

Applying the Medications at Transitions and Clinical Handoffs Toolkit in a Rural Primary Care Clinic

Implications for Nursing, Patients, and Caregivers

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ABSTRACT

Background: Adequate medication reconciliation is related to patients' safety. Rural populations are at increased risk of adverse drug events due to errors in medication reconciliation and often receiving medical care across multiple health care entities and across long distances with separate electronic medical records.

Methods: This study examined the implementation of Medications at Transitions and Clinical Handoffs Toolkit (MATCH) in a rural primary care clinic and assessed the acceptability and feasibility of implementation.

Intervention: MATCH was developed as a workflow process intervention to improve medication reconciliation.

Results: Findings from MATCH implementation indicate that the process improved medication reconciliation workflow. A shared definition of current medications across providers and patients was essential.

Conclusions: Empowering patients and caregivers with tools and language to work with providers, particularly nurses, to conduct medication reconciliation during primary care clinic visits is key to improving patient medication reconciliation in rural settings.

Keywords: adverse drug events, handoff, medication reconciliation, primary care, rural health care

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Health care complexity escalates with evolving treatments and pharmacological advances. Patient safety and quality improvement demand continued progress as the patient navigates the health care system. Being a patient is not a passive state. Patients must be knowledgeable about past medical history and past and present medications. One-third of adults in the United States take more than 5 prescription medications.¹ An estimated 700 000 emergency department visits and 100 000 hospitalizations are attributed to adverse drug events (ADEs) annually.² Five percent of hospitalized patients have a reported ADE.³ Outpatient facilities also report issues with medication errors: 25% of patients experienced an ADE.⁴ Medications such as selective serotonin-reuptake inhibitors, beta-blockers, angiotensin-converting enzyme inhibitors, and nonsteroidal anti-inflammatory medication are frequently involved in ADEs.⁴ In ambulatory care, the rate of ADEs approaches 27 per 100 patients, a rate 4 times what is estimated in inpatient settings; preventive intervention strategies may reduce nearly one-third of reported ADEs.⁴

Clinical handoffs following hospital discharge are a critical time to address medication reconciliation and prevent ADEs.⁵⁻⁸ Hospital stays often result in medication changes, and appropriate adjustments to medications are vital. The Agency for Healthcare Research and Quality identified rural communities, the elderly, and low-income populations as priorities due to increased risk of health and social disparities.⁹ Overall, health care facilities face challenges, but these are compounded in rural clinics by geographic and social isolation. These clinics may have limited staff, limited access to e-prescriptions, fewer on-staff pharmacists, an aging population with multiple chronic conditions and polypharmacy, limited access to specialists, and patients with low health literacy.¹⁰⁻¹⁷ Successful interventions to prevent ADE across health care facilities require investing in nursing staff time and financial resources and training and coordination of providers who may be geographically dispersed, often with multiple electronic health records that hinder coordination of care and medication reconciliation.¹⁰

The Agency for Healthcare Research and Quality supported development of the Medications at Transitions and Clinical Handoffs (MATCH) toolkit, a process designed to reduce medication errors and patient harm. The process examines internal processes, workflow, and staff responsibilities related to medication reconciliation.^{5,18} MATCH is an evidence-based toolkit that provides step-by-step guidance to improve the medication reconciliation process in health care facilities. A study of MATCH implementation with 651 patients (5701 medication prescriptions) showed that 35.9% had medication errors.⁶ Of these, 85% originated in the medication history.⁶ This study used the MATCH toolkit in a novel setting, a rural primary care clinic in partnership with a local rural hospital, to assess the feasibility of using the MATCH framework to improve clinic and transition processes.

METHODS

Context

This study examined medication reconciliation in 2 separate health care settings, a rural primary care clinic and a hospital. The clinic has a rural health designation from the Centers for Medicare & Medicaid Services. Both the hospital and

the clinic serve a primarily rural county (69.7%) with a population of approximately 35 000.¹⁹

Overview of the process

MATCH is an 8-step process that includes the following: (1) convene an interdisciplinary team, (2) map current medication reconciliation processes, (3) identify potential areas of improvement, (4) establish a measurement strategy, (5) design changes to the medication reconciliation process, (6) pilot changes in the facility, (7) provide education and training, and (8) assess/evaluate the changes.⁵ Pilot results for the workflow process intervention and modifications tailored to the rural clinic environment are reported in this article. The study was approved by the University Institutional Review Board (protocol 2016-3).

Identification of the issue

Hospital staff approached the research team to explore modifiable factors in hospital readmissions. Clinic nursing staff were asked to consider the underlying issues related to hospital readmission in their patient populations. Although many issues were discussed, insufficient medication reconciliation was identified as a priority. With cooperation from the hospital, we worked with clinic information technology staff to create a de-identified list of clinic patients who were discharged from that hospital in the previous 18 months to determine demographic characteristics of patients at greatest risk for readmission. Risks for readmission included being 65+ years with 2 or more chronic conditions (specifically, chronic obstructive pulmonary disease, hypertension, diabetes, coronary artery disease, and/or depression), low income, and polypharmacy.

