



Optimization of Clinical Decision Support Tools for the Care of Older Adults with Diabetes Mellitus Type II

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ABSTRACT

In 2012, the Centers for Medicare and Medicaid Services (CMS) released the Meaningful Use criteria for eligible professionals requiring the healthcare providers (HCP) to "use clinically relevant information to identify patients who should receive reminders for preventive/follow-up care and send these patients the reminders, per patient preference" (CMS, 2012, Objectives). The mandate requires organizations to review the process of providing preventive and follow-up care reminders and to develop clinical decision support systems (CDSS) that will prompt the HCPs to order the necessary preventive and follow-up care for the patient. The project focused on optimization of existing CDSS in the electronic health record system (EHR) of a primary care clinic (clinic) located in the Southern United States. The CDSS prompts the HCPs to order the necessary preventive and follow-up care specifically for older patients with Diabetes Mellitus Type II (DM II), based on standardized clinical practice guidelines to help guide HCPs' treatment decisions related to foot care, eye care, and glycosylated hemoglobin (HbA1C) measurements for the care of older patients with DM II.

OBJECTIVES

1. Determine the number of patients within the clinic for which use of CDSS tools for DM II care is appropriate;
2. Using current guidelines, quantify the current state of care for older adults with DM II using data retrieved from the EHR prior to revision of existing CDSS DM II tools;
3. Integrate CDSS optimization for older adults with DM II; and
4. Obtain feedback from the healthcare HCP (who is also the owner of the practice) regarding efficiency of refined CDSS DM II tools use.

THEORETICAL FRAMEWORK: ROGER'S DIFFUSION OF INNOVATION

- **Invention.** The enhancement to the existing CDSS in the EHR to increase efficiency in the care of older adults with diabetes
- **Diffusion via communication through the social system.** The flow of information between the provider at the clinical practice, the analyst from the EHR provider, and the project investigator is crucial to ensure support and adoption of the proposed enhancement to the existing CDSS.
- **Time.** The timeliness of the project in relation to the CMS
- **Consequences.** The mandate from CMS requires organizations to review the process of providing preventive and follow-up care reminders and to develop clinical decision support systems

IMPLEMENTATION

Implementation was a two-phase process that began after approval was received from the Institutional Review Board at the University of Alabama in Huntsville.

Phase One

- obtained access to the clinic EHR and learned how to use the system
- reviewed the functionalities of the EHR
- tested the efficiency and usability of the CDSS specific to the care of patients with DM II
- mapped out current state workflow
- analyzed for potential solutions to improve the efficiency and ease of use for the CDSS
- mapped out the future state workflow and obtained approval for enhancements
- submitted optimization requests to the EHR provider
- updated the CDSS for functionalities that can be changed at the user level

Phase Two

- determined the number of patients in the clinic who could benefit from the CDSS tool by running a query in the EHR
- determined the current state of care for older adults with DM II in the clinic by reviewing existing reports in the EHR
- communicated the recommended enhancements
- received approval to submit enhancement requests to the EHR vendor
- implemented the user level functionality enhancement
- maintained continuous communication to ensure that the interventions were appropriate for the clinic.

EVALUATION

Number of Patients who will Benefit from the CDSS Tools

- The PI ran a query to determine the number of patients with DM II in a previous 6-month time frame
 - finding a total of 195 patients with DM II who would benefit from use of the CDSS
- In reviewing the practice guidelines from ADA (2016) and using a timeframe of January 1, 2017 to June 30, 2017 for EHR data extraction
 - 104 patients would benefit from the use of CDSS tools related to foot examination
 - 94 patients for the measurement of HbA1C
- Limitations in current EHR functionality prevented the identification of patients who might benefit from the use of CDSS tools related to the eye examination

Current State of Care for Older Adults with DM II

- the current state of care (focusing upon foot care and HbA1C levels) for the project chart sample was reviewed
 - current practice guidelines are being followed
 - the clinic provider had adequate knowledge regarding management needs
 - the current state process for coordinating recommended examinations by HCPs external to the clinic is based on individual recollection and paper management using the clinic charts or staff workstations
- sixteen of 104 (15.38%) patients with DM II had documentation of sensory foot examinations during the time period of the project
- Twenty eight of 94 (29.79%) had HbA1C greater than 9.0% (requires repeating HbA1C every 90 days until glycemic goals were met)

Improvement in EHR CDSS

- A deep review of CDSS management functionalities found additional opportunities for improvement
 - an order profile tailored to HCP preferences and evidence-based care guidelines for patients with DM II was not used
 - disease management settings that were in the EHR system did not integrate current recommendations for care
 - preventive maintenance settings were not activated for patients with DM II
 - patient reminder letter template also demonstrated opportunities for improvement

Descriptive Feedback from the Clinic's HCP

- The HCP provided feedback regarding ease of use, usability, and relevance of the optimized CDSS tools
- The HCP verbalized increased understanding of the functionalities within the EHR and increased efficiency with the optimizations added

Percentage of patients aged 18 to 75 with diabetes who had a foot exam during the measurement period					
	Q1	Q2	Q3	Q4	Sparkline
Numerator	9	7	30	21	■ ■ ■ ■ ■
Denominator	86	59	79	62	■ ■ ■ ■ ■
Percentage	10.47%	11.86%	37.99%	33.87%	■ ■ ■ ■ ■

Percentage of patients aged 18 to 75 with diabetes who had HbA1C >9.0% during the measurement period					
	Q1	Q2	Q3	Q4	Sparkline
Numerator	33	22	14	18	■ ■ ■ ■ ■
Denominator	75	55	70	53	■ ■ ■ ■ ■
Percentage	44.00%	40.00%	20.00%	33.96%	■ ■ ■ ■ ■

APPLICATION TO PRACTICE

- evidence-based practice tools may assist the healthcare team in closing the gap for preventive care and management of DM II
- the use of CDSS prompts HCPs to order recommended interventions that are based on CPGs
- the mandate from CMS prompted the need to implement CDSS that will remind HCPs to order the necessary preventive and follow-up care specifically for older patients with DM II
- the refinement of the existing CDSS tools allows the HCP to meet the criteria for Meaningful Use due to improvement in the usability thus allowing the HCP to improve the care for older adults with DM II

Barriers

- limitations of the EHR functionalities EHR does not support one CDSS for all users thus creating the need to build the CDSS for each HCP separately
- HCP-specific CDSS places the EHR at risk of losing uniform integration of CPGs across the platform
- reporting function limited to pre-designed queries without capacity for customization by end-user
- EHR lacked functionality to push documentation of preventive and care management measures simultaneously into separate sections of patient charts
- CPGs describing standards of care for ophthalmologic exams in patients with DM II was not integrated in the CIIR

Sustainability

- continuous evaluation and an annual review process for the CPGs
- development of the CDSS for the care of patients with DM II
- the replicability of the process for building CDSS for other diagnoses

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