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Clinical Decision Support Systems for Medication Safety: A Review of Effectiveness in Geriatric and Long-Term Care Populations

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Abstract: Clinical decision support systems (CDSS) are becoming more prevalent to improve medication safety in geriatric and long-term care (LTC) settings, where polypharmacy and multimorbidity pose particular risk of adverse drug events. This narrative review synthesizes evidence from a structured literature search using thematic analysis to evaluate the effectiveness of CDSS on prescribing quality, medication-related risks, and clinical outcomes in geriatric and LTC populations. CDSS consistently improves the appropriateness of prescribing across multiple studies with statistically significant reductions in potentially inappropriate medications both at initiation (up to 18% reduction) as well as system level prevalence (87.7% vs. 74.4%). These led to significant improvements in adherence to guidelines and medication appropriateness indices, as well as better identification of medication-related risks, including drug–drug interactions, therapeutic duplications and omissions regarding appropriate prescribing. CDSS also improved medication safety procedures, with discrepancies detected in up to 98% of patients and adverse drug events identified with high precision. Although these process-level improvements are encouraging, changes in clinical outcomes such as hospitalizations, mortality, and readmissions were modest or inconsistent. Alert quality and prescriber engagement, as well as system usability and integration into clinical workflows, were among the strongest determinants of effectiveness, with alert fatigue and implementation barriers reported most often. Overall, CDSS can serve as a valuable tool to improve medication use in geriatric and LTC settings, particularly relating to prescription quality and risk detection. However, translation to consistent outcomes at the patient level is lacking. Optimal impact requires a multidisciplinary care environment and robustly designed, context-appropriate systems.

Keywords: Clinical decision support systems, Medication safety, Geriatrics, Long-term care.

INTRODUCTION

The world population is aging faster than ever before. The global population aged 60 years and older is estimated to further double to reach nearly 2.1 billion in 2050, while the number of individuals aged 80 and older will triple to 426 million (Economic, 2024; Organization, 2025). This demographic transition is exerting tremendous pressure on healthcare systems, particularly with regard to medication safety for older adults who often suffer from multimorbidity and frailty, and polypharmacy. Geriatric individuals are also at higher risk of age-related pharmacokinetic and pharmacodynamic changes including decreased renal and hepatic clearance, altered body composition or drug sensitivity (Aggarwal *et al*., 2020; Umegaki, 2025).

Long-term care (LTC) populations, such as residents of nursing homes and residential aged-care facilities, have compounded risk because of high dependency, cognitive impairment, low on-site medical oversight and multiple transitions in care (Hakimjavadi *et al*., 2025; Oware & Mensah, 2025). Polypharmacy, commonly described as the concurrent use of five or more medications, is particularly common in this population (Nortey *et al*., 2025). A systematic review and meta-analysis performed with over 57 million older adults globally found that the pooled prevalence of polypharmacy was 39.1%, and hyperpolypharmacy (≥10 medications) was 13.3% (Wang *et al*., 2024). Prevalence was even higher in Europe (45.8%), Oceania (45.5%) and North America (40.8%), with nursing home residence, age ≥70 years and increased multimorbidity identified as independent determinants of increased rates (Wang *et al*., 2024).

Polypharmacy and potentially inappropriate medications (PIMs) are associated with significant clinical and economic consequences. Adverse drug reactions (ADRs) and adverse drug events (ADEs) are major contributors to morbidity, hospitalization, functional decline, falls, delirium and mortality (Hagiwara *et al*., 2024). A recent systematic review found that ADRs were responsible for 3.3% to 23.1% of hospitalizations in older adults and ADEs were cited in 11.75% to 18% of admissions, with antithrombotics, diuretics and renin-angiotensin-aldosterone system inhibitors frequently implicated (Cosgrave *et al*., 2025). The incidence of ADE is especially high in LTC settings. In a prospective cohort study performed in nursing homes, the incidence rate of ADEs was reported to be 36.4 per 100 residents, with one-third being considered preventable (Ayani *et al*., 2022). These events compromise

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quality of life and accelerate frailty in addition to driving increased healthcare utilization and costs.

