

Electronic Standing Orders in Primary Care Offices Boost the Delivery of Adult Vaccinations and Other Health Maintenance Services

Patients make appointments with their primary care clinicians for a variety of reasons. Essential services such as screening tests, adult immunizations, and diabetes care may be overlooked if they are not the reason for the health care visit. By organizing and reviewing key information from a patient's electronic health record (EHR) at each visit and through careful review of the patient's medical record regardless of the reason for the current appointment, as-needed essential services can be identified and addressed.



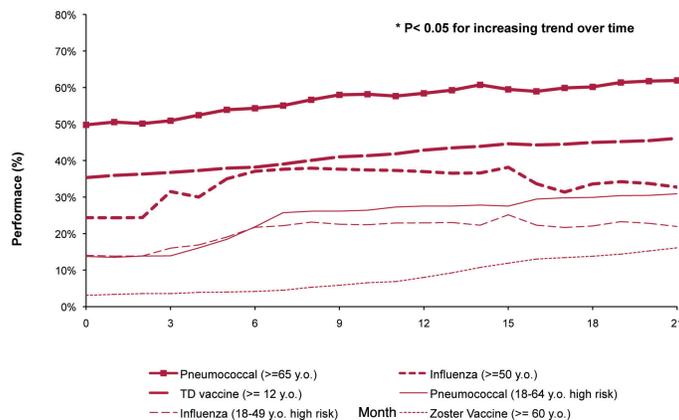
A standing order (SO) authorizes nurses and other appropriate medical staff to carry out services in the doctor's office or to prescribe essential health maintenance services, which can be scheduled elsewhere (e.g., bone density scan). While SOs are triggered by a patient visit to their clinician's office, SOs do not require that the patient be examined. This pilot project implemented and examined the effectiveness of an electronic SO process through the creation of a health maintenance report and other information technology functionalities. Study sites used a common commercial EHR, McKesson, which was customized to deliver appropriate health services at the right time for the patients.

The project made us more aware that our patients were missing regular health maintenance....we did not realize that we missed this. We are now keeping up with their health maintenance issues, and patients realize that they are cared about.

PARTICIPATING PHYSICIAN

Eight primary care practices implemented and evaluated electronic SOs for 15 measures in the areas of preventive screening, adult immunizations (Figure 1), and diabetes care. Participating practices reported 6 to 10 percent improvements in preventive care screenings, 8 to 17 percent improvements in adult immunizations, and up to 18 percent improvements in diabetes care measures. Interviews with practice staff revealed that the time commitment contributed to implementing standard orders was minimal and not a deterrent to participation. This pilot project demonstrated that by empowering staff to carry out SOs, practices can improve the efficiency and quality of care by facilitating the timely delivery of necessary preventive services to patients.

Figure 1. Immunization Performance Measures Over Time: Monthly Medians Across All 8 SO-TRIP Practices



Access video which describes electronic standing order process and demonstrates the positive impact it had on staff's involvement in improved patient care and patients' receipt of recommended services at <http://healthit.abrq.gov/AHRQHealthITSuccessStories/NemethVideo>.



Health IT Implementation to Address a Health Care Need

The Practice Partner Research Network (PPRNet), a member-driven, practice-based learning and research organization, was the lead agency for this project. Currently, PPRNet has 160 physician practices, representing over 850 health care providers, and approximately 1.8 million patients located in 41 States (<http://www.musc.edu/PPRNet/>). Its members consist of 73 percent family medicine physicians, 21 percent internal medicine physicians, and 6 percent specialty or other type practices. Although practice-based research networks have been in existence for many years, PPRNet is unique in that all of its members use the McKesson EHR system to capture their patient information. A total of eight PPRNet member practices from eight different States were selected for participation in this project. Two of the practices serve a rural population, and one practice serves a population with a high proportion of Hispanic patients.

Screening recommendations from the U.S. Preventive Services Task Force, adult immunization recommendations from the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices, and disease monitoring recommendations for persons with diabetes from the American Diabetes Association were used as the basis for creating the electronic SOs and the electronic SO quality-of-care measures. A customized EHR health maintenance (HM) template served as the electronic SO provider reminder. The HM template outlined the schedule of testing, screening, and immunizations that should be provided to each patient based on the patient's disease, age, and gender. The HM table (Table 1), in contrast to the HM template, aggregates the recommended services from multiple HM templates into one location. The HM table indicates a patient's need for a preventive service and can be used to track if the patient received these services. Overdue items appear highlighted in red in the HM table for easy viewing, serving as electronic reminders.

