Advances in Geriatrics

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Electronic Medication Reconciliation: A Pilot Demonstration on an Inpatient Geriatrics Unit

In a 2007 report, the Institute of Medicine estimated that at least 1.5 million preventable adverse drug events (ADEs) occur annually in the United States.[1] And the consequences of such ADEs can be dire: One study found that ADEs were associated with a nearly twofold increased risk of death in hospitalized patients.[2] A major problem underlying preventable ADEs and other serious medical errors is poor communication of medical information.[3–5] In fact, communication problems are believed to cause up to 50% of all medication errors and 20% of ADEs.[6,7]

The process known as medication reconciliation can be a useful tool for improving medication-related communication and avoiding ADEs. This process involves compiling an accurate list of all medications a patient is taking and comparing that list to orders generated during a transition from one care setting to another (for example, during hospital admission, transfer, or discharge). The aim is to decrease transcription errors, therapeutic duplications, therapeutic omissions, drug-drug interactions, and drug-disease interactions.[7] In recent years, the Institute for Healthcare Improvement, the Joint Commission on Accreditation for Healthcare Organizations (JCAHO), and the Institute for Safe Medication Practices all have called for the implementation of measures that promote medical reconciliation during all transitions of care.

Responding to this call, the Geriatric Research, Education and Clinical Center (GRECC) at the VA Tennessee Valley Healthcare System (VATVHS)—in conjunction with the VATVHS Geriatric Evaluation and Management (GEM) unit—set out to design and test an electronic tool to facilitate documentation of medication reconciliation. This initiative was in keeping with the mission of the VATVHS GRECC, which was established in 1999 to explore issues relating to quality and safety, health services research, and pharmacology as they apply to geriatric patients. Likewise, it fit in well with the goals of the GEM unit, which was launched in 1987 to improve the quality of care for aged veterans. In addition to providing acute care for approximately 250 elderly veteran patients annually, the GEM unit serves as a clinical "laboratory" for both GRECC- and non–GRECC-based clinical investigation.

As a result of this latest collaboration, an automated, standardized medication reconciliation template was developed for use with the facility's computerized patient record system. Starting in June 2006, this template was implemented on the GEM unit, and its potential to help minimize inappropriate or unnecessary drug therapy has begun to be evaluated. While further study is needed, preliminary results from this pilot demonstration are promising.

DEVELOPING THE TEMPLATE

For some time now, the GEM unit has held a once weekly multidisciplinary team meeting during which current cases are discussed and relevant information is communicated to all providers involved in the patients' care. While the processes of medication review and reconciliation were included intuitively in these discussions, they generally were conducted informally, without documentation. The idea behind the electronic template was to promote

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The VHA's Geriatric Research, Education and Clinical Centers (GRECCs) are designed for the advancement and integration of research, education, and clinical achievements in geriatrics and gerontology throughout the VA health care system. Each GRECC focuses on particular aspects of the care of aging veterans and is at the forefront of geriatric research and clinical care. For more information on the GRECC program, visit the web site (http://www1.va.gov/grecc/). This column, which is contributed monthly by GRECC staff members, is coordinated and edited by Kenneth Shay, DDS, MS, director of geriatric programs for the VA Office of Geriatrics and Extended Care, VA Central Office, Washington, DC.

standardized, formal documentation of medication reconciliation in an easy-to-use format that would be integrated smoothly into existing procedures.

To that end, the GRECC-GEM team worked with the facility's Medication Reconciliation Work Group to develop an automated, standardized, coding-compliant, medication reconciliation template that would be incorporated into the existing electronic admission and discharge notes. The resulting template consists of lists of active and recently discontinued medications, followed by a series of questions that document the process of evaluating the lists for accuracy, therapeutic duplications, therapeutic omissions, and possible interactions (Figure).

Once the provider clicks the check box at the top of the template next to the "Medications" heading, the medication lists are populated automatically with all active and recently inactive (expired or discontinued within the past three months) VA prescriptions using data from VA pharmacy electronic records. Providers must enter non-VA medications (both prescription and over-the-counter) into the patient's electronic records manually.