One of the most targeted technological interventions to counter such risks is Clinical Decision Support Systems (CDSS). CDSS are computerized systems that merge patient-specific information such as age, comorbidities, renal function, and current medications with knowledge-based resources to provide real-time alerts or recommendations at the point of care (Shahmoradi *et al*., 2021). Integrated with electronic health records or computerized provider order entry systems, they help deal with drug–drug interactions, dosing errors, potentially inappropriate medications (PIMs), and deprescribing opportunities and thus support multidisciplinary teams of physicians, pharmacists, nurses, and geriatric specialists (Filani & Opoku, 2025; Scott *et al*., 2018). Previous systematic reviews have demonstrated that CDSS increases medication safety processes across a variety of healthcare contexts, such as decreased prescribing errors and increased appropriateness of therapy. However, a recent systematic review which focused specifically on adults aged 65 years or older found that while CDSS consistently reduce PIM initiation and support deprescribing practices, effects on hard patient outcomes such as ADE incidence, hospital length of stay, and mortality remain inconsistent and context dependent (Ng *et al*., 2025).

Some critical gaps remain despite this evidence base. Several reviews aggregate data across broad adult or acute-care populations, which may under-represent the unique complexities of geriatric and LTC environments, including healthcare regulation constraints, high staff turnover rate, limited physician availability and frail residents. There are few studies of the factors mediating the likelihood that alert improvements relate to benefits at the patient level, including alert quality and specificity, clinician engagement, user-centered design and multidisciplinary collaboration, and organizational context. This review aims to fill this gap by focusing on CDSS for medication safety within geriatric and LTC patient populations. It reviews evidence on appropriate prescribing, reduction in medication error, risk detection, deprescribing assistance and medication optimization and summarizes its effect on patient outcomes. It seeks to guide the design and dissemination of integrated, user-centered, and multidisciplinary CDSS interventions situated in routine clinical practice by identifying contextual and implementation determinants that moderate effective uptake. The paper aims to inform future policy, practice and research efforts globally to enhance safety for vulnerable older adults in an aging world by reducing medication-related harm.

Prescribing Appropriateness and Potentially Inappropriate Medications (PIMs)

CDSS demonstrates a positive impact on prescribing appropriateness and a reduction in potentially inappropriate prescribing (PIP) and PIMs. Evidence of moderate certainty suggests CDSS reduces initiation of PIMs in older adults (Ng *et al*., 2025). Multiple studies reported statistically significant reductions in PIM initiation at the point of care, including an 18% reduction at the point of care, emergency department prescribing, and pharmacist-dispensed high-risk medications such as amitriptyline and diazepam (Ng *et al*., 2025). Fewer overall total medications in intervention groups also indicate general prescribing behavioral changes (Ng *et al*., 2025). System level analyses reported decreases in PIM prevalence from 87.7% to 74.4% across hospitals (Prasert *et al*., 2019). Recent clinical data also demonstrated a significant burden of inappropriate prescribing. CDSS detected PIMs in 59.04% of patients (mean 1.09 per patient) and identified additional high-risk medications beyond those captured by recommended standard criteria through multi-criteria integration (Bobrova *et al*., 2022; Torun & Apikoglu, 2024).

Interventions from the CDSS improved prescribing decisions via real-time alerts regarding dosage, frequency, drug avoidance, and prescribing information that was missing (Marasinghe, 2015). Intervention groups also achieved higher rates of appropriate prescribing decisions quantitatively. These included relative risks of 2.4 for adherence to maximum frequency, 2.6 for avoidance of inappropriate drugs, and 1.8 for addressing missing prescribing information, along with an improvement in overall appropriateness (RR = 1.2) (Marasinghe, 2015). These findings were further supported by validated measures. Overall, CDSS interventions were associated with a significant reduction in Medication Appropriateness Index (MAI) scores (14.56 ± 11.39 to 7.26 ± 5.07; $p = 0.046$). However, the extent of impact attributable to the CDSS specifically was limited compared to clinician-driven medication review (van den Hanenberg *et al*., 2022). In broader evidence, around 75% of studies demonstrated positive changes in prescribing processes and guideline adherence (Jia *et al*., 2016).

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Both qualitative and quantitative improvements in prescribing quality were confirmed through evidence of significant upticks in guideline concordant prescribing. For example, a significant increase in adherence to geriatric prescribing recommendations was observed after CDSS implementation where compliance with ED prescribing increased from 52% to 71% and discharge prescribing from 0.5% to 31.7% (Elder *et al*., 2026). These findings indicate that point-of-care integrated CDSS facilitates safer prescribing practices.

