

USING SIMULATION TO MODEL CLINICAL MEDICATION REVIEWS IN COMMUNITY PHARMACIES

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ABSTRACT

Providing enhanced clinical services to complex patients is one way that community pharmacies are responding to the shift in healthcare to outcomes-based performance over fee-for-services. One enhanced service that is becoming more popular is comprehensive medication reviews (CMRs). CMRs allow pharmacists to educate the patient on how to correctly manage their medications and discover any possible drug therapy problems (DTPs) that could be effecting the patient's adherence and/or health outcomes. Currently, there is not a specific workflow or process for the best way to perform CMRs in a community pharmacy setting. We developed discrete event simulation models to test different CMR workflows in two different pharmacies and determine the effects on patient waiting time and staff utilization.

1 INTRODUCTION

One of the leading causes of preventable morbidity are adverse drug events and drug related events are the second highest adverse events occurring in hospitals (de Vries et al. 2007). Collaboration between patients, providers, and pharmacists is necessary in order to prevent drug related events (Jokanovic et al., 2017). Conducting CMRs is one way to facilitate collaboration between these parties. "A CMR is an interactive, person-to-person or telehealth medication review and consultation of a beneficiary's medications (including prescriptions, over-the-count medication, herbal therapies, and dietary supplements), by a pharmacist or qualified provider that is intended to aid in assessing medication therapy and optimizing patient outcomes" (CMS.gov Medicate Par D). In order to increase the number of CMRs performed by community pharmacies in North Carolina, the Community Pharmacy Enhanced Services Network (CPESN) project was created. CPESN is a collaborative effort to assist the pharmacies as they implement enhanced services.

Despite multiple systematic reviews supporting the positive effect of pharmacist-led medication reviews on patient adherence and adverse drug events (Jokanovic et al., 2017), most insurance companies do not reimburse for CMRs. Therefore, it is critical to determine the most efficient workflow that has the smallest impact on patient waiting and staff utilization. In order to test different workflows, discrete event simulation models were created of two community pharmacies that were involved in the CPESN project. The staff members at Pharmacy A share clinical and operational responsibilities and no CMRs were being performed at the baseline. Pharmacy B has a dedicated clinical pharmacist to perform CMRs and other enhanced services, such as adherence packaging. Adherence packaging consists of packaging all of a patients' medications in their daily doses together. Both the operational and clinical workflows were modeled in order to test different potential interventions and clinical workflows.

2 METHODS

The objective of this work was to model the current operational and clinical workflows and evaluate multiple proposed changes and their impact on patient wait time and staff utilization for two community pharmacies with different divisions of clinical responsibilities. In order to characterize the workflows, identify

possible improvements, and determine the input parameters, time studies and observations were performed. Time studies were conducted of the different filling activities as well as any clinical activities that were observable across different times of day and different days of the week. Based on the observations, value stream maps were created of the workflows and possible improvements were identified. Possible improvements consist of asking patients when they arrive if they would like a CMR, preparing for patients who are most likely to come in, and dividing up the work differently for different staff members.

The workflows from the value stream maps and the data from the time studies were used for the discrete event simulation models. Some of the input parameters for the CMR process and improvements were based on observations at other pharmacies or assumptions made based on discussions with pharmacists. Both models have four different entity types: patients, prescription orders, phone calls, and CMRs. The model of pharmacy A also includes provider consultations, as it is co-located with a clinic. The workflows modeled include filling prescriptions for patients waiting, filling refill prescriptions that were called in, filling adherence packages, conducting CMR, and phone calls.

3 RESULTS AND CONCLUSIONS

The results of the model of Pharmacy A showed that patient wait time could be reduced by an average of 8 minutes without increasing staff utilization before including CMRs by creating a three-tiered priority fill system and filling prescriptions as soon as the order is received. Once CMRs were being conducted, the results showed that splitting up the work between the pharmacist and either all of the technicians or only the ones performing order entry and receptionist responsibilities were the workflows that showed the smallest increase in patient wait time per additional CMR and had the smallest impact on staff utilization.

The results of the model of Pharmacy B showed no significant difference in patient wait time but showed a decrease of 3 minutes for patient time in system while increasing the number of daily CMRs from six to seven by asking patients about conducting CMRs when they first arrive and attempting to contact patients prior to performing pre-work. The staff utilization increased for the receptionist and the clinical pharmacist be decreased or stayed the same for the other staff members. However, if no clinical pharmacist is present, the waiting time is increased dramatically and only four CMRs could be performed, suggesting the workflow of having one dedicated staff member is better for patient wait time but not robust to staffing changes.

ACKNOWLEDGEMENTS AND DISCLAIMERS

Funding Opportunity Notice: “The project described was supported by Grant Number 1C1CMS331338 from the Department of Health and Human Services, Centers for Medicare & Medicaid Services.”

General Disclaimer: “The contents of this publication are solely the responsibility of the authors and do not necessarily represent the official views of the U.S. Department of Health and Human Services or any of its agencies.”

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