Annually, over $528 billion is wasted and 275,000 lives are lost due to non-optimized medication use. Misuse, overuse or underuse of medication therapy can lead to treatment failure, a new medical problem or both. With over 80% of Americans taking at least 1 medication per week and an increased percentage of hospital readmissions associated with a medication related problem, a strategy must be integrated that can ensure patients “Get the Medications Right”. Comprehensive medication management (CMM) is a patient centered approach to optimizing medication use and improving patient health outcomes that is delivered by a clinical pharmacist working in collaboration with the patient and other healthcare providers. This care process ensures each patient’s medications (whether prescription, nonprescription, alternative, traditional, vitamins, or nutritional supplements) are individually assessed to determine that each medication has an appropriate indication, is effective for the medical condition and achieving defined patient and/or clinical goals, is safe given the comorbidities and other medications being taken, and that the patient is able to take the medication as intended and adhere to the prescribed regimen.

CMM integration and implementation as part of the patient care experience and the team providing the care holds great value. This value can be quantified by the overall effect of CMM supporting the quadruple aim of health care to improve the patient experience, provide better care, reduce cost and to improve the provider experience.

Is there research that supports the benefits of CMM integration surrounding the Quadruple Aim of Healthcare? The short answer is yes. Although a review of the data surrounding CMM can reveal different nomenclature and descriptions, the answer is unequivocally supported in the primary literature that CMM does improve and support the quadruple aim. As the fidelity around the model of the provision of CMM increases, findings in the primary literature for CMM are increasing at an exponential rate.

This document summarizes key findings from published CMM literature supporting the quadruple aim of healthcare. The studies reviewed have integrated CMM into team based care in a myriad of different healthcare systems spanning the spectrum from individual provider offices with privately insured patients to nonprofit value based payment healthcare systems and government run healthcare systems. Regardless of the system, findings are consistent that when CMM is integrated, care improves, cost decrease, and the patient and provider experience increase.
I. Summary of Data on Cost Outcomes from CMM

**Best practices: improving patient outcomes and costs in an ACO through comprehensive medication therapy management**

- Since 1998, pharmacists at the Fairview Health System have cared for more than 20,000 patients and resolved more than 107,000 medication-related problems which, if left unresolved, could have led to hospital readmissions and emergency visits. Fairview Pharmacy Services utilized 23 CMM pharmacists (approximately 18 full-time equivalents) working in 30 locations, who conduct pharmacotherapy workups as part of the medication optimization services.
  - Approximately 27% of patients needed additional drug therapy, and medication dosages increased.
  - Thirteen percent of the drug therapy problems were the result of unnecessary drug therapy and inappropriately high dosages.
  - **Reduced costs:** Fairview MTM showed a 12:1 ROI when comparing the overall health care costs of patients receiving services to patients who did not receive those services.
    - Total health expenditures decreased from $11,965 to $8,197 per person (n = 186, P < 0.0001).
    - Pharmacist estimated cost savings to the health system over the 10-year period were $2,913,850 ($86 per encounter), and the total cost of CMM was $2,258,302 ($67 per encounter), for an estimated ROI of $1.29 for every dollar spent.


**A sustainable business model for comprehensive medication management in a patient-centered medical home**

- This project was a collaboration between the Kennedy Pharmacy Innovation Center (KPIC) at the University of South Carolina College of Pharmacy (formerly the South Carolina College of Pharmacy) and Palmetto Primary Care Physicians (PPCP). A Clinical Pharmacist providing CMM was integrated into a PCMH practice.
  - **Improved access to care:** By the end of this project, the pharmacist was able to increase patient visits to an average of 11 per day, which was 72% of his capacity based on hours worked during the day.
  - **Reduced costs:** The estimated cost avoidance provided by the pharmacist was $164,551.50 per month and more than $1.9 million annually.


