Program Description

HomeMeds is a medication use improvement program developed specifically for agencies providing in-home services and health care to older adults. The program addresses four common medication problems, as identified by an expert panel of researchers: (1) unnecessary therapeutic duplication, (2) cardiovascular medication problems (e.g., poorly controlled high or low blood pressure, drop in blood pressure upon standing, low pulse), (3) use of psychotropic drugs by patients with possible adverse psychomotor or adrenergic effects (e.g., falls, dizziness, confusion), and (4) use of nonsteroidal anti-inflammatory drugs (NSAIDs) by patients at high risk of peptic ulcer complications. HomeMeds involves a structured collaboration between a consultant pharmacist and the patient's home health nurse or case manager (e.g., social worker or nurse), who assess the patient's medication use and resolve common medication problems with the assistance of the patient's primary care physician, as follows:

- An agency staff member (i.e., home health nurse or case manager) performs a comprehensive in-home assessment of the patient's prescribed and over-the-counter medications and supplements. The staff member also documents the patient's vital signs and looks for indicators of potential adverse effects (e.g., a history of falls in the preceding 3 months, dizziness, confusion). The staff member then enters this information into the program's Web-based software, either during the home visit or in the office.
- If the program's computerized algorithm indicates a potential problem, the consultant pharmacist reviews the patient's medication assessment.
- Using all data, the consultant pharmacist consults with agency staff and, as appropriate, the patient or patient's family and develops a plan to address any medication problems that warrant reassessment by the patient's primary care physician.
- The consultant pharmacist contacts the patient's primary care physician to present the medication problems, discuss the regimen, and obtain instructions for follow-up.
- As appropriate, agency staff assist the patient with follow-up appointments with the primary care physician. Agency staff also document any medication changes and their effect.

Before implementing the program, agency staff and the consultant pharmacist must complete training.

Descriptive Information

Areas of Interest	▸ Long-term services and supports • In-home services
Outcomes	**Review Date: December 2011** ▸ Medication problems ▸ Therapeutic duplication ▸ Cardiovascular medication problems

Ages	61–74 (Older adult) 75–84 (Older adult) 85+ (Older adult)
Genders	- Female - Male
Races/Ethnicities	Data were not reported/available.
Settings	Home
Geographic Locations	Urban
CER Studies	Evaluated in comparative effectiveness research studies
Adverse Effects	No adverse effects, concerns, or unintended consequences were identified by the developer.
Implementation History	HomeMeds was first implemented in October 1996 as a randomized controlled trial (RCT) with home health agencies in Los Angeles and New York City. Since then, HomeMeds has been implemented in approximately 35 sites in Arkansas, California, Connecticut, Florida, Illinois, Indiana, Minnesota, New York, Texas, and West Virginia, as well as in Arizona/California Indian tribal territory. The medications of more than 8,000 older adults have been screened through HomeMeds.
Adaptations	No population- or culture-specific adaptations were identified by the developer.

Quality of Research

Review Date: December 2011

Documents Reviewed

The documents below were reviewed for Quality of Research. The research point of contact can provide information regarding the studies reviewed and the availability of additional materials, including those from more recent studies that may have been conducted.

Study 1

Meredith, S., Feldman, P., Frey, D., Giammarco, L., Hall, K., Arnold, K., … Ray, W. A. (2002). Improving medication use in newly admitted home healthcare patients: A randomized controlled trial. *Journal of the American Geriatrics Society, 50*(9), 1484–1491. PubMed abstract available at http://www.ncbi.nlm.nih.gov/pubmed/12383144

Supplementary Materials

Brown, N. J., Griffin, M. R., Ray, W. A., Meredith, S., Beers, M. H., Marren, J., … Avorn, J. (1998). A model for improving medication use in home health care patients. *Journal of the American Pharmaceutical Association, 38*(6), 696–702. PubMed abstract available at http://www.ncbi.nlm.nih.gov/pubmed/9861787

Outcomes

Outcome 1: Medication Problems	
Description of Measures	Medication problems were assessed through a determination of patients' medication use. A home health nurse documented each patient's medication inventory and completed a brief assessment. A research assistant then conducted a structured interview, asking the patient to indicate medications taken in the preceding 7 days and confirming the patient's response by inspecting labels on the patient's medication containers. Having a medication problem was defined as having one or more of the following four high-priority problems: (1) unnecessary therapeutic duplication, (2) cardiovascular medication problems, (3) use of psychotropic drugs by patients with possible adverse psychomotor or adrenergic effects, and (4) use of NSAIDs by patients at high risk of peptic ulcer complications.
Key Findings	In an RCT, Medicare patients who had been admitted to medical and surgical services of two home health agencies from October 1996 through September 1998 were screened for the four high-priority medication problems. Patients identified as having a medication problem were randomly assigned to the intervention group or the control group. Both groups received care as usual, which included review of medications and potential medication adverse effects; however, the intervention group also received HomeMeds.