Once the medication list section is populated, a section appears underneath the lists that asks providers to attest that medication reconciliation has occurred and that the patient's outpatient medications have been reviewed and discussed with the patient or caregiver as appropriate. Two additional statements are provided that address discrepancies—either inclusion of medications on the list that the patient is not taking or the exclusion from the list of medications that the patient is taking. After clicking on the box next to the appropriate statement, the provider is given access to a free-text box in which he or she can describe one or more medication discrepancies.
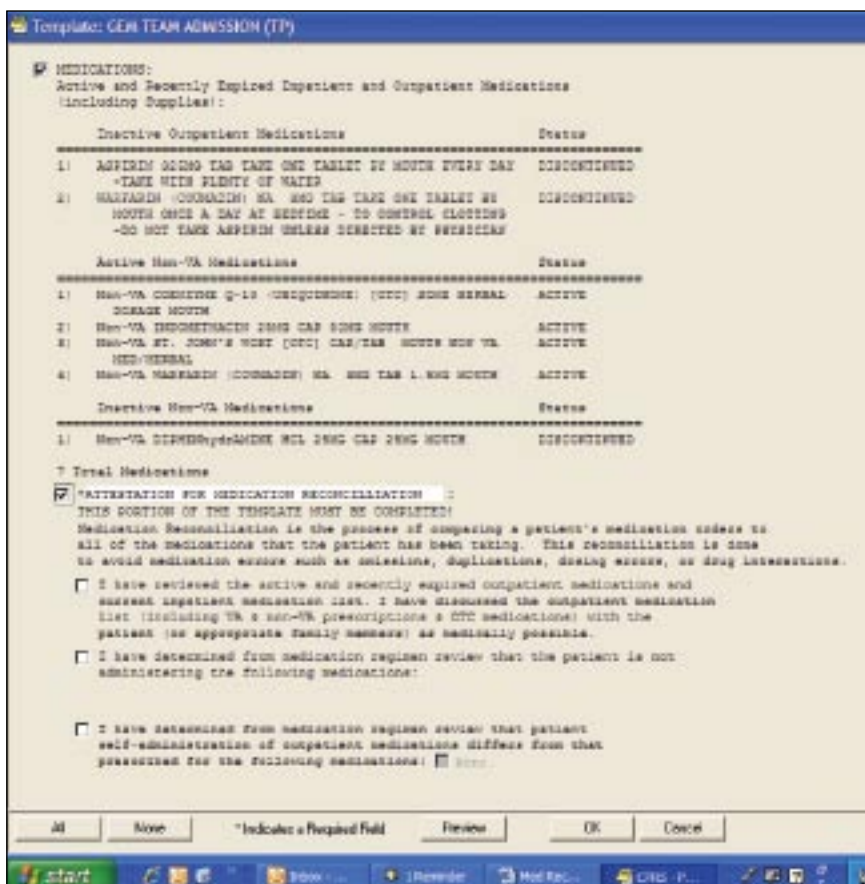

Figure. Screen shot of the medication reconciliation template developed and pilot tested on the Geriatric Evaluation and Management Unit of the VA Tennessee Valley Healthcare System. When a provider checks either one of the two discrepancy statements, a free-text box appears in which the provider can document the specific discrepancy.

It is the responsibility of the provider to resolve any discrepancies that are identified. The value of the template, however, is that it both serves as a reminder to the provider to double check the listed medications with the patient or caregiver to ensure accuracy and provides a means for consistent documentation of medication reconciliation. By documenting this information as part of the admission and discharge notes, the template promotes improved communication between all individuals involved in the patient's care. The admission and discharge notes are key components of the patient's medical record. They are reviewed often by various providers seeking information about the patient's hospitalization, and they are consulted routinely by nursing and pharmacy staff as they provide education to patients and caregivers at discharge.

IMPLEMENTATION ON THE GEM UNIT
Starting on June 1, 2006, the medication reconciliation template was implemented on the GEM unit.