Preliminary planning for MATCH: focus groups and interviews

We conducted focus groups with clinic ($n = 7$) and hospital staff ($n = 11$) to assess the need for medication reconciliation processes across facilities, barriers for patients/caregivers and organizations for implementing changes to the process, and next steps before starting MATCH. Participants were recruited via e-mail invitation.

Next, we conducted key informant interviews using a structured interview guide with 21 older adult patients and/or their caregivers to assess perceived barriers and solutions to medication reconciliation. Trained research personnel

conducted interviews in private locations; interviews were recorded and transcribed. We collected basic demographic information and assessed health literacy using the 3-question Chew short questionnaire.²⁰ The Chew questionnaire allowed researchers to assess health literacy with 3 questions and the interviewer to better understand when participants might need further explanation of the questions that was practical for use in this setting.²⁰ Participants were an average of 74.2 years, 14 females, 4 males, and 3 who did not identify gender. Seventeen were patients and 4 were caregivers. Of the 3 health literacy questions,²¹⁻²³ 11 participants indicated a low score on at least 1 question. Overall, at least half of the older adults interviewed experienced moderate challenges with health literacy. As part of the interviews, some patients reported that they could easily consult a pharmacist or their provider to straighten out any medication problems and to organize multiple medications. Others reported feeling confused when they needed to organize multiple medications, change dosage, and take medications at certain times of day or with food, and were uncertain about supplements. Many had a family member help them keep track of medications and fill prescriptions.

RESULTS

The results of MATCH implementation in the clinic are described in 2 parts. First, each step of MATCH is explained as it is outlined in the toolkit,⁵ followed by a description of the process as it was implemented in the clinic, including modifications.

Step 1: Assemble an interdisciplinary team

MATCH starts with identification and assembly of a 2-part interdisciplinary team. MATCH recommends that the team be composed of executive sponsors who are senior management, can provide oversight and accountability, and can reduce organizational barriers. The team should also consist of project sponsors such as the director of nursing and staff from Health Information Technology, pharmacy, and so forth, who can ensure timely implementation, provide insights based on discipline, remove department specific barriers, and approve recommendations. Finally, the team should consist of improvement leaders who provide quality improvement and patient safety oversight and can integrate operational clinic process flow recommendations. A

second design team including physicians, nurses, representatives of information systems, and patient safety would supply firsthand knowledge of medication reconciliation process and workflow. Finally, additional stakeholders who can advise, enforce, or contribute to problem solving should be included.

Step 1: implementation

To adjust MATCH across 2 independent health facilities (rural hospital and clinic), we planned to hold 4 separate interdisciplinary team meetings (steps 1 and 2) to understand workflow/plan at each location and then combine teams to implement the 5 remaining steps. However, we were unable to meet this goal. Although the rural hospital was supportive, in the time between the idea/proposal and funding, they formed an internal group to address medication reconciliation to reduce readmissions, and staff turnover created barriers that we were unable to address. We conducted a preliminary focus group with hospital staff and attended 1 internal meeting concerning medication reconciliation. The hospital remained supportive but was unable to continue with the study.

We successfully implemented the interdisciplinary team at the clinic. The team represented clinic staff who were directly involved in medication reconciliation. Overall, we held six 1-hour team meetings that included nurses, the nursing director, the care coordinator, the social worker, reception staff, health analytics/information technology support, pharmacy and pharmacy tech, physicians/hospitalists, residents, and students, and when possible, executive leadership. Pre- and posttests of feasibility and acceptability were conducted with the team to understand potential for dissemination to other rural clinics.

Step 2: current medication reconciliation process

Step 2 is to develop a flowchart of the current medication reconciliation process. MATCH provides guidelines to assess current organizational workflow to recognize successful processes, current roles and responsibilities, challenges, and unnecessary steps related to medication reconciliation. Because MATCH was developed for hospital systems, it includes admissions, intrafacility transfers, and discharge-specific guidelines for assessment. In admissions, MATCH includes

medication history, comparison of orders, and resolution. Intrafacility transfer includes comparison of orders and resolution. Finally, discharge includes a medication discharge list and reconciliation.