Assessments occurred at baseline (within 2 weeks of admission) and at follow-up (between 6 and 12 weeks after the baseline assessment). At follow-up, the percentage of patients with an improvement in medication problems was higher for the intervention group (50%) than the control group (38%) (p = .05). |
Studies Measuring Outcome	Study 1
Study Designs	Experimental
Quality of Research Rating (0.0–4.0 scale)	3.2

Outcome 2: Therapeutic Duplication	
Description of Measures	Therapeutic duplication, the concurrent use of two or more different drugs for the same therapeutic purpose or the use of two or more versions of the same drug (e.g., generic and brand name), was assessed through a determination of patients' medication use. A home health nurse documented each patient's medication inventory and completed a brief assessment. A research assistant then conducted a structured interview, asking the patient to indicate medications taken in the preceding 7 days and confirming the patient's response by inspecting labels on the patient's medication containers.
Key Findings	In an RCT, Medicare patients who had been admitted to medical and surgical services of two home health agencies from October 1996 through September 1998 were screened for four high-priority medication problems: (1) unnecessary therapeutic

	duplication, (2) cardiovascular medication problems, (3) use of psychotropic drugs by patients with possible adverse psychomotor or adrenergic effects, and (4) use of NSAIDs by patients at high risk of peptic ulcer complications. Patients identified as having a medication problem were randomly assigned to the intervention group or the control group. Both groups received care as usual, which included review of medications and potential medication adverse effects; however, the intervention group also received HomeMeds. Assessments occurred at baseline (within 2 weeks of admission) and at follow-up (between 6 and 12 weeks after the baseline assessment). At follow-up, the percentage of patients who stopped using at least one duplicative drug was higher for the intervention group (71%) than the control group (24%) ($p = .003$).
Studies Measuring Outcome	Study 1
Study Designs	Experimental
Quality of Research Rating (0.0–4.0 scale)	3.1

Outcome 3: Cardiovascular Medication Problems

Description of Measures	Cardiovascular medication problems were assessed through a determination of patients' medication use. A home health nurse documented each patient's medication inventory and completed a brief assessment. A research assistant then conducted a structured interview, asking the patient to indicate medications taken in the preceding 7 days and confirming the patient's response by inspecting labels on the patient's medication containers.
Key Findings	In an RCT, Medicare patients who had been admitted to medical and surgical services of two home health agencies from October 1996 through September 1998 were screened for four high-priority medication problems: (1) unnecessary therapeutic duplication, (2) cardiovascular medication problems, (3) use of psychotropic drugs by patients with possible adverse psychomotor or adrenergic effects, and (4) use of NSAIDs by patients at high risk of peptic ulcer complications. Patients identified as having a medication problem were randomly assigned to the intervention group or the control group. Both groups received care as usual, which included review of medications and potential medication adverse effects; however, the intervention group also received HomeMeds. Assessments occurred at baseline (within 2 weeks of admission) and at follow-up (between 6 and 12 weeks after the baseline assessment). At follow-up, the percentage of patients with an improvement in cardiovascular medication problems was higher for the intervention group (55%) than the control group (18%) ($p = .017$).
Studies Measuring Outcome	Study 1

Study Designs	Experimental
Quality of Research Rating (0.0–4.0 scale)	3.1

Study Populations

The following populations were identified in the studies reviewed for Quality of Research.