TABLE 1 - SAMPLE HEALTH MAINTENANCE TABLE*

	Recommend For	Due (seq.#)	04/17/2009	05/09/2009
Alcohol	50-64 YEAR OLD FEMALE	04/10/2011	X	
Aspirin Therapy	Multiple			
BP	Multiple	11/09/2009	X	
Cholesterol	50-64 YEAR OLD FEMALE	05/24/2002		
Colonoscopy	50-64 YEAR OLD FEMALE			
Creatinine	ACE INHIBITOR	09/11/2008		
Depression	50-64 YEAR OLD FEMALE	05/24/2002		
Diet Counseling	DIABETES MELLITUS	05/02/2010		X
Exercise Counsel	DIABETES MELLITUS	05/02/2010		X
Eye exam	DIABETES MELLITUS	11/09/2009		
F.O.B.	50-64 YEAR OLD FEMALE	04/30/2010		X
Flex Sig	50-64 YEAR OLD FEMALE			
Foot Exam	DIABETES MELLITUS	11/09/2009		
Glucose,Fasting	50-64 YEAR OLD FEMALE			
HDL Cholesterol	Multiple	05/24/2002		
Height	50-64 YEAR OLD FEMALE	05/02/2014		X

Hemoglobin A1C	DIABETES MELLITUS	11/09/2009		X
Influenza vaccine	Multiple	05/24/2002		
LDL Cholesterol	Multiple	05/24/2002		
Mammogram	50-64 YEAR OLD FEMALE	05/24/2002		
Microalbumin, Ur	DIABETES MELLITUS	11/09/2009		
Pap Smear	50-64 YEAR OLD FEMALE	04/10/2012	X	
Pneumococcal poly.	DIABETES MELLITUS	11/09/2009		
Potassium	ACE INHIBITOR	05/03/2009	X	X
Smoking Counseling	Multiple	11/09/2009		
Tdap	50-64 YEAR OLD FEMALE	05/24/2002		
Triglycerides	Multiple	05/24/2002		
Weight	50-64 YEAR OLD FEMALE	05/02/2011		X
Zoster	50-64 YEAR OLD FEMALE	05/24/2002		

*Light red shading indicates what is overdue for the patient.

PPRNet previously developed a quality improvement (QI) model called the “PPRNet-Translating Research into Practice (TRIP) QI model” (for more information, please see:

<http://academicdepartments.musc.edu/PPRNet/research/model.htm>). This model served as the basis for assisting practices in incorporating the electronic SO into their systems and workflow using a set of core concepts on how to lead practice development and what to focus on for practice QI. Following this model, the research team convened a meeting of participating practices during which all of the participants made plans to introduce the project within their practice, and to configure their patient records to assure that the relevant HM templates were available for use. A site visit was made by research team members within 2 months of the meeting to further reinforce the project goals and to help the practice with any implementation issues. Monthly correspondence with each practice helped the project staff to understand the practices’ experience using the SO interventions and to provide assistance. Correspondence with practice teams focused on learning the successful strategies that the practices had used to implement their electronic SO system.

A second site visit was made at the midpoint of the project to further understand how the project was implemented and help practices overcome any new or ongoing technical issues with the process. A second network meeting was held in September 2009 in Charleston, South Carolina, during which each practice presented their specific experiences in implementing electronic SOs. This meeting encouraged discussion, further reflection by practices, and reconsideration/revision of their own plans and strategies.

A final site visit or evaluation phone conference took place within the last quarter of the data collection period to elicit final perspectives related to the project and perceptions about sustainability. Three practices had only two site visits: one practice had successful adoption of the intervention, and no additional learning was expected; one practice did not have interim data to report at the midpoint of the project due to data extraction problems (which were eventually solved); and one practice had too many conflicting priorities and had not demonstrated adequate success to warrant a third visit.