**Budget impact analysis of a pharmacist-provided transition of care program**

- Synergy Pharmacy Solutions (SPS) in Bakersfield, California, initiated a pharmacist-provided transition of care program for adult members of Kern Health Systems (KHS) managed Medicaid health plan who were classified as high risk using the Johns Hopkins Adjusted Clinical Groups (ACG) predictive model. High-risk patients admitted to participating hospitals were referred to the SPS TOC program and contacted via continued
telephone within 2 to 4 days after discharge. Once a referred patient agreed to participate, the SPS team provided CMM.

- **Reduced costs:** A budget impact analysis was conducted using a decision-tree model developed and built from the payer perspective. This tool was used to evaluate the impact of the program expansion to additional participating hospitals on total health care costs, including inpatient, outpatient, medication and emergency room costs, in 6-month increments up to 2 years.
  - The budget impact model showed that in the first 6 months, the CMM program resulted in cost avoidance of over $4.3 million in total health care costs to the plan, which corresponded to $3 per member per month.
  - By the end of year 2, the savings reached over $4 per member per month, for a total of $25.6 million.


### II. Summary of Data on Better Quality, Improved Access to Care and Patient/Provider Satisfaction from CMM

**Evaluation of pharmacist care for hypertension in the Veterans Affairs patient-centered medical home: a retrospective case-control study**

- A 3:1 case-controlled study that details the impact of referral to a pharmacist-led hypertension management clinic in the Veterans Affairs system patient-centered medical home model.

- **Better care:** multivariate regression modeling identified significantly lower systolic blood pressure at both 6 and 12 months (risk ratios 9.7; 95% CI 2.7-35.3 and 20.3; CI 4.1-99.2, p < 0.01 for both comparisons) in the patients managed by clinical pharmacists compared to controls and significantly lower diastolic blood pressure at 12 months (risk ratio 2.9; 95% CI 1.2-7.1, p < 0.01).


**Perceptions of integration of the clinical pharmacist into the PCMH model by the PCMH team**

- Integration of CMM by a clinical pharmacist in a Department of Veterans Affairs facility was rated by the primary care team (physicians, nurses, and staff) for seven domains.

- **Better care:** 80% of responses rated the ability of the pharmacist to evaluation medication therapy and monitor the effectiveness and safety of medication therapy as a highly positive benefit.

- **Improved access to care:** 87% of physicians and nurse practitioners responded that CMM integration by a clinical pharmacist increased access to their clinic by decreasing the time patients had to wait for primary care services.

- **Improved provider work life:** 93% of physicians and nurse practitioners responded that CMM integration by a clinical pharmacist improved their job satisfaction.

Medication therapy management: 10 years of experience in a large integrated health care system

- Assessment of the clinical, economic, and humanistic outcomes of 10 years of experience with medication optimization within Minnesota's Fairview Health Services utilizing medication therapy management (a precursor to CMM). Data from 33,706 patient encounters were included in the evaluation.

- **Better care:** 85% of patients had at least 1 medication therapy problem identified. Of those, 29% had 5 or more problems identified. The most frequent issues were the need for an additional medication (28.1%) and adjustment of a subtherapeutic dose (26.1%). 55% of patients not at goal at the time of enrollment in the program improved after their medication regimens were optimized.

- **Reduced costs:** the program produced an average cost savings per encounter of $86. Average cost to provide the service was $67 per encounter, producing an estimated return on investment of $1.29 per $1 in administrative cases.

- **Improved patient satisfaction:** 95.3% of patients surveyed gave a rating of agree or strongly agree to the statement that their overall health and well-being had improved as a result of the service.


Primary care providers believe that comprehensive medication management improves their work-life

- Part of a larger study of CMM implementation in Minnesota and North Carolina, this series of structured interviews were conducted with sixteen primary care providers (PCPs) identified the impact of CMM on their work life. Responses were then categorized to develop common themes.

- **Better care:** participants reported increased satisfaction that their patients were receiving better care and highlighted increased achievement of quality measures.

- **Improved provider work life:** in addition to citing a decreased workload, PCPs reported a decrease in mental exhaustion related to the reassurance of having a clinical pharmacy colleague and enhanced opportunities for professional learning. This beneficial impact of team-based clinical pharmacist-provided CMM aligns with previously identified methods for decreasing burnout and engagement among primary care providers.