Step 2: implementation

One of the goals of this project was to understand the medication reconciliation process, both internally and at the point of transition to primary care. We successfully conducted focus groups with both the rural hospital and the clinic staff, as well as 2 providers who worked in both environments. We also visited 2 additional rural clinics with similar patient populations to understand their medication reconciliation processes and the challenges they face to see whether any of their processes could offer solutions to the issues identified in this study. All agreed that medication reconciliation was an issue and a patient's safety was a priority. Each group identified multiple potential sources of medication reconciliation information. The team created a flowchart (see Supplemental Digital Content Figure 1, available at: <http://links.lww.com/JNCQ/A663>) and identified areas for improvement both in the transition across health care facilities at discharge and internally. After reviewing the flowchart, nurses were the primary source of medication reconciliation communication directly with patients and caregivers, as well as working with providers to create accurate active medication lists. The team created a consistent definition of an accurate medication list and a clinic intervention discussed in step 3.

Step 3: plan for improvements

MATCH outlines the process to plan for organizational improvements for medication reconciliation. Steps include developing a problem statement, establishing goals and objectives to address the problem statement, integrating individuals who are responsible for regulations and accreditation to ensure that the process is designed to meet requirements, determining the scope of the project, understanding of system capabilities and barriers, identifying resources available and needed for success, and finally outlining project milestones to measure success.

Step 3: implementation

At this point in the project, we were unable to maintain relationships with the hospital. However, we continued to work with clinic staff to

improve internal processes (addressed in the second team meeting). The team agreed on a shared definition of an "accurate medication list" that integrated reception, nursing, and clinical information technology staff, and quality assurance committee members. Barriers and strategies to address medication reconciliation that were identified as part of the interviews with patients/caregivers in the interviews and with clinic/hospital staff in the focus group were discussed with and supplemented by the team with their own experiences. Barriers included issues related to adherence, access, and structural barriers (summarized in Supplemental Digital Content Table 1, available at: <http://links.lww.com/JNCQ/A664>). Strategies included some nurses asking patients to bring all of their current medications with them to the appointment, pharmacies prepackaging 3 months of medications in blister packs, and using a hospital portal to verify discharge orders and the context of the hospital stay. However, patients would often have to self-identify that their clinic visit was due to a recent hospitalization follow-up.

Patients who were identified as transition-of-care patients had a clinic team dedicated to follow up with the hospital, home health, and pharmacy to ensure accurate medication lists. Critically, the hospital was using an incorrect fax number to share discharge lists with the clinic. We identified and corrected this immediately. One of the rural clinics we visited as a part of the study used grant money to identify high-risk patients and paired them with a community health worker who went to the home and performed medication reconciliation to get a more complete picture of the social context of the patient. Because most of the proposed solutions involved helping to educate and empower patients to understand and track their current medications, it was suggested to use a visual map of symptoms/body systems.²⁴ This map, MedManage,²⁴ was pilot tested using pre- and postchart audits to assess medication lists charted versus the "accurate medication list" defined by the team by investigating the number of medication discrepancies, including all pro re nata and over-the-counter (OTC) medications and herbal supplements.^{5,18}

Steps 4 to 6: measurement strategy of design and pilot project

MATCH includes using a medication reconciliation workflow process that includes 1 source

of truth for current medications. One source of truth is either a paper or an electronic copy of a patient's current medication list that is consistently available to all disciplines responsible for any part of medication reconciliation. The accuracy of this list, compared with the working definition of "accurate medication list," was the common goal.

Steps 4 to 6: implementation

The team decided to print off a copy of the last medication list at the clinic, hand to the patient on check-in, and use MedManage to prompt the patient to recall and report any pro re nata or OTC medications that they used in the last 2 weeks. One provider with an adult patient population was chosen to pilot the project. A chart audit of 38 charts found that 40% had either inaccurate or incomplete medication lists, including 3% pro re nata and 82% with a previously unrecorded OTC medication.²⁴ We were unable to assess hospital readmissions because the hospital was no longer a part of the study at this point.

Step 7: education and training

MATCH suggests that everyone involved should be trained and informed of the plan. Roles and responsibilities should be defined and understood by each member of the team. Team training promotes understanding of roles and duties.

Step 7: implementation

Prior to the pilot test, MedManage paperwork was assessed by adults similar to those who were the primary focus of the study to make sure the medication list and MedManage were easy to understand. Based on this pretest, the paper for MedManage was changed to yellow so that the patient could differentiate it from other sheets with previously identified current medications. Reception and nursing staff were trained to implement the process and reconcile medications in patients' charts. An assistant was on hand to explain MedManage and help patients complete the paperwork.

Step 8: assessment and process evaluation

Each step of MATCH requires careful evaluation to determine strengths and weaknesses of the project. This is critical to change and adoption of the process. Knowing how each part performed will help with feedback and defining issues that need to be addressed.