Further, CDSS interventions demonstrated improvement in medication appropriateness indices and quality metrics for prescribing. However, the magnitude of effect was often incremental when integrated with usual care or clinical review processes (Monteiro *et al*., 2019). CDSS also addressed under-prescribing with START criteria, whereby important omissions, such as statins, ACE inhibitors, anticoagulants and osteoporosis medications, were identified (Sallevelt *et al*., 2022). However, improvements in prescribing appropriateness were not universal. Some studies reported no significant differences as a result of CDSS implementation, illustrating variability in system design, clinical context or end-user engagement (Abdellatif *et al*., 2021; Donovan *et al*., 2010; Marasinghe, 2015; Monteiro *et al*., 2019; Ng *et al*., 2025).

Reduction in Medication Errors and Enhancement of Medication Safety Processes

CDSS was shown to be highly effective in reducing medication errors and improving processes of care surrounding medication safety. These are the two major mechanisms through which these systems exert their effect on patient safety. The errors tackled included potentially inappropriate medications (PIMs), drug-drug interactions (DDIs), duplications, and prescribing inaccuracies in various fields (Lampe *et al*., 2024). It has been well-established through numerous studies that CDSS are effective in reducing prescribing errors and improving guideline adherence. This is achieved through various functionalities, including automated alerts, rule-based recommendations, and the integration of prescribing criteria (Jia *et al*., 2016; Marasinghe, 2015). Clinical event monitoring systems reached a high level of accuracy in ADR detection, with a positive predictive value of 81%, and found that around one-third (31%) of all those detected were preventable (Marasinghe, 2015).

CDSS also improved medication safety processes through documentation, clinical intervention, and medication reconciliation (Niehoff *et al*., 2016). For instance, CDSS corrected more than three times as many medication discrepancies compared with usual care (Ng *et al*., 2025), while advanced systems identified reconciliation discrepancies in 98% of patients with a median of four discrepancies per patient (Niehoff *et al*., 2016). Additionally, CDSS was associated with decreased unnecessary monitoring (e.g., less INR testing), without adversely affecting the quality of care (Abdellatif *et al*., 2021; Marasinghe, 2015). These key findings underscore the dual purpose of CDSS in both improving safety and efficiency in medication management.

Deprescribing and Medication Optimization

CDSS showed a moderate but meaningful effect on deprescribing and a small beneficial effect on medication optimization. Multiple studies documented higher discontinuation of inappropriate medications, including increases in deprescribing rates that ranged from 29.8% to as high as 55.4%, dose reductions and implementation of recommended changes (Ng *et al*., 2025). In LTC settings, CDSS-based interventions helped reduce anticholinergic drug use by 40%, long-acting benzodiazepine use by 17%, and drug duplication by 30%. They also contributed to modest reductions in overall medication burden (Abdellatif *et al*., 2021). In community pharmacy settings, that number was closer to 10%, with 8.7% of changes sustained at six months, implying long-term impact (Mulder-Wildemors *et al*., 2020).

The degree of effectiveness differed by type of medication and clinical setting. CDSS was found to have a greater impact on changes in new prescriptions. It also showed a stronger effect for high-risk drug classes such as tricyclic antidepressants and benzodiazepines (Mulder-Wildemors *et al*., 2020; Sallevelt *et al*., 2022). Acceptance rates were especially high in deprescribing of benzodiazepines (64%) and initiation of preventive therapies such as vitamin D (76%), statins (63%), and ACE inhibitors (51%) (Sallevelt *et al*., 2022). Nevertheless, medications prescribed by specialist services or those considered clinically stable were less frequently modified. Some studies also identified either small or non-significant changes in rates of deprescribing (Mulder-Wildemors *et al*., 2020; Ng *et al*., 2025). Thus, CDSS facilitate medication

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optimization but are limited by clinical context and prescriber judgment.

Impact on Medication Burden and Polypharmacy

Evidence on the impact of CDSS on global medication burden and polypharmacy was inconsistent. Certain studies detected reductions in total medication counts and mean number of drugs per patient (e.g., from 10.4 to 9.5 medications) (Abdellatif *et al*., 2021). However, others revealed no significant differences (Monteiro *et al*., 2019). CDSS did not uniformly decrease the percentage of patients on polypharmacy (>5 medications per patient). This indicates that while CDSS optimizes prescribing decisions for individuals, its influence on the overall medication burden is limited (Monteiro *et al*., 2019).

