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EFFECTIVENESS OF PHARMACIST PARTICIPATION IN MULTIDISCIPLINARY ROUNDS ON MEDICATION SAFETY AND PATIENT OUTCOMES: A SYSTEMATIC REVIEW

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Abstract

Background: Pharmacist participation in multidisciplinary rounds (MDRs) has been proposed as a high-leverage strategy to improve medication safety and patient outcomes in hospitals. **Objective:** To systematically review the effectiveness of pharmacist participation in MDRs on medication safety and clinical outcomes among inpatients. **Methods:** We searched MEDLINE/PubMed, Embase and CINAHL (1999–October 2025) for randomized or observational comparative studies in adult inpatients where a pharmacist joined MDRs/ward rounds and outcomes included medication errors, preventable adverse drug events (pADEs), drug-related problems (DRPs), appropriateness, mortality, readmission, length of stay (LOS) or costs. Two reviewers independently screened, extracted data, and appraised risk of bias. Narrative synthesis was performed. **Results:** Twelve original studies (1 randomized, 11 quasi-experimental/observational) met inclusion. Pharmacist participation during rounds reduced prescribing errors and pADEs, improved medication appropriateness and the acceptance of recommendations, and frequently identified DRPs at the point of prescribing. Effects on LOS and readmissions were mixed; mortality benefits were most apparent in intensive care settings where pharmacists were embedded in daily rounds. **Conclusions:** When pharmacists are integrated into MDRs, medication safety and prescribing quality improve, with probable downstream clinical benefits in high-risk settings. Hospitals should prioritize round-based clinical pharmacy services and evaluate implementation context, team processes, and scope of practice to maximize patient impact.

Keywords: Pharmacist; Multidisciplinary Rounds; Ward Rounds; Medication Safety; Adverse Drug Events; Prescribing Errors; Inpatient; Systematic Review.

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INTRODUCTION

Medication errors and preventable adverse drug events (pADEs) is a major threat to patient safety in hospitals. Clinical pharmacists, when integrated into team-based care, reduce medication errors and improve important processes of care across inpatient settings [1]. In critical care and acute medicine, pharmacists' proximity to prescribing decisions during multidisciplinary rounds (MDRs) offers a unique opportunity to prevent errors before they reach the patient [2–4].

Systematic reviews and meta-analyses have shown that inpatient clinical pharmacist services generally improve prescribing quality, safety outcomes, and sometimes hard outcomes (mortality in ICU cohorts), though effect sizes vary by service model and setting [1,3]. Contemporary guidance from professional bodies now positions the round-based critical care pharmacist as core to the ICU team, emphasizing direct participation in daily rounds, medication stewardship, and continuous quality improvement [4]. Broader overviews of clinical pharmacy services in hospitals similarly underscore round participation as a key driver of impact, especially when pharmacists have authority to make or enact recommendations in real time [5–7].

Editorial and practice literature point to round-based models improving communication, team situational awareness, and medication decision-making at the bedside [8]. Time-motion work suggests that pharmacist presence on ward rounds may be a highly efficient use of clinical time, converting "interrupt-driven" work into structured, proactive contributions at the point of prescribing [7]. Nevertheless, heterogeneity in team composition, round structure (consultant-led post-take ward rounds vs. daily unit rounds), and pharmacist scope of practice can influence outcomes and the extent to which benefits translate into reduced LOS, readmissions, or mortality [3,6].

Given these considerations, we conducted a focused systematic review of studies in which pharmacists participated directly in MDRs or ward rounds and evaluated effects on medication safety and patient outcomes. Our aim was to synthesize contemporary evidence across general medicine, intensive care, and specialty wards, and to interpret findings in light of current guidance and implementation questions.

METHODS

Protocol and reporting. The review question, eligibility criteria, and methods were prespecified. Reporting follows PRISMA 2020 concepts (flow description, eligibility, synthesis).

Eligibility criteria.

Population: Adult inpatients in hospitals (general medicine, surgery, ICU, specialty wards).
Intervention: A clinical pharmacist participating in person in multidisciplinary rounds/ward rounds (consultant-led rounds, daily ICU rounds, post-take ward rounds), contributing medication review/optimization and real-time recommendations.

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Comparator: Pre-intervention/usual care without a round-attending pharmacist, or parallel units without pharmacist on rounds.

Outcomes: Medication safety (medication errors, pADEs, prescribing appropriateness, DRPs), clinical outcomes (mortality, LOS, readmission), and costs/acceptance rates. Designs: RCTs, quasi-experimental (pre–post, controlled interrupted time series), and cohort/controlled observational studies.

Exclusions: Studies of pharmacist services not linked to rounds (remote verification only, discharge-only services), pediatrics, qualitative studies, conference abstracts without data.

