

Project Description: This project utilized Monitor-Rx to optimize the medication regimens of older adults seen in six practice sites that provide pharmacist services: AFSC, OASIS, HbL Pharma Consulting, IFPMH, UCI-SHC and UCI-HAPS. Monitor-Rx is a web-based clinical tool that associates medication effects with geriatric problems (e.g., falls, incontinence, depression, and delirium), identifies anticholinergic medications and medications inappropriate for use in the geriatric population, and provides medication monitoring recommendations to foster early recognition of adverse drug effects that can be avoided, managed, or reversed. The goals were to:

- increase awareness/knowledge of medications as a cause or aggravating factor contributing to physical, functional or cognitive decline among non-pharmacists working with older adults;
- identify medications that may cause, aggravate or contribute to common geriatric conditions to assist the clinician in the problem identification process when evaluating complex medication regimens and inform the pharmacist's recommendations for changes in drug therapy;
- reduce anticholinergic medication burden to reduce the risk for physical and cognitive decline or improve physical/cognitive function; and
- reduce the number of inappropriate and unnecessary drugs an individual is taking to reduce costs and avoid potential medication problems.

Measures: The project evaluated:

1. awareness/knowledge of medications as a cause or aggravating factor contributing to physical, functional or cognitive decline after an educational program using a pre-post test and an end-of-project survey
2. number of referrals to pharmacist
3. number of pharmacist recommendations made and accepted
4. anticholinergic medication use
5. inappropriate medication use

Discussion: There were numerous barriers to the technology implementation encountered, some unique to the practice site; time for data entry to convert from paper to electronic records was the barrier cited most frequently. The process of initial data entry for the majority of patients at OASIS and AFSC took nearly six months. The two UCI sites dropped out after the 2nd quarter and two new sites were added (HbL and IFPMH). The time remaining in the project period was inadequate to document enough data to demonstrate significant change in most of the measures to be evaluated. The nurses, social workers and care managers at the project sites valued the information generated by Monitor-Rx. Monitor-Rx use will definitely continue at two sites and possibly continue at two sites.

Caring Choices (CC)

Project Description: Caring Choices and partner Home Health Care Management, Inc (HHCM) worked with 4 partner agencies (2 home health agencies and 2 Independent Living agencies) to replicate an existing medication management program developed by HHCM. This program utilizes technology (the Philips PMD machine) to provide medication management services to individuals in their homes and in residential care settings. As part of the replication activities, CC and HHCM trained program partners' staff (Alternative Home Care, Asian Community Center, Eskaton, and Visiting Nurse Association of the Inland Counties) regarding use of the PMD machines and worked with those agencies if they decided to continue the program after the initial year was up. It was believed that the use of this technology can be a viable, cost effective method for medication management and it was our hope that reimbursement policies at the state and federal levels can be changed.

Measures: Our objective was to replicate the medication management program utilizing PMD technology as an innovative, cost-effective program that will allow other organizations to assist seniors to manage their medications. We collected information in order to evaluate success of the program, regarding medication compliance rates, hospitalizations and emergency room visits by participants. We also collected subjective information from our partners regarding the use of this medication management program in their agencies. Our original goal was also to evaluate the effects of the use of the PMDs on reducing caregiver burden and improving the quality of life of participants.

Results: The original plan was to place 100 PMD machines with clients of the 4 partner agencies. It became apparent half way in to the program that we would not be able to place 100 machines during the grant period. This was due to several factors: (1) Even though our program was ready to begin in January, we could not get IRB review until a month into the project. This delayed our initial training of our partners. (2) Our partners had initially believed that they would be ready to start in January, they had their own internal agency issues (unrelated to this project) which delayed the initial trainings. (3) We ran into problems getting staff at 3 of our partner agencies to accept the program initially. It did take extra time and trainings to work with our partners to establish the programs at their agencies. We did place 43 PMD machines at our partner sites. The overall medication compliance rate was 98% - better than we originally expected. All 4 sites did use the PMD machine, and 3 will continue with their programs after the grant period. The fourth agency, VNAIC, had one patient who wants to continue with their machine.

