favorable adherence or blood-pressure outcomes [33].

Rohla *et al*. reported more treatment changes and greater systolic blood-pressure reduction after pharmacist intervention, but the between-group difference in the proportion reaching blood-pressure control remained uncertain [34]. Oncology meta-analytic evidence similarly supports reductions in medication-related problems but demonstrates heterogeneity across pharmacist interventions [35]. Pharmacist audit-and-feedback studies show that prescriber behavior can change without pharmacists independently prescribing [36], while adherence counseling evidence further demonstrates that intervention effects depend strongly on the targeted outcome [37].

Medication safety and healthcare use also diverged. Ravn-Nielsen *et al*. demonstrated benefit from a multifaceted in-hospital pharmacist intervention on readmission-related outcomes [22]. Pourrat *et al*. found fewer patients with drug-related problems (OR 0.77, 95% CI 0.61–0.98) and fewer severe iatrogenic problems (OR 0.57, 95% CI 0.35–0.93), but unplanned hospitalization did not decrease (OR 1.46, 95% CI 0.91–2.35) [23]. MedSafer increased deprescribing but did not reduce 30-day ADEs [24].

Table 2. Comparator intensity and appraisal features affecting causal interpretation

Intervention contrast	**Causal leverage**		**Interpretation**
Evidence configuration	**Comparator intensity**	**Main appraisal issue**	**Interpretation**
Independent pharmacist prescribing vs usual care	Low–moderate	Cluster allocation/open care	Captures authority plus medication-review effect
Pharmacist recommendation vs usual care	Low–moderate	Prescriber enactment	Effect includes recommendation-to-action failure
Enhanced deprescribing review vs active review	High	Small incremental contrast	Null effect may coexist with improvement in both groups
Multifaceted hospital pharmacy service	Variable	Co-intervention attribution	Cannot isolate prescribing authority alone
Pilot randomized intervention	Variable	Imprecision	Effect estimates remain exploratory
Subjective patient-reported outcome	Variable	Instrument responsiveness/unblinded care	Different instruments may detect different consequences

Quality of life, treatment burden and patient-reported consequences

Treatment burden was much less consistently measured than medication use. In heart failure, pharmaceutical-care intervention improved several medication-therapy-related PROMPT domains, while generic EQ-5D-5L and disease-specific MLHFQ outcomes did not demonstrate equivalent improvement [38]. This illustrates how instrument selection changes what is recognized as benefit.

In dementia telehealth deprescribing, pharmacists incorporated care-partner goals and measured both Medication Regimen Complexity Index and caregiver medication-administration hassles [9]. Medication discontinuation was common, but prescribing additions also occurred, emphasizing that goal-concordant optimization may involve both deprescribing and prescribing. Contemporary dementia deprescribing guidance likewise stresses goals, tapering, monitoring and caregiver involvement rather than medication count alone [39].

The outcome definitions used in this review are shown in **Table 3**.

Table 3. Outcome definitions separating medication modification from patient benefit and treatment burden

Domain	Qualifying measures	Measures that do not substitute for the domain
Medication-level domains		
Medication exposure	Discontinuation, dose reduction, medication count, DBI	Generic QoL
Prescribing quality	MAI/PIM resolution, DRP resolution	Medication count alone
Patient- and health-system-level domains		
Clinical benefit	Symptoms, disease control, function, recurrence	Prescribing-process improvement
Medication harm	ADEs, severe iatrogenic events, clinically relevant adverse effects	Potential-risk scores alone
Healthcare use	Emergency visits, admissions, readmissions	DRP resolution alone
Treatment burden	Regimen complexity, administration workload, medication-specific QoL, patient/caregiver burden	Number of medicines alone

ADE, adverse drug event; DBI, Drug Burden Index; DRP, drug-related problem; MAI, Medication Appropriateness Index; PIM, potentially inappropriate medication; QoL, quality of life.

Comparator intensity and outcome discordance

The relationship between comparator intensity and effect size was visible across the evidence. Trials against minimally augmented usual care could show large medication-change effects, whereas LeMON compared enhanced deprescribing training with an active clinical medication review and produced a smaller, uncertain incremental difference [14]. A null between-group result in such a design does not imply that medication review itself is ineffective.

Outcome discordance was similarly common. CHIPPS improved DBI without reducing falls [4]. Pourrat reduced drug-related problems and severe iatrogenic events without reducing unplanned hospitalization [23]. MedSafer increased PIM deprescribing without reducing short-term ADEs [24]. These patterns are clinically plausible because hospitalization, falls and ADEs have multiple competing causes and may require longer follow-up or substantially larger samples to demonstrate change.

Quantitative synthesis and certainty

The available quantitative evidence did not support one common pharmacist-effect estimate. Six study-level estimates with reported or derivable 95% confidence intervals were sufficiently specified in the extraction to present directly:

- CHIPPS DBI: adjusted rate ratio 0.83 (95% CI 0.75–0.92).
- CHIPPS falls: RR 0.91 (95% CI 0.66–1.26).
- D-PRESCRIBE inappropriate-medication discontinuation: 43% vs 12%; RD 31 percentage points (95% CI 23–38).
- Jamieson DBI reduction ≥0.5: 12.2% vs 12.7%; difference −0.4 percentage points (95% CI −7.9 to 7.0).
- LeMON medication discontinuation: OR 1.40 (95% CI 0.65–2.82).