Training, which consisted of educating the two geriatricians and one nurse practitioner who serve as providers

on the GEM unit, was achieved fairly quickly and easily. The providers were instructed to complete the template within 24 hours of a patient's admission to the unit and again at discharge. Patients were to be given a list of the reconciled medications at discharge as part of their education. The providers were told that the attestation section must be completed in order to meet JCAHO documentation standards. All three expressed their support and willingness to participate. The clinical pharmacy specialist for the unit, who was part of the team that developed the template, conducted the training and answered questions as they arose.

As a first step in assessing the impact of the template, we conducted a retrospective review of medical records for two groups of patients: those admitted to the GEM unit during a two-month preimplementation period (April and May 2006) and those admitted during a two-month postimplementation period (September and October 2006). Specifically, we compared the number of medications discontinued due to duplications, interactions, or lack of indications between admission and discharge for the patients admitted preimplementation versus those admitted postimplementation. We also checked whether providers had used the template as instructed during the postimplementation period.

In total, we reviewed the records of 54 patients: 30 who were admitted during the preimplementation period and 24 who were admitted during the postimplementation period. Of these 54, we excluded seven patients who either died or were transferred to another unit prior to discharge, leaving 47 patients in the final sample.

The records review showed that all providers did complete the template in the postimplementation period, resulting in consistent documentation of medication reconciliation. During the preimplementation period, 13 patients had medications reduced. These patients had an average initial intake of 11.75 medications, which was decreased by an average of 2.69 medications (22.9%). During the postimplementation period, 14 patients had medications reduced. These patients had an average initial intake of 16.68 medications, which was decreased by an average of 4.57 medications (27.4%). This indicates a 20% improvement in our medication reduction strategy for those patients for whom medication reduction was appropriate.

IMPROVING SAFETY WITH INFORMATION TECHNOLOGY

Previous experience has shown that information technology can be used to improve the safety of the medication use process.[8] In this case, the integration of an electronic medication reconciliation template into the existing computerized admission and discharge notes on one inpatient, acute care geriatric unit provided for consistent documentation of the medication reconciliation process and appeared to reduce inappropriate and unnecessary medication use. Consistent documentation of medication reconciliation is helpful in facilitating communication between multiple providers on a multidisciplinary care team, and discontinuing inappropriate or unnecessary medications may assist in preventing errors and ADEs related to therapeutic duplication, drug-drug interactions, and continuation of drug therapy without further indication.

Tools such as this template, however, are only effective when used correctly. Although we have emphasized to providers the need to complete all sections of the template to meet JCAHO requirements, and we have included language in the template to reinforce this message, we are not able to program the fields as required components of the admission and discharge notes. Thus, the provider could conceivably skip these sections or delete them from the completed admission or discharge note prior to electronic signature.

Our experience thus far also has demonstrated that inclusion of all recently inactive medications can make the medication lists rather lengthy and, therefore, cumbersome to review, especially when patients have been in the hospital for several days. (In fact, providers often delete these inactive medications from the completed electronic note prior to signing it.) In order to address this problem, we are working with information technology staff to determine whether the inactive medications can be removed from the template.

Our evaluation of the template thus far has been somewhat limited. In our small, retrospective review of patients on the GEM unit, for instance, we could not rule out the role of chance in the increased number of medications discontinued. It is also difficult to determine the extent to which the involvement of various health care professionals, including clinical pharmacists, may have contributed to the success of the template. Finally, because we did not look at appropriate medication additions that might have occurred as a result of the template's use, it's possible that such additions could have offset the number of appropriate medication reductions that occurred, thus blunting the overall observed effect.

To address these limitations, the template needs to be evaluated in a larger group of patients and with a study design that investigates the role of various health care professionals. Recently, the VATVHS expanded use of the template to other services, with the hopes of producing outcomes similar to those seen on the GEM unit. This expansion will provide the opportunity

for a larger scale, GRECC-based analysis to determine whether the improvement in medication reductions can be duplicated in other settings and whether it ultimately translates to enhanced quality of care for the elderly veteran population. ●

Author disclosures
The authors report no actual or potential conflicts of interest with regard to this column.

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