Discussion: Despite the fact that only 43 out of the planned 100 machines were placed, this program was still very successful. We have three partners who will continue with the program and have found funding mechanisms to do so. We do believe that 12 months is just too short of a period of time to set up a new program. We believe it takes at least 18 months. And it is necessary when starting such new programs to have a champion to promote the program in their agency. We looked at reviewing the quality of life of participants when they received a machine. Because we were serving frail elderly individuals, most could not or did not want to participate in the Quality of Life Surveys. These low numbers affect the validity of the surveys. We also reviewed Caregiver Burden and found that there was indication that the use of PMD machines does decrease caregiver reported feelings of burden.

Connecticut Pharmacists Foundation (CPF)

Project Description: This project delivered culturally and linguistically appropriate Medication Therapy Management (MTM) services to elderly Cambodians in Long Beach, California (CA), Connecticut (CT), and Western Massachusetts (MA). Services were provided through a collaboration between the Connecticut Pharmacists Foundation, Khmer Health Advocates, and Mount Carmel Cambodian Project, and delivered by pharmacists and community health workers (CHWs) trained to use telemedicine.

The goals of the project were to:

- improve patients' drug therapy outcomes by at least 20% from baseline;
- demonstrate similar improvement of drug therapy outcomes between face-to-face and telemedicine-provided service;
- reduce potentially inappropriate medication use by at least 20%; and
- demonstrate a reduction in health expenditures compared to the cost of providing the service by a factor of at least 8:1.

Measures: The patient criteria were age 60 and over, the presence of at least one chronic condition and three chronic medications. Over a 6-9 month period, pharmacists and CHWs met face-to-face with patients in CT/MA, while CA patients had a CHW with them and the pharmacist linked via high-definition videoconference link. A total of 627 patients were screened (282 in CT/MA, 345 in CA); CT/MA enrolled 53 patients with 147 total encounters (2.8/patient), and CA enrolled 43 patients with 70 total encounters (1.6/patient). Prior to and during the initial encounter, the pharmacist and CHW compiled a comprehensive medication profile, including prescription, non-prescription and traditional therapies. At the time of patient enrollment, a medical record was requested from their primary care provider (if available). At all encounters the pharmacist assessed each medication for appropriateness, efficacy, safety, and adherence (in this sequence) to achieve optimal therapy goals. They also assessed the patient for determinants of health -- physical characteristics, socioeconomic status, education level, psychological factors and behavior that could impact medication use and overall health. At the end of all encounters, the pharmacists provided patients with a Personal Medication Summary report that included a comprehensive medication list and a patient action plan. Also, the pharmacists sent an electronic copy of the MTM Summary Report to the patients' primary care provider; this included the comprehensive medication list, description of medication related problems (MRPs) and treatment recommendations.

Results: The average number of medications and conditions per patient was 10.3 and 6.6, respectively. There was no significant difference between locations. The most common conditions were cardiovascular disease, pain, diabetes, and depression/PTSD; and the most common drug categories were consistent for these conditions. A total of 604 MRPs were identified (6.3/patient), and nearly all (93%) were resolved during the study period. The majority of MRPs (81%) were attributed to problems with medication indication, effectiveness, and safety, and adherence problems accounted for only 19% of MRPs. Overall, the percentage of patients' therapy goals achieved increased from 69% to 93% after MTM services were provided. There was significant improvement overall in adherence behavior ($p=0.027$), and depression screening ($p=0.022$), and of inappropriate medication use (34.5% reduction) from initial to final encounter. Total health avoidance costs (for the time period) were \$256,998 (\$2677/patient), and exceeded the cost of providing the service by a factor of 6:1. An outcome comparison of face-to-face versus telemedicine-provided care revealed mixed results, primarily attributable to technology and social determinant variations that resulted in disparate encounter totals in the two service areas.

Discussion: The Cambodian American community has exceedingly poor health when compared to both the general and Asian American population (RAND 2010 study). This project shows that pharmacists, when working with Cambodian American community health workers, can provide culturally and linguistically appropriate MTM that can improve patient medication outcomes and reduce total healthcare costs. The application of new technologies allows for the provision of MTM to be both culturally and linguistically appropriate AND be available to the highest risk isolated patient populations. These findings are congruent with current health care delivery reforms, especially the patient-centered medical home. Results of this project will be used to support policy initiatives to fundamentally change health care delivery systems to eliminate health disparities.