- Pourrat unplanned hospitalization: OR 1.46 (95% CI 0.91–2.35).

Because these estimates describe different endpoints, intervention mechanisms and effect measures, pooling them would not estimate a coherent common parameter. No new pooled estimate is therefore presented.
The separation of medication-level and patient-level evidence is displayed in **Figure 2**.

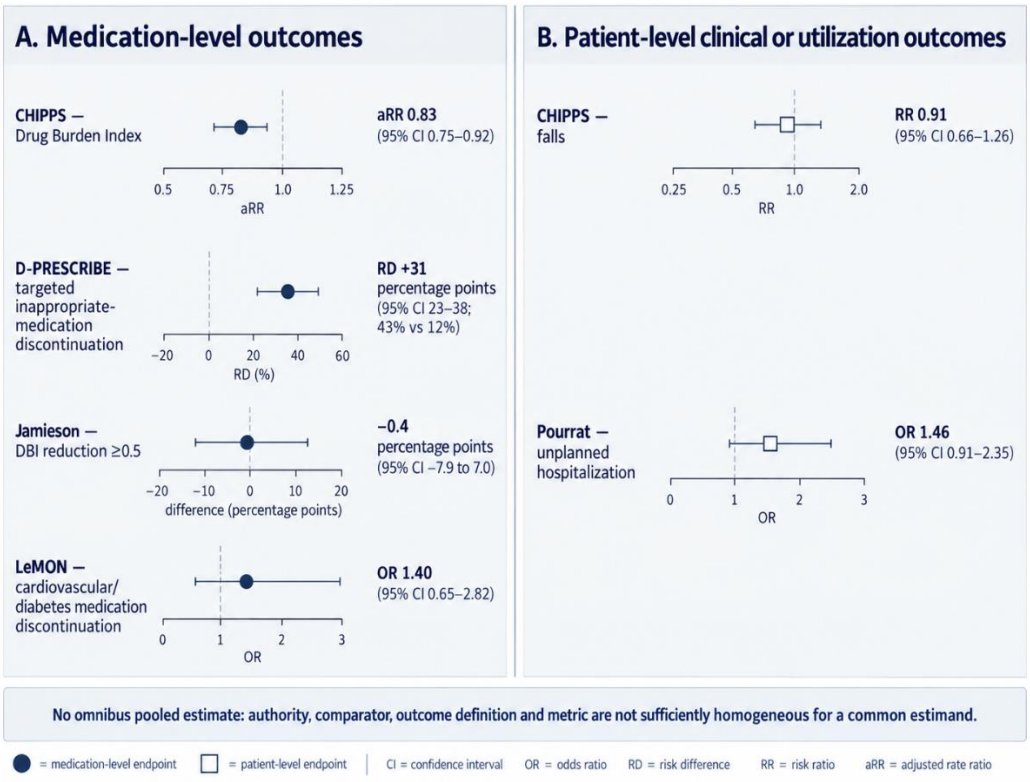

Figure 2. Quantitative divergence between medication change and patient-level outcomes

Table 4. Outcome-specific synthesis and limits to pooling

Outcome family	Evidence profile		Synthesis handling
Outcome family	**Evidence direction**	**Principal heterogeneity**	**Synthesis decision**
Targeted deprescribing	Often favorable	Drug class, authority, active comparator	Study-level quantitative synthesis
DBI/medication burden	Mixed	Baseline exposure, setting, implementation	No pooled estimate
Prescribing appropriateness	Generally favorable	Instrument and intervention mechanism	Structured synthesis
Disease-specific clinical outcomes	Context-dependent	Population and co-interventions	Structured synthesis
Falls/hospitalization/ADEs	Mixed or null	Competing causes, follow-up, event frequency	No pooled estimate
QoL/treatment burden	Instrument-dependent	Generic vs medication-specific measurement	Structured synthesis

Qualitative confidence was greater for directly observed medication-change effects in larger randomized studies and lower for broad clinical outcomes because of imprecision, inconsistency and indirectness. No formal GRADE category was assigned to these outcome families. Funnel-plot or small-study-effect testing was not considered reliable for sparsely populated outcome families [30].

Conclusion

Pharmacist-led prescribing and deprescribing can produce clinically meaningful medication change, but the evidence does not support treating medication modification as synonymous with patient benefit. The clearest effects occurred for targeted medication discontinuation, medication burden and prescribing appropriateness. Clinical, safety and healthcare-use effects were more variable.

The 18 controlled studies also show why "pharmacist-led" should not be treated as one homogeneous intervention. Independent prescribing, recommendation-mediated deprescribing, collaborative medication review and multifaceted pharmaceutical care create different treatment contrasts. Comparator intensity further changes the meaning of a null or favorable result.

Treatment burden remains an important evidence gap. Medication count is insufficient to demonstrate that treatment has become easier to manage. Future controlled studies should measure medication-specific workload, regimen complexity and patient or caregiver experience alongside clinical benefit and medication harm.

The most defensible answer to the review question is therefore conditional: pharmacist-led prescribing and deprescribing can improve medication use and selected patient outcomes without clear evidence of increased harm, but patient benefit and reduced treatment burden cannot be assumed. They must be demonstrated directly within the intervention, population, comparator and outcome context in which medication change occurs.

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Ethics Statement: None

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