Information sources and search. We searched MEDLINE/PubMed, Embase, and CINAHL (January 1999–October 18, 2025) using terms for *pharmacist*, *ward rounds*/*multidisciplinary rounds*/*post-take rounds*, and outcomes (*adverse drug events*, *medication errors*, *drug-related problems*, *mortality*, *readmission*, *length of stay*). Reference lists of included studies and key reviews/guidelines were scanned.

Study selection. Two reviewers independently screened titles and abstracts, assessed full texts against eligibility, and resolved disagreements by consensus. When multiple papers reported the same intervention but distinct outcomes, each was included if it provided unique data.

Data extraction. Using a piloted form, we extracted study characteristics (country, setting, unit/round type, design), intervention details (pharmacist activities, frequency, authority), comparator, outcomes, effect estimates, and implementation notes (acceptance rates, communication metrics).

Risk of bias. RCTs were appraised with RoB 2; nonrandomized studies with ROBINS-I. Domains included confounding, selection, classification of interventions, deviations, missing data, outcome measurement, and selective reporting.

Synthesis. Due to heterogeneity in designs, settings, and outcomes, we conducted narrative synthesis grouped by setting (ICU vs. general medicine/post-take vs. specialty wards). Where feasible, we report direction and magnitude as provided in each source; we did not statistically pool results because effect measures and outcome definitions varied substantially.

RESULTS

Study selection and characteristics. Twelve original studies met inclusion: one randomized trial and eleven quasi-experimental/observational studies from the U.S., U.K., Netherlands, Canada, Sweden, Australia, and Slovenia. Settings included medical ICUs [11,17], general medicine units [12,13,15], consultant-led post-take ward rounds (PTWRs) [14,21], daily general ward team rounds [19,20], and daily interdisciplinary psychiatric rounds [22]. Pharmacists participated directly in rounds, identifying DRPs, advising on drug selection/dosing, monitoring and stewardship, medication reconciliation/history, and facilitating enactment of changes at the point of prescribing.

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ICU settings.

A foundational before–after study in a medical ICU reported that adding a pharmacist to physician rounds markedly reduced preventable ADEs attributable to prescribing errors; nearly all pharmacist recommendations were accepted [11]. In a Dutch ICU, on-ward pharmacist participation reduced prescribing errors, including those requiring dose changes, and improved medication safety processes [17]. Together, these ICU studies demonstrate that when pharmacists join daily bedside rounds with prescribing authority or high acceptance, safety events decrease at the stage of ordering, precisely where MDRs exert the strongest influence [11,17].

A disease-focused ICU study showed that embedding a pharmacist in the care team was associated with better anticoagulation management and fewer thromboembolic/infarction events among critically ill patients [16]. Although not exclusively a “rounds trial,” the intervention involved active, on-unit participation integral to daily team workflows, consistent with MDR participation, and supports the downstream clinical relevance of pharmacist involvement in high-risk pharmacotherapy [16].

General medicine and post-take ward rounds.

In a controlled study on general medicine units, pharmacists on rounding teams achieved a 78% reduction in preventable ADEs (from 26.5 to 5.7 per 1000 patient-days) with high acceptance of recommendations [13]. A separate quasi-experimental study showed that pharmacist participation in medical rounds reduced medication errors in real time [12].

On consultant-led PTWRs, pharmacist presence improved documentation quality, reduced discrepancies in admission drug histories, and lowered medication-related risk, as well as prescribing costs, compared to pre-intervention periods [14]. A prospective non-randomized controlled study across five medical wards found that adding pharmacists to consultant-led rounds nearly doubled physician-accepted interventions per patient (1.73 vs 0.89), and the rate of accepted interventions during rounds was dramatically higher (one every eight minutes during rounds vs one every 63 minutes during routine pharmacy visits) [18].

In an Australian pre–post study of PTWRs, pharmacist participation increased the proportion of patients whose medication appropriateness improved between admission and discharge and substantially increased in-depth medication discussions, especially for high-risk medicines, while length of stay and 28-day readmissions were unchanged [21]. A companion analysis from the same program showed that adding a PTWR pharmacist increased the risk-weighted significance and enactment of medication-related recommendations, suggesting that round-time engagement helps teams prioritize and act on higher-risk issues [20].

Multidisciplinary ward teams beyond post-take rounds.

The multicenter COLLABORATE trial (quasi-randomized) evaluated a rounding/team-based clinical pharmacist embedded on general internal medicine/family medicine services. Collaborative care with a rounding pharmacist improved the quality of

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prescribed drug therapy and targeted underuse of evidence-based treatments; effects on readmissions were variable across sites, reflecting contextual differences in implementation and baseline quality [15].

In Sweden, an RCT of pharmacist participation in hospital ward teams (including rounds plus follow-up medication review) reported improvements in medication appropriateness and a signal toward fewer drug-related readmissions in high-risk patients, highlighting the value of sustained pharmacist engagement from rounds through transitions of care [19].

Specialty wards (psychiatry).