Study	Age	Gender	Race/Ethnicity
Study 1	▶ 61–74 (Older adult) ▶ 75–84 (Older adult) ▶ 85+ (Older adult)	▶ 75% Female ▶ 25% Male	Data not reported/available

Quality of Research Ratings by Criteria (0.0–4.0 scale)

Criterion	Ratings		
	Outcome 1	Outcome 2	Outcome 3
Reliability of Measures	2.8	2.8	2.8
Validity of Measures	3.1	3.1	3.1
Intervention Fidelity	3.3	3.3	3.3
Missing Data and Attrition	3.3	2.8	2.8
Potential Confounding Variables	3.3	3.3	3.3
Appropriateness of Analysis	3.8	3.5	3.5
Overall Rating	3.2	3.1	3.1

Study Strengths
The outcomes are concepts easily grasped by nurses, elderly beneficiaries, and family caregivers. The program is based on a standardized protocol that specifically identifies how to define outcomes and that maximizes intervention fidelity. Rigorous steps were taken to ensure intervention fidelity. Missing data and attrition patterns were comparable in intervention and control groups. Statistical analysis largely accounted for potential confounding variables. In addition,

statistical analyses were adjusted for the possible clustering effect of nurses with more than one patient and tested for homogeneity of intervention effect across patient characteristics. The sample size was adequate as evidenced by a power analysis, and intention-to-treat analyses were conducted according to RCT best-practice methods.

Study Weaknesses

There are limited data on the psychometric properties of the self-reported outcome measures. In terms of reliability, it was not noted how often the container inspections to confirm self-reported medication use produced discrepancies and how these discrepancies were resolved. Information on attrition for subgroups (defined by specific medication problem) is not provided.

Readiness for Dissemination

Review Date: December 2011

Materials Reviewed

The materials below were reviewed for Readiness for Dissemination. The implementation point of contact can provide information regarding implementation of the program and the availability of additional, updated, or new materials.

HomeMeds Risk Screening Web-based software, https://homemeds.homemeds.org/

Partners in Care Foundation. (n.d.). *Getting started with HomeMeds: Outreach and national dissemination materials.* San Fernando, CA: Author.

Partners in Care Foundation. (n.d.). *Getting started with HomeMeds: Readiness, decisions and planning.* San Fernando, CA: Author.

Partners in Care Foundation. (n.d.). *Getting started with HomeMeds: Training and implementation.* San Fernando, CA: Author.

Program Web site, http://www.homemeds.org

Readiness for Dissemination Ratings by Criteria (0.0–4.0 scale)

Criterion	Rating
Implementation Materials	4.0
Training and Support	4.0
Quality Assurance	4.0
Overall Rating	4.0

Dissemination Strengths

The developer provides a well-thought-out and easy-to-understand readiness survey to assist implementers in assessing their readiness to adopt the program. The implementation manual, forms, sample contracts, flow charts, and other support materials are well developed and easy to understand. The developer conducts initial training and provides continued program support through periodic site visits and follow-up interviews. The materials included in the appendix of the training manual are particularly useful during caregiver-patient interaction, and they are presented in an easy-to-use format. To ensure fidelity to the model, the developer maintains communication with new sites during their first year of implementation, answers questions, and reviews procedures and protocols. The Web-based risk assessment screening and alert system is periodically updated on the basis of internal quality assurance and user feedback. The developer also reviews each implementer's individual and aggregated data to identify inconsistencies and notifies the implementer if any inconsistencies are found.

Dissemination Weaknesses

No weaknesses were identified by reviewers.

Costs

The cost information below was provided by the developer. Although this cost information may have been updated by the developer since the time of review, it may not reflect the current costs or availability of items (including newly developed or discontinued items). The implementation point of contact can provide current information and discuss implementation requirements.

Implementation Materials

Item Description	Cost	Required by Developer
HomeMeds Risk Screening Web-based software license (includes software tools for monitoring clients, alerts, actions, resolutions, and medication changes; creating administrative reports; and conducting quality assurance)	Varies depending on user's business sector (e.g., nonprofit, social service, hospital), volume of use, and complexity of user's needs (minimum of $200 per month)	Yes
Start-up planning and implementation consultation (includes readiness survey, the implementation manual, and other support materials), training (includes the training manual), and first-year technical support (includes monthly calls)	$2,500 for training via Webinar and teleconference or $5,000 plus travel expenses for on-site training	Yes

Item Description	Cost	Required by Developer
1-hour teleconference after the first year of program implementation	$250	No
2-hour refresher Webinar after the first year of program implementation	$500	No
Program support site visit (includes evaluation, quality improvement, and refresher training)	$1,500 plus travel expenses	No

Additional Information

Each site must make local arrangements for qualified personnel (licensed pharmacist, nurse practitioner, or physician, preferably with geriatric certification or special training) to conduct the clinical consultation and review of the medication-related problems identified by the HomeMeds software. The cost for a licensed pharmacist is estimated at $75 per hour.

