



Responsible Automation of Medication Workflows at Discharge

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Commentary

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Abstract

Hospital medication workflows may persist after discharge, generating unnecessary handling, returns, and costs. Automated cancellation of medication batches can align pharmacy processes with the patient's care status and reduce redundant medication circulation. In our institutional experience, implementation was associated with a 78.9% reduction in medication returns and a 54.4% reduction in return-related cost per 1,000 dispensed items. Responsible automation requires reliable discharge status, reversibility, auditability, monitoring of unintended consequences, and multidisciplinary governance to ensure that efficiency gains are achieved without compromising patient safety or continuity of care.

Keywords: Hospital Pharmacy; Automation; Medication Management; Patient Safety; Hospital Medication

Introduction

Medication management and reducing medication-related errors remains an important priority in healthcare policy [1]. Dispensing, returns, redistribution, and disposal also consume staff time, infrastructure, and financial resources. At the institutional level, understanding patterns of hospital utilization can support service planning and resource allocation [2]. Within pharmacy services, automation can contribute to reducing dispensing errors and improving workflow efficiency [3]. This approach is particularly relevant given that more than half of pharmacy staff time has been reported to be devoted to infrastructure-related activities [4]. The practical value of digital tools also depends on their ability to integrate into routine clinical workflows without adding unnecessary burden to healthcare professionals [5]. Automation should therefore focus on eliminating activities that no longer provide clinical benefit while preserving safety and equitable access to treatment.

Automation and Responsible Use of Healthcare Resources

A relevant target for hospital automation is the persistence of medication-dispensing activity after a patient

has already been discharged. A discharge may be completed while a scheduled dispensing batch remains active. Medications may then continue through operational steps that no longer have a clinical purpose, generating unnecessary handling, returns, and associated costs. Automation can interrupt this process by aligning the medication workflow with the patient's actual care status. This approach acts on an operational process that has become unnecessary. Better digital coordination can reduce processing time, unnecessary communication, and avoidable pharmacist interventions [6-7]. By improving information flow across teams, these strategies reduce duplicated work and preserve professional attention for the clinical demands of safe care transitions. At our institution, hospital discharge recorded in the electronic health record was linked to the real-time cancellation of dispensing batches associated with the completed admission. Following implementation, the medication return rate decreased 78.9%, while the cost associated with returns per 1,000 dispensed items fell 54.4%. This illustrates how a relatively simple digital intervention can reduce redundant medication circulation while preserving the underlying clinical decision-making process. The intervention stopped an inpatient logistical process once it was no longer needed and reduced redundant medication circulation. These reductions represent more than financial savings. Each

avoided return may eliminate several handling steps and free pharmacy personnel to focus on higher-value activities, including medication reconciliation, patient counselling, clinical review, shortage management, and medication-error prevention.

Safety and Governance of Automated Discharge Cancellation

Automatic cancellation should be implemented with safeguards that recognize discharge as a process rather than a single event. The system should rely on a validated, finalized discharge status and clearly distinguish discharge from events such as internal transfer. Pharmacy staff should also have access to an auditable record of cancellations and a rapid mechanism to reverse inappropriate actions. These safeguards should be complemented by monitoring that captures not only efficiency gains but also potential unintended consequences. Relevant balancing outcomes include inappropriate cancellations, order reactivation, and delayed or omitted doses, since operational improvement alone should not be interpreted as evidence of safety across all dimensions [8]. This broader assessment also requires multidisciplinary governance. Pharmacists, prescribers, nurses, information technology professionals, and quality and patient-safety teams should jointly define the automation rule, its exceptions, monitoring strategy, and accountability pathway.

Conclusion

Automated batch cancellation at discharge can improve alignment between clinical status and pharmacy workflow by preventing operational steps that no longer serve a therapeutic purpose. Our institutional experience suggests that this approach can substantially reduce medication returns and associated costs. Responsible implementation requires reliable discharge status, reversibility, auditability, monitoring of unintended consequences, and multidisciplinary governance. When these safeguards are in place, this automation can support more efficient use of pharmacy resources while maintaining patient safety and continuity of care.

Conflicts of Interest

The authors declare no conflict of interest.

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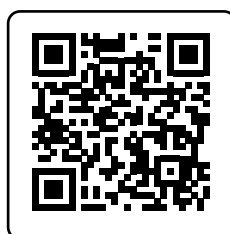
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