More recently, a pre-post study in a psychiatric hospital implemented daily interdisciplinary ward rounds including a clinical pharmacist. The intervention reduced drug-related problems related to somatic comorbidities and achieved high acceptance and continuation of pharmacist recommendations at three months, demonstrating feasibility and safety gains in a setting often excluded from earlier MDR studies [22].

Medication safety process measures and acceptance.

Across settings, pharmacist participation consistently increased identification and resolution of DRPs at the point of care, improved medication appropriateness indices (STOPP/START), and achieved high clinician acceptance of recommendations, frequently above 90% in the classic ICU/general medicine studies [11,13,18,21]. These process improvements are mechanistically linked to reduced errors and pADEs, especially when pharmacists contribute during ordering decisions on rounds. Where hard outcomes (LOS, readmission) did not change, studies still demonstrated meaningful safety/process gains (fewer discrepancies, more high-risk discussions, better documentation), which are core quality targets in hospital medicine [14,18,21].

Clinical outcomes and heterogeneity.

Evidence for mortality benefit is strongest from ICU cohorts where round-based pharmacists are fully integrated and pharmacotherapy risks are concentrated [11,16,17]. Readmission and LOS results are mixed, likely reflecting study power, case-mix, and whether pharmacist participation extended beyond rounds into transitions and follow-up [15,19,21]. Notably, the positive signal for drug-related readmissions in the Swedish trial suggests that coupling rounds with longitudinal medication management can translate safety gains into downstream outcomes [19].

Implementation insights.

Studies that reported team communication metrics showed substantial increases in medication-related discussions and rapid enactment of round-time recommendations [18,21]. This aligns with guidance advocating routine pharmacist presence on daily rounds, clear role delineation, and authority to act on medication plans [4,6]. Time-motion evidence also suggests that round participation is an efficient deployment of clinical pharmacist time [7].

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DISCUSSION

Across 12 studies spanning ICU, general medicine, PTWRs, and psychiatry, pharmacist participation in MDRs/ward rounds consistently improved medication safety and prescribing quality, with context-dependent effects on clinical outcomes. These findings echo prior syntheses that inpatient clinical pharmacist services improve safety and processes of care, while patient-level outcomes depend on setting, baseline risk, and the breadth of the service [1,3]. In ICUs, where pharmacotherapy risk is concentrated and rounds are highly protocolized, embedding a pharmacist on daily rounds reduced preventable ADEs and prescribing errors and has been associated with improved clinical outcomes in targeted populations [2–4]. Guidance from SCCM/ACCP/ASHP now explicitly recommends round-based critical care pharmacy services as standard of care, which our review supports [4].

On general medicine wards and post-take rounds, pharmacist participation reduced medication errors and pADEs, improved medication appropriateness and documentation, and increased acceptance and prioritization of high-risk recommendations. Even where LOS/readmissions were unchanged, the magnitude of safety/process gains (improved STOPP/START indices, more in-depth medication discussions) represents meaningful quality improvement aligned with modern performance frameworks [6–8]. The randomized Swedish trial suggests that sustained pharmacist engagement across the inpatient stay (rounds + medication review + follow-up) may be necessary to realize readmission benefits, an implementation lesson for hospitals scaling MDR pharmacy services [3,19]. Two cross-cutting insights emerge. First, proximity and timing matter: safety gains are greatest when pharmacists participate during ordering decisions and carry authority to enact or directly influence prescribing [3–6,8]. Second, context and scope matter: benefits scale with pharmacist access to data, stewardship protocols, and continuity into transitions of care [3–6]. Implementation guidance now emphasizes measurable quality indicators (acceptance rates, discrepancies resolved, high-risk medication optimization) to standardize impact reporting and drive improvement [6].

Limitations of the evidence base include nonrandomized designs susceptible to confounding, heterogeneity in team composition and pharmacist scope, and varied outcome definitions that preclude robust meta-analysis. Nevertheless, consistency of direction across settings and decades, triangulated with systematic reviews/meta-analyses and contemporary position statements, strengthens confidence that round-based pharmacist participation improves medication safety and is likely to yield patient-level benefits in high-risk cohorts [1–6,8–10].

Implications. Hospitals should embed pharmacists in daily MDRs (ICU and acute medicine), ensure authority and pathways to enact recommendations, and extend services into transitions to capture downstream outcomes. Future research should prioritize pragmatic cluster trials and standardized outcome sets (safety + patient-level endpoints), and evaluate cost-effectiveness using real-world workflows.

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CONCLUSION

Pharmacist participation in multidisciplinary rounds reliably improves medication safety at the bedside by reducing prescribing errors and pADEs, improving appropriateness, and accelerating the enactment of high-risk recommendations. Mortality and readmission benefits are most evident when pharmacists are fully integrated into high-risk settings (ICU) and when services extend beyond rounds into medication review and transitions. Health systems should make pharmacist-attended rounds standard practice and measure impact with transparent safety and patient-level indicators to optimize outcomes.

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