Visiting Nurse Service of New York (VNSNY)

Project Description: This project sought to address the challenge of optimizing medication management for a particularly vulnerable population – community dwelling, cognitively impaired (CI) older adults with chronic illness and complex medication regimens. The project implemented and evaluated a multi-faceted, information technology (IT) based intervention designed to better support nurses, as well as cognitively impaired patients and their caregivers, in the challenging process of managing multiple medications in the context of multiple co-morbidities. We extended to the CI population a medication optimization health IT intervention that was being developed for chronically ill older adults receiving health services at home. Specifically, the intervention tested used an algorithm to alert the home health nurse, at the point of service, to a patient at dual risk due to the complexity of his/her medication regimen, and the patient's cognitive impairment. Intervention clinicians were provided with decision support including 1) complex medication management recommendations that were integrated into the clinician's visit documentation system and the electronic patient health record; and 2) education materials for the patient/caregiver to improve awareness and self-management practices. The intervention was assessed relative to usual care. Randomization occurred at the nurse level.

Measures: To assess the effectiveness of the IT intervention, we used a randomized design whereby nurses of eligible CI patients were randomly assigned to intervention or control group. Data came from five main sources: 1) the Outcomes Assessment and Information Set (OASIS) – a standardized home care data collection instrument used as part of usual care; 2) the agency's electronic medications database; 3) patients' electronic clinical records; 4) a caregiver survey conducted at a fixed point (~60 days) post-assignment to the study; and 5) administrative and claims data routinely collected by the agency. Uptake of the intervention was assessed by tabulating the frequency that intervention nurses documented processes of care in the electronic decision support tool that was made available to them directly in the patient's electronic clinical record. Outcome measures used for the full sample of patients in the study include: changes in the MRCI (medication complexity risk score) and two outcomes-based quality improvement (OBQI) measures (hospitalization and emergency department {ED} use) that are used for public reporting. Outcome measures evaluated for the sample involved in the caregiver survey include caregiver report of patient regimen adherence, caregiver report of processes of care, and caregiver report of medication management burden.

Results: A total of 406 nurses who served 1,308 eligible patients were randomized in this study. Evaluation of intervention-nurse use of the electronic decision support tool and full sample patient outcomes was completed using an intent-to-treat approach (meaning that data on the designated nurse and patient were included in the analysis without specification of the number of visits a nurse had with a patient, length of stay, or any other nurse or patient characteristic that might have affected exposure to or actual uptake of the intervention). There was only moderate use of the decision support tool with 60% of the intervention nurses using a component of it with at least one of their targeted patients – overall, affecting 40% of the patients. There were no reductions in the complexity of patients' medication regimens for either randomized group. The unadjusted results demonstrated no differences between the usual care and intervention group in regard to ED visits or hospitalizations. Additional data was collected from 156 family caregivers of the targeted CI patients. No differences were found between the usual care and intervention targeted caregivers in regard to home care nurse teaching, caregivers' report of adherence to the medication regimen, physician contacts to simplify regimen, or caregivers' reported management burden.

Discussion: Our objective was to provide home care nurses with information and support they could use to provide better assistance to CI patients and their informal caregivers with managing complex medication regimens. With better management and improved adherence, the goal was to reduce ED visits and hospitalizations. We were unable to demonstrate that the medication optimization strategies we put in place benefited CI patients or their caregivers during the study period. The CI population was targeted for this project due to the challenges their condition poses in improving care management and clinical outcomes. This population has higher care needs and service use, including urgent care services, than the non-CI population. It may be that these patients' multiple care needs and overall medical complexity overwhelmed medication complexity per se, limiting any measurable impact of the intervention. When full data is available, additional analyses comparing the CI and non-CI populations will be conducted, including analysis to learn more about nurse exposure effect – e.g., did outcomes differ with the patient length of stay thus the opportunity that the nurse had to work with and teach the family caregivers?