Clinician Decision Support Initiative to Decrease Outpatient High-Risk Medicine Prescriptions in the Elderly

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INTRODUCTION

Reduction of high-risk medications (HRM) in the elderly (age 65+) was identified as an opportunity for improvement in a clinic-based quality improvement (QI) program at one academic suburban outpatient clinic when assessing electronic clinical quality measures within a Medicare demonstration grant Comprehensive Primary Care Plus (CPC+).

Previous studies have shown HRM in elderly, as defined by the American Geriatrics Society BEERS list in the USA,¹ lead to increased odds of adverse drug reactions (OR 1.44 95% CI 1.33–1.56) and hospitalizations (1.27 95% CL 1.2–1.35).² Strategies to reduce risk of adverse drug events include discontinuing medications and prescribing new medications sparingly.³

QI work at initial site supported by our institution's process improvement in action program included a mixed intervention: brief peer education, monthly peer comparison report cards, patient-targeted informational posters, and low-technical refill clinical decision support from a single licensed practical nurse. This work targeted the clinic's three most prescribed HRM in elderly (cyclobenzaprine, lorazepam, and zolpidem) and resulted in an initial 20.5% reduction 3 months after intervention with persistent 10% reduction from baseline at 6 months' post intervention.

Our primary care service line (PCSL) sought to generalize this successful local QI initiative. The aim was to use central informatics resources to develop and implement a sustainable electronic health record (EHR) clinical decision support tool to provide actionable, evidence-based decision support to decrease unnecessary use of HRM in our elderly population. This aim aligned with major payor programs like measure-based incentive payments and CPC+.

METHODS

Our large academic PCSL includes ~ 40 practices and ~ 93,000 geriatrics patients with a single EHR and dashboard tracking HRM prescriptions for elderly patients. Decision support provided at the point of care for the most commonly prescribed HRM in elderly in the PCSL from BEERS list: zolpidem, promethazine, diphenhydramine, cyclobenzaprine, and amitriptyline. Best practice advisory (BPA) fires with any prescription and provides a soft stop providing BEERS list alternatives⁴ to HRM in elderly depending on indication of use (Fig. 1(a)). For existing medications, during a refill encounter, new functionality indicates that patients “fail” refill protocol based on age (Fig. 1(b)). The patient-facing posters were distributed to all PCSL practices for use.

We monitored HRM prescription rates via run charts to track the ongoing prescription rates per 1000 elderly patients in a pre/post analyses to track changes in monthly average prescribing rates. Clinics new to our EHR during analysis period had a minimum of 2 months baseline data. We also tracked rate of BPA triggers versus conversion to HRM prescription versus alternatives.

This project was reviewed and determined to qualify as quality improvement by the University of Pennsylvania's Institutional Review Board.

RESULTS

Run chart (Fig. 2) showed reduction in average monthly rates of elderly patients with HRM prescription per 1000 patients from 20.60 to 19.72, a relative 4.3% reduction, a shift in baseline average but not significant with 3–5 consecutive points below prior run chart average.

BPA data showed 1273 individual triggers from April–June 2019 for new HRM in elderly prescriptions. Of these, 163 events showed a prescription within 6 days, showing 13% conversion to prescription of HRM after BPA.

DISCUSSION

This low-cost, low-tech non-sustainable successful QI intervention reducing HRM in elderly was successfully implemented as PCSL sustainable intervention using clinical

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BestPractice Advisory - Zzzepic, George

Quality and Compliance (1)

Zolpidem is considered a high-risk medication in patients ≥ 65 years old for cognitive issues and falls. Consider the following alternatives:

- Sleep hygiene; cognitive behavior therapy
- ① -Melatonin (OTC) 3 mg one hr before bedtime
- Doxepin 10 mg/mL oral solution- 3-6 mg 30-60 min before bedtime
- Mirtazapine 7.5 mg one hr before bedtime
- Trazodone 25-50 mg one hr before bedtime

Remove the following orders?

Remove	Keep	
		zolpidem 5 MG tablet Take 1 tablet by mouth daily. Print, Disp-30 tablet, R-0 (Removing this order will not discontinue the existing signed order.)

Apply the following?

Order	Do Not Order	
		mirtazapine (REMERON) tablet 7.5 mg
		melatonin tablet 3 mg
		doxepin oral solution 10 mg/mL
		traZODone (DESYREL) tablet 50 mg

Count Zzzepic V

Male, 75 y.o., 7/17/1943
MRN: 642028815

PCP: None
Coverage: None

Requested Medications

Rx Cyclobenzaprine HCl (AMRIX) 15 MG PO CP24

Sig: Take by mouth.
Disp: 30 capsule Refills: 5
Start: 10/30/2018
Class: Phone Med
Non-formulary

Muscle Relaxants Except Baclofen, Tizanidine, Soma Refill Protocol Failed 10/30 7:46 AM

- ✗ Appointment in past 270 or next 90 days.
- ✗ Age < 65 years.
- ✓ Last AST/ALT less than 2x normal, or not on file.

[Protocol Details](#)

To be filled at: None

Figure 1 Best practice alert (top 1 (a)) and medication refill (bottom 1 (b)) screen shots.

decision support software as a BPA. Process metric of 13% conversion of HRM prescription in elderly shows success, although the relative reduction in overall elderly patients with prescription (4.3%) was more modest than the initial site reduction (10%).

Limitations include inability to assess change of provider behavior with refill-encounter clinical decision

support which did not include soft stop nor prescription alternatives. The migration of new clinics to EHR may have contributed to variable baseline data which could affect intervention analyses. We were unable to track adverse drug events from HRM nor track potentially negative unintended consequences from alternative medication prescriptions.

Figure 2 Run U-chart: Tracking number of High-Risk Medications Prescribed monthly to elderly patients

In conclusion, this soft-stop active BPA-reduced prescription of HRM in elderly for new medication orders was a relatively small systems intervention with great reach. Based on this work, our health system is extending this work to deploy BPA in specialty clinics.

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Compliance with Ethical Standards:

Conflict of Interest: The authors declare that there is no conflict of interest.

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