Translational Work

HomeMeds, previously known as the Medication Management Improvement System, is a collaborative approach for identifying, assessing, and resolving medication problems experienced by older adults receiving in-home services. HomeMeds is being implemented at multiple sites throughout the United States, and a range of translational efforts have been documented and published. Translational efforts have been carried out in urban and rural settings as well as with private and public agencies. Implementation of the intervention has included comprehensive adoption as well as innovative collaboration and adaptation. HomeMeds targets practices at the organization and staff levels only and does not involve the recruiting of individual participants. Community partnerships enhance the program but are not essential. However, a deep sense of collaboration within the implementing organization is necessary.

The HomeMeds algorithm used to identify high-risk patients was initially implemented through pen-and-paper data collection, but the program has been computerized and is now implemented as a Web-based risk assessment and screening tool. HomeMeds includes a standardized procedure and guidelines. Adaptation and flexibility are encouraged in efforts to integrate HomeMeds into preexisting practice. For example, program adopters can add components to the algorithm (e.g., suboptimal pain management, measures associated with an increased risk of falls) to address specific quality assurance initiatives, novel health care delivery system strategies, and accrediting agency requirements. Program adopters also have created unique partnerships (e.g., between a home health agency and a college of pharmacy) to ensure ongoing implementation.

Results from program translation in different settings indicate that between 22% and 33% of patients screened had medication problems serious enough for the consultant pharmacist to recommend reassessment by the primary care physician, and up to 61% of these reassessments resulted in changes in medication. Individual-level characteristics were not found to be associated with the adoption of recommended medication changes. Most care managers surveyed acknowledged that the intervention was useful and worthwhile and thought it should be available as an ongoing service in care.

Site With Translational Work	Articles Describing Site's Translational Work, by Category					
	Planning/ Partners	Adoption	Reach/ Recruitment	Implementation	Effectiveness	Maintenance
California Medicaid waiver care program	Article 1	Articles 1 and 3	Article 1	Articles 1–3	Articles 2 and 3	—
Home health agency based in a medical center	—	Article 4	—	Article 4	Article 4	—
Collaboration between home health agency and college of pharmacy (rural area)	Article 5	Article 5	Article 5	Article 5	Article 5	—
Rural proprietary home health agency	Article 6	Article 6	—	Article 6	Article 6	—

Article Number	Article Reference
1	Partners in Care Foundation. (2007). *Medication Management Improvement System: Replication report.* San Fernando, CA: Author.
2	Alkema, G. E., Enguidanos, S. M., Wilber, K. H., Trufasiu, M., Simmons, W. J., & Frey, D. (2009). The role of consultant pharmacists in reducing medication problems among older adults receiving Medicaid waiver services. *Consultant Pharmacist, 24*(2), 121–133. PubMed abstract available at http://www.ncbi.nlm.nih.gov/pubmed/19275454
3	Alkema, G. E., & Frey, D. (2006). Implications of translating research into practice: A medication management intervention. *Home Health Care Services Quarterly, 25*(1–2), 33–54. PubMed abstract available at http://www.ncbi.nlm.nih.gov/pubmed/16803737
4	Sperling, S., Neal, K., Hales, K., Adams, D., & Frey, D. (2005). A quality improvement project to reduce falls and improve medication management. *Home Health Care Services Quarterly, 24*(1–2), 13–38. PubMed abstract available at http://www.ncbi.nlm.nih.gov/pubmed/16236656

Article Number	Article Reference
5	Triller, D. M. (2005). Medication Management Model as experiential education tool for students of pharmacy. *Home Health Care Services Quarterly, 24*(1–2), 47–59. PubMed abstract available at http://www.ncbi.nlm.nih.gov/pubmed/16236658
6	Atkinson, W. L., & Frey, D. (2005). Integration of a medication management model into outcome-based quality improvement: A pilot program in a rural proprietary home healthcare agency. *Journal of Home Health Care Services Quarterly, 24*(1–2), 29–44. PubMed abstract available at http://www.ncbi.nlm.nih.gov/pubmed/16236657

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Additional program information can be obtained through the following Web site:

http://www.homemeds.org