Detection and Prevention of Medication-Related Risks

One of CDSSs major strengths was the detection and prevention of medication-related risks in complex geriatric populations. Systems recognized multiple types of risk, including DDIs, therapeutic duplications, high-risk prescribing patterns, renal impairment and electrolyte abnormalities, as well as overtreatment (Lapp *et al*., 2022; Marasinghe, 2015; Niehoff *et al*., 2016). The most advanced CDSS tools detected medication-related issues in as many as 90% of patients, including PIMs (58%), overtreatment of hypertension (50%) and diabetes (43%) and feasibility problems (25%) (Niehoff *et al*., 2016). Similarly, STOPP/START-based systems elicited high volumes of clinically significant signals, with 5080 alerts among 826 patients, and the majority of patients having at least one inappropriate prescribing or omission signal (Sallevelt *et al*., 2022).

CDSS further supported real-time decision-making and did not depend on clinician memory by embedding geriatric-specific recommendations into prescribing workflows (Elder *et al*., 2026). This active approach was especially beneficial for minimizing exposure to high-risk medications, including benzodiazepines, skeletal muscle relaxants and anticholinergic agents. Upstream interventions of this nature are essential in light of the known association between PIM exposure and poor outcomes, including falls, cognitive functioning impairment, hospitalization, and mortality among older adults (Elder *et al*., 2026).

The Use of multiple criteria, such as Beers, STOPP/START, and TIME, improved detection performance over single-criterion approaches (Bobrova *et al*., 2022; Torun & Apikoglu, 2024). CDSS also exhibited high rates of ADE detection (up to 96%) when combined with laboratory and medication signals (Abdellatif *et al*., 2021). CDSS expanded beyond prescribing by integrating patient-specific and other multi-source data such as electronic health records, laboratory values, and patient-reported information. This enabled a comprehensive evaluation of safety risks related to medications (Niehoff *et al*., 2016).

Drug–Drug Interactions and Dosing Safety

Evidence regarding the impact of CDSS on DDIs was limited and inconsistent. Some studies reported decreased initiation of interacting drugs, but other studies found greater DDI exposure with reduced mean DDI counts per patient (Monteiro *et al*., 2019). Nevertheless, CDSS was effective for recognizing dose-related risks such as renal dosing errors and electrolyte-related modifications. However, these occurred at lower overall rates of incidence (approximately 5% prevalence) compared with other medication issues (Niehoff *et al*., 2016). Overall, CDSS contributes to dosing safety, particularly in high-risk populations such as older adults with a greater risk of renal impairment.

Alert Systems, Functionality, and Clinical Relevance

One of the main mechanisms utilized by CDSS to influence prescribing behavior is alert generation. One study described considerable alert volume, including 9,414 alerts from 47,997 medication orders (approximately 2.5 alerts per resident per month) (Marasinghe, 2015). Alerts covered a range of medication safety events, including central nervous system effects (20%), constipation (13%), renal and electrolyte disturbances (12%), and risks related to anticoagulants (12%) (Marasinghe, 2015).

Despite their utility, the clinical relevance of alerts was frequently low. Only 3.6% of alerts were clinically relevant in some studies, whereas as many as 64% were deemed unnecessary (Abdellatif *et al*., 2021; van den Hanenberg *et al*., 2022). High alert volumes and low specificity contributed to alert fatigue, a significant barrier that resulted in decreased use and effectiveness (Abdellatif *et al*., 2021; Genes *et al*., 2016; Marasinghe, 2015). Alerts worked better if they were specific, clear and actionable. In particular, systems that have clear, concise, actionable alerts,

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such as one-click recommendations, had higher usability and clinical impact (Genes *et al*., 2016).

Prescriber Response, Adherence, Acceptance, and Utilization

The response of prescribers to CDSS alerts is a key factor determining effectiveness. Response rates were extremely variable, with some studies reporting that up to 70% of alerts resulted in some form of medication modification or discontinuation (Abdellatif *et al*., 2021; Marasinghe, 2015). In other areas, therapy was reviewed in 83.3% of consults and adjusted in 24.6% (Marasinghe, 2015). Adherence rates ranged from 33% to 55% (Monteiro *et al*., 2019), while higher adherence was observed in contexts where CDSS tools were actively integrated into clinical workflows. For example, adherence rates reached 90% for emergency department orders and 80.4% for discharge prescriptions when geriatric CDS order panels were applied (Elder *et al*., 2026).