Step 8: implementation

The process had several issues that needed to be addressed. It was difficult to sort patients in the project versus patients who were seeing other providers. Nurses had difficulty finding OTC and herbal medications in the electronic health records formulary. This increased intake time and caused delays for providers who were already on a limited time frame. Patients' charts were evaluated pre- and postvisit for medication discrepancies based on the definition (developed by the nurses in the project) of accurate medication reconciliation. Additional medications added at the visit were the overall indicator of the success. Newly reported OTC and pro re nata medications gave insight as to the necessity of symptom-driven medication reconciliation.²⁴ Using MedManage was a challenge in the patient flow process (see Supplemental Digital Content Figure 2, available at: <http://links.lww.com/JNCQ/A665>), but the team acknowledged increased accuracy, by their definition, of patients' medication lists. Further suggestions to improve the process included context questions to help patients and caregivers provide more accurate information during medication reconciliation (Table) and a printed list of current medications for patients to keep with them.

To assess overall feasibility of implementing a new clinic medication reconciliation process, the research team conducted feasibility assessments. Feasibility questions related to the importance of medication reconciliation, ease of implementation, and processes related to discharge. Pre- and postmean scores were assessed using a *t* test (see Supplemental Digital Content Table 2, available at: <http://links.lww.com/JNCQ/A666>), an appropriate test for small sample sizes.²⁵

DISCUSSION

Participants in MATCH identified challenges that patients and/or caregivers often face, and solutions they employed, and worked through MATCH to improve workflow and processes for medication reconciliation. The pre/posttests with the leadership team did not indicate significant changes in the perception of medication reconciliation importance, which indicates its overall weight in patient care/acceptability among clinic and hospital staff. Significant changes from pre- to posttest about MATCH implementation support the feasibility of using MATCH in a rural clinic setting. We learned that increased

Table. Medication Reconciliation Prompt Questions

<p>Medical history</p> <p>Have you been to the hospital or emergency department since the last time you were here?</p> <p>Have you been to see any other doctors/health care providers? What about dentists?</p> <p>How long ago did you have your last appointment, or did you see another doctor/health care provider?</p> <p>Did they tell you to take any new medicine or to stop taking some of your medicine?</p> <p>Do any of the medicines that you take now make you feel bad or have side effects?</p> <p>Is there any medicine that you take only sometimes?</p> <p>Do you use any medicines that you can buy over the counter? Like for a headache or upset stomach?</p>
<p>Pharmacy use</p> <p>Which pharmacy do you use the most?</p> <p>Do you go to any other pharmacies?</p> <p>Has your pharmacist ever talked to you about the medicine that you take? What did they say?</p> <p>Do you go to the pharmacy or have them mail medicine to you?</p>
<p>Social context</p> <p>Do you have anyone at home who helps you take your medicine?</p> <p>Do you have someone who goes to the doctor/pharmacy with you to help you remember everything you talk about with them?</p> <p>Sometimes when we have lots of medicine to take, it is hard to remember when to take them and what to take. Do you always remember to take your medicine?</p> <p>Do you know what all of your medicines are for?</p> <p>Is there anything that makes it hard to get your medicine (transportation, pharmacy hours, money)?</p> <p>Do you know what to do with old medicine if the doctor/health care provider tells you to stop taking something?</p>

communication between pharmacies, nurses, primary care providers, hospital inpatient and emergency departments, specialists, home health and/or community health workers, and caregivers is critical. However, the key to accurate medication reconciliation postdischarge is helping patients work with intake nurses to identify, monitor, and track medications across health care entities. This is facilitated by creating easy-to-understand reconciliation tools and improving the workflow within rural clinics to reduce steps and identify who is responsible within the process to maintain a current medication list, create a shared definition for accurate medication reconciliation, and implement it within the clinic.

CONCLUSIONS

Adverse drug events occur in multiple settings. Rural primary care is no exception. MATCH provides a systematic method to improve medication reconciliation. However, since many of the preventable errors occur during the transition from hospital to primary care, the process must be modified to fit the clinic situation, and nursing staff play a critical role in both understanding and refining the process. This study is one of few to take place in a rural

primary care setting to monitor the processes related to medication reconciliation in primary or ambulatory care settings.²⁶ One limitation was the small sample; however, the pre- and postsurveys conducted with the interdisciplinary team indicate that using the MATCH toolkit increased the perception that leadership could improve patient outcomes and identification of workflow changes that could be implemented easily.

Patients and caregivers are the only consistent link between multiple providers and pharmacies, particularly in rural settings, which indicates that tools to empower and educate them on maintaining accurate medication lists across health care entities are needed. Nurses are key to provide the support needed for accurate medication reconciliation. MATCH was a useful tool to improve medication reconciliation at the clinic. Additional evaluation and redesign are necessary as electronic health record systems change and medication reporting evolves. A consistent process such as the MATCH toolkit provides allows for easy-to-understand steps to reevaluate the medication reconciliation workflow regularly. This type implementation research is an important tool in improving rural clinical practice.

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