Key Results

The electronic SO intervention was customized to each practice based on the unique characteristics of the participating practice. To evaluate the success of the intervention, practices submitted EHR data extracts on a quarterly basis. The research team used these extracts to measure the presence of HM templates, use of the templates, and performance on the study measures for each practice. The “presence” of the HM template was calculated as the number of patients that had the measure on their HM template divided by the number of patients eligible for the measure. The “use” of the template was calculated as the number of patients with an entry on the template divided by the number of patients with the measure on their template. Table 2 shows the percent change from the beginning of the study to study end, which increased in six practices, was relatively unchanged in one practice, and declined in another. Statistically significant changes over time were noted for osteoporosis screening, most immunizations, and urinary microalbumin testing.

TABLE 2: MEDIAN PERCENT OF ELIGIBLE PATIENTS WITH MEASURE ON HEALTH MAINTENANCE (HM) TEMPLATE AND MEDIAN PERCENT OF PATIENTS WITH HM TEMPLATE ENTRY AT STUDY BASELINE AND END

Measure	Eligible Patients with Measure on HM Template		Patients with HM Template Entry	
	July 1, 2008	April 1, 2010	July 1, 2008	April 1, 2010
Cholesterol (≥ 18 y.o.)	92%	97%	41%	56%
HDL-Cholesterol (≥ 18 y.o.)	21%	95%	16%	52%
Mammography (≥ 40 y.o. F)	92%	99%	35%	60%
Osteoporosis (≥ 65 y.o. F)	94%	100%	9%	21%
Pneumococcal (≥ 65 y.o.)	91%	99%	40%	66%
Pneumococcal (18-64 y.o. high risk)	63%	79%	8%	35%
Influenza (≥ 50 y.o.)	51%	99%	8%	37%
Influenza (18-49 y.o. high risk)	52%	60%	4%	17%
Td Vaccine (≥ 12 y.o.)	96%	100%	26%	46%
Zoster Vaccine (≥ 60 y.o.)	0%	100%	0%	28%
Urine Microalbumin	68%	80%	9%	44%
Hemoglobin A1c	57%	80%	6%	54%
HDL-Cholesterol	85%	99%	37%	67%
LDL-Cholesterol	90%	97%	48%	76%
Triglycerides	85%	93%	37%	61%

Since receipt of a procedure (e.g., mammogram, any immunization) is in part assessed from data recorded on the HM table, increased use of the HM features rather than actual delivery of more services may have biased assessments of improvements for these measures. Also, since most practices ordered lipid measurements as panels (total-cholesterol, LDL-cholesterol, HDL-cholesterol, and triglycerides), improvements in one actual clinical procedure (obtaining a lipid panel) may exaggerate improvements in the summary measure which counted each lipid measure independently.

Qualitative methods were used to determine the barriers and facilitators to the adoption of and ability to sustain a new electronic SO system within each practice. The research team found that most successful practices had established policies and protocols, and educated their staff on their new roles. Staff in practices with significant improvement embraced the project with the support of leaders, and did not experience major time burdens. Technical competence and leadership were cited as important to optimally adapt and use EHR reminder tools and help staff adopt new roles and overcome barriers. Reinforcing the system was critical; successful practices followed up on the project with staff, soliciting staff input and posting quarterly performance reports to share successful approaches. Several practices provided trainings conducted by practice physicians to enhance staff knowledge regarding the system and implementation of the SO. Many of the practices took an incremental approach to implementing a set of measures at first and added others when success was demonstrated. Some practices focused on a more limited set of standing orders throughout the project and may have needed more time to demonstrate substantial improvements.

Two of the eight practices experienced more difficulty in demonstrating improvements. Difficulty incorporating the SO protocol in these two practices was related to larger practice size and diversity (multi-specialty and an internal medicine group) of clinicians.

As this research was designed as a pilot demonstration project using a small sample of practices to test the efficacy of this approach, future work should test the effectiveness in a larger sample of practices. Additional work is also needed to identify which clinical measures are best suited for inclusion in such SO protocols in the future.

Contract Title: Implementation and Evaluation of Standing Orders Using Health Information Technology

Principal Investigator: Lynne Nemeth, Charleston, South Carolina

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AHRQ Background Report: <http://healthit.ahrq.gov/29007100152Nemeth2010.pdf>