Overall acceptance of recommendations was moderate, with rates between 31.6% and 39.1%, but varied significantly by recommendation type (2.5% to 75.8%) (Sallevelt *et al*., 2022; van den Hanenberg *et al*., 2022). Clinically actionable alerts, notably drug-drug interactions or the ordering of high-risk medications, were more widely accepted. However, overall implementation rates varied widely across settings (15% to 62.2%) (Ng *et al*., 2025), and adherence in some settings ranged from 33% to 55% (Monteiro *et al*., 2019). In community pharmacy settings, there was a high acceptance rate (85.8%), but only 24.4% of recommendations were sent to prescribers indicating communication barriers (Torun & Apikoglu, 2024). CDSS impacted prescribing behavior directly through real-time alerts and indirectly via reinforcement of knowledge, with clinicians internalizing recommendations for future improved practice (Sallevelt *et al*., 2022; Vandenberg *et al*., 2017).

Impact on Clinical Outcomes

Despite continuous enhancements in prescribing processes, the effect of CDSS on clinical outcomes is still limited and inconsistent. No statistically significant reduction in ADEs or ADRs was reported for most studies, and only a minority showed statistically significant improvements (Abdellatif *et al*., 2021; Damoiseaux-Volman *et al*., 2021; Jia *et al*., 2016; Monteiro *et al*., 2019; Ng *et al*., 2025). However, targeted interventions had tangible benefits. These consisted of a 6.8% absolute reduction in ADEs (number needed to treat = 15) (Ng *et al*., 2025), reductions in ADR risk (Monteiro *et al*., 2019), and decreased injury risk by 1.7 per 1000 patients (Marasinghe, 2015). A few of the studies also reported a significant decrease in falls (P =. 04) and improvements in discharge outcomes (Damoiseaux-Volman *et al*., 2021). Nevertheless, CDSS did not uniformly benefit major clinical outcomes including length of stay in the hospital, readmissions, mortality or delirium (Damoiseaux-Volman *et al*., 2021; Lapp *et al*., 2022; Monteiro *et al*., 2019; Ng *et al*., 2025; VanDaele *et al*., 2021). These findings highlight an enduring gap between improvements in system processes and patient-level outcomes.

Role of CDSS in Clinical Decision-Making and Multidisciplinary Care

CDSS consistently performed as a supplement to clinical judgment, not a substitute. CDSS alone is less effective than clinician-led interventions, especially when not integrated into clinical workflows (van den Hanenberg *et al*., 2022). The clinicians highlighted the contextual interpretation of outputs derived from CDSS, describing that some PIMs could be clinically appropriate for defined cases (Vandenberg *et al*., 2017). CDSS was most effective when integrated within a multidisciplinary approach, involving physicians, pharmacists, and geriatric specialists (Damoiseaux-Volman *et al*., 2021; Mulder-Wildemors *et al*., 2020; van den Hanenberg *et al*., 2022). CDSS also acted as a cognitive booster, aiding clinical vigilance, assisting with difficult choices in complex cases, and enabling safer prescribing amidst polypharmacy and multimorbidity (van den Hanenberg *et al*., 2022; Vandenberg *et al*., 2017).

CDSS Implementation Factors and Barriers

Implementation quality, system design, and integration into clinical workflows were all important determinants of the effectiveness of CDSS. Systems that integrated workflow considerations before implementation and employed multifaceted strategies such as education, audit, feedback achieved greater effectiveness (Damoiseaux-Volman *et al*., 2021). Systems that were multi-criteria and/or embedded in electronic health records had more comprehensive, actionable decision support (Bobrova *et al*., 2022; Torun & Apikoglu, 2024).

In contrast, reported barriers included time constraints (95%), communication issues (90%), unfamiliarity of prescribers with patients (75%)

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and lack of trust (50–55%) (Torun & Apikoglu, 2024). Other barriers included poor integration, the need for manual data entry, resistance to change and the imposition of a perceived threat to clinical autonomy (Mulder-Wildemors *et al*., 2020; Niehoff *et al*., 2016; Vandenberg *et al*., 2017). System-level limitations, including limited formulary options, lack of therapeutic alternatives and fragmented care also restricted implementation of CDSS recommendations (Prasert *et al*., 2019; Sallevelt *et al*., 2022).