The effect of clinical pharmacist-led comprehensive medication management on chronic disease state goal attainment in a patient-centered medical home

A retrospective comparison study of the effect of pharmacist-led CMM on achievement of chronic diabetes treatment goals. This study took place in 11 clinics within a primary care network designated as a patient-centered medical home and affiliated with a large academic medical center. Achievement was defined as reaching a combined goal of a hemoglobin A1c < 8%, blood pressure < 140/90, and placement on statin therapy for dyslipidemia.

- Improved outcomes: 40% of patients receiving CMM reached the combined treatment goal versus only 12% of patients in the control group (p < 0.001) over the 13-month study. Patients receiving CMM also had significantly greater improvement in individual assessments of A1C, blood pressure, and use of a statin from their baseline to the completion of the study.


Reductions in medication-related hospitalizations in older adults with medication management by hospital and community pharmacists: a quasi-experimental study

Implementation of a medication optimization program that incorporated a pharmacist hand-off at the transition of care from hospital to home for geriatric patients revealed a significant benefit in high-risk patients, compared to hospitals within the same state where the program had not yet been implemented.

- Better care: Medication optimization and communication between hospital and community pharmacists was associated with an estimated 36% reduction in future medication-related hospitalizations.

- Reduced costs: an annualized cost avoidance of avoided future hospital admissions was estimated to be $6.6 million, while the estimated annual cost of the program was $1.8 million, resulting in a 2.6:1 return on investment.


Optimizing the primary care clinical pharmacy specialist: increasing patient access and quality of care within the Veterans Health Administration

The Department of Veterans Affairs has integrated the PCMH model as the delivery method of primary care since 2010. The VA Clinical Pharmacy Specialist Provider practicing CMM in primary care is a large component of the ability for the VA to increase access and the quality of care for Veterans.

- Currently, there are over more than 1850 CPS practicing CMM in primary care.

- Improved access to care: VA Primary Care CPS demonstrated that 27% of primary care return appointments could be averted to a CPS.

- In fiscal year 2019, PACT CPSs documented 2,561,124 CMM interventions during 1,248,635 patient care encounters.
• **Improved quality of care:** The most common disease states where interventions occurred in primary care were: type 2 diabetes (1,020,191 interventions), anticoagulation (353,829 interventions), hypertension (283,609 interventions), hyperlipidemia (135,384 interventions), tobacco cessation (67,224 interventions), and pain (27,901 interventions).

• **Better Care:** Multiple studies performed within the VA have shown improvement in specific quality indicators:
  - Significant reduction in median A1C values to 7.7% (interquartile range [IQR] (0.5); P < .001) from a baseline A1C of 10.0% (IQR + 0.7).
  - Significant reductions in median systolic blood pressure (SBP) and diastolic blood pressure (DBP) from a baseline of 142/83 (IQR + 10 for SBP and 8 for DBP) to 134/79 (IQR + 7 for SBP and 7 for DBP; P < .001).
  - CPSs coordinated follow-up post-COPD discharge from a hospital or an emergency department (ED) within 30 days. Patients had a 0% composite readmission rate to the ED or hospital for a COPD exacerbation within 30 days of discharge.


**Impact of comprehensive medication management on hospital readmission rates**

The Fairview Health System implemented a formal care transitions process that included referrals to outpatient services provided by CMM pharmacists to determine whether or not a CMM visit with an MTM pharmacist within 30 days of hospital discharge decreased readmissions at 30 days post discharge when compared patients who did not receive a CMM visit.

- 1291 hospitalizations had a CMM visit within 30 days of discharge.
- **Better Care:** At 30 days post discharge, patients who received a CMM visit had a significantly lower rate of readmissions compared to the comparator cohort (4.2% lower, P < 0.001).
- **Improved access to care:** 60% of patients received their CMM visit within 7 days of hospital discharge.


**Endnotes**