Economic and Resource Utilization Outcomes

Data on economic outcomes was limited but indicated potential cost savings. One study reported drug costs were reduced including €149 per patient over 10-month period and approximately US$1,391 annually (Abdellatif *et al*., 2021). Another randomized controlled trial showed that there was a 95% probability that CDSS in combination with pharmacist-led interventions was cost-effective. This was based on a willingness-to-pay threshold of £75 per medication error avoided (Monteiro *et al*., 2019). Laboratory costs increased in some studies due to closer monitoring, and full economic evaluations remain limited (Monteiro *et al*., 2019).

Implications and Recommendations

While CDSS show consistent improvements in medication safety processes among geriatric and LTC populations, these outcomes are not consistently translated in demonstrated reductions in adverse drug events, falls, hospitalizations, or mortality (Ng *et al*., 2025). The limited and context-dependent influence on patient-level outcomes is mainly mediated by factors such as alert specificity, clinician acceptance rates, system usability, workflow integration and wider organizational support (Meunier *et al*., 2023). The combined burden of alert fatigue associated with high volumes of low-value notifications hindered sustained engagement. This challenge was compounded by a lack of integration into varied multidisciplinary workflows, particularly in LTC settings, which are affected by workforce constraints, staff turnover, and fragmented electronic health record infrastructure (Is-mail & Nortey, 2026; Wong *et al*., 2023). CDSS are most effective when embedded in integrated, user-centered, team-based interventions as a complement to clinical judgment (Ng *et al*., 2025).

The implications of these findings are profound for health systems faced with an aging population. Standalone CDSS risk inefficiency and disengagement, while poorly tailored implementations may exacerbate inequities between well-resourced acute-care environments and under-equipped LTC facilities (Najjemba & Solomon, 2026). The limited economic evidence available has further underscored the importance of demonstrating value beyond process metrics such as drug-cost savings and reduced healthcare utilization (Langenberger *et al*., 2025). Enhancing CDSS necessitates careful consideration of human and organizational components so as to mitigate the enduring disconnect between the improvements in prescribing habits and meaningful clinical outcomes (Meunier *et al*., 2023).

Clinical practice recommendations should focus on the intentional integration of human factors engineering into CDSS design and deployment. To mitigate alert fatigue and enhance relevance, developers and implementers should prioritize the integration of high-specificity, actionable, geriatric-tailored alerts. These should incorporate tiered prioritization, one-click deprescribing options aligned with validated criteria such as Beers or STOPP/START, and alignment with electronic health record workflows. To encourage acceptance, strategies such as formalizing multidisciplinary medication review processes involving physicians, pharmacists, nurses, and geriatric specialists are warranted. Additional measures include usability testing prior to implementation, appropriately targeted training programs, and iterative audit-feedback loops (Meunier *et al*., 2023).

Adequately powered pragmatic cluster-randomized trials with long-term follow-ups are needed for definitive evaluation of patient-centered and economic outcomes in addition to process measures. Head-to-head assessments of unique CDSS architectures (rule-based vs. AI-augmented) and implementation models will help clarify mediators of effectiveness. When paired with mixed-methods research exploring contextual factors and equity in resource-limited LTC settings, such studies may also identify unintended consequences such as over-reliance on CDSS or clinician deskilling (Ng *et al*., 2025). Health systems and policymakers need to further promote adoption through targeted incentives. These may include quality indicators, reimbursement models, and regulatory frameworks that reward coordinated multidisciplinary programs rather than isolated technology purchases. Investment in interoperable electronic health record

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infrastructure, and sustainable workforce development for geriatric and LTC environments is critical to scalable, equitable implementation.

CONCLUSION

CDSS was associated with consistent improvements in several medication safety processes in geriatric and long-term care settings. Prescribing appropriateness, detection of medication-related risks, reduction of prescribing errors, and support for deprescribing and medication optimization were the outcomes most commonly improved. Evidence linking these gains to reductions in adverse drug events, hospitalizations, or mortality remained limited and was not consistent across studies. CDSS delivered greater benefit when incorporated into multidisciplinary, user-centered models of care and integrated into routine clinical practice.

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