The Outcomes of Implementing and Integrating Comprehensive Medication Management in Team-Based Care: *A Review of the Evidence on Quality, Access and Costs, December 2024*

Developed by the Evidence Based-Resources Subgroup of the GTMRx Practice and Care Delivery Transformation Workgroup:

M. Shawn McFarland, Pharm.D., FCCP, BCACP, National Clinical Pharmacy Practice Program Manager, Clinical Pharmacy Practice Office, Pharmacy Benefits Management Services, Veterans Health Administration

Marcia Buck, Pharm.D., FCCP, FPPAG, BCPPS, Director, Clinical Practice Advancement, American College of Clinical Pharmacy

Judith Jacobi, Pharm.D., FCCP, MCCM, BCCCP, National Coalition for IV Push Safety

Over $528 billion is wasted and 275,000 lives are lost each year in the United States due to non-optimized medication use.[1] Misuse, underuse or overuse of medications can lead to treatment failure, adverse effects and toxicity causing significant morbidity or mortality. With over 80% of Americans now taking one or more medications per week, and rates of hospital admissions resulting from medication-related problems continuing to rise, a strategy must be implemented to ensure that we get the medications right for all patients.[2,3] Comprehensive medication management (CMM) is a patient-centered approach to optimizing medication use and improving patient health outcomes. It is delivered by a clinical pharmacist working in collaboration with the patient and the health care team. The CMM patient 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 clinical goals, is safe given the co-morbidities and other medications being taken, and that the patient is able to take the medication as intended and adhere to the prescribed regimen.[4]

Integration of CMM into existing patient care processes ensures a holistic approach. The broader value of CMM lies in the ability of medication optimization to facilitate achievement of the goals defined as the quintuple aim of health care: improving the quality of care, reducing health care costs, improving both patient and health care provider experience, and achieving health equity.[5,6] The authors of these studies have integrated CMM into team-based care in a variety of health care settings from individual provider offices with privately insured patients to non-profit value-based payment health care systems. In addition, CMM is being used in a wider range of patients, including those with mental health issues and children with medically complex conditions.[7,8] Regardless of location, health care setting, or patient population, the findings are consistent: when CMM is integrated into team-based care, therapeutic goals are achieved, costs decrease and the patient and provider experience improves.

With the growth in CMM practices comes interest in the potential for this comprehensive process of care to aid in addressing healthcare disparities affecting the ability to optimize the patient's medications. CMM may become an important tool for achieving pharmacoequity, ensuring that all patients regardless of race, ethnicity, socioeconomic status, or availability of resources are treated with the optimal medication regimen, have access to their medications, and can use their medications to manage their health conditions.

I. Summary of Data on Improved Quality of Care and Reduced Costs after Implementing CMM

CMM results in over $1 million savings in primary care clinics with a state-based incentive payment program

A one-year observational study of 3,280 adult patients participating in a state-wide healthcare delivery system incentive-based payment reform program revealed significant cost savings for those receiving CMM. Patients were eligible for CMM consultation if they were receiving more than four medications and had been diagnosed with at least one chronic disease (diabetes, hypertension, heart failure, COPD or asthma). A clinical pharmacist reviewed patients' records and created action plans for 290 patients with a total of 311 medication-therapy problems (MTPs). Two physicians conducted independent reviews of the pharmacist's recommendations to establish inter-rater reliability of the MTPs, with agreement on a final count of 301 MTPs in 280 patients.

- **Better care:** Of the identified problems, recommendations for 150 (49.8%) were fully implemented by the primary care team, with the other 129 (42.8%) partially implemented. The majority were categorized as related to medication safety/adverse drug reactions (56.8%), with the second most common category related to appropriateness of the medication indication (34.9%).
- **Reduced costs:** Resolution of MTPs resulted in an estimated potential cost savings of $1,143,015 in 2016 US dollars. The largest portion of this cost avoidance was achieved through the prevention of 62 hospital admissions.

Chung TH, Hernandez RJ, Libaud-Moal A, et al. The evaluation of comprehensive medication management for chronic diseases in primary care clinics, a Texas delivery system reform incentive payment program. BMC Health Services Research. 2020; 20:671. doi: 10.1186/s12913-020-05537-3.

Retrospective analysis of economic and utilization outcomes of CMM in a large Medicaid plan using a novel artificial intelligence platform

In this observational study, the authors used mixed-effects regression models to assess savings and associated economic impact of a CMM program provided by pharmacists using an advanced artificial intelligence (AI) platform developed by Surveyor Health and clinical decision support tools. Pharmacists interacted with patients by phone; assisted by the AI platform which created a patient profile and provided clinical decision support. Pharmacists provided recommendations via fax or by phone to providers for a total of 2,150 Medicaid members with an average of 10 medications for chronic conditions. Cost and utilization data were compared from 2017 and 2019 to capture the impact of the addition of CMM in 2018.

- **Better care:** A total of 7,485 interventions were made with 46,090 recommended actions. The majority of recommended actions (84.6%) were to stop the medication because it was either not needed or duplicate therapy. The next most common action (32.3%) was to change a medication dose to optimize therapy.
- **Reduced costs:** The authors found a statistically significant decrease in the total cost of care of 19.3% ($p < 0.001$) or $554 per patient per month. Medication costs alone decreased by 17.3% ($p < 0.001$) or $192 per patient per month.

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- There was a 15.1% decrease in emergency department (ED) visits, a 9.4% decrease in hospitalizations and a 10.2% decrease in days of hospital admission (all results statistically significant).
- Assessing the savings in light of the cost of program implementation and maintenance including the AI platform and pharmacist salaries, the authors reported a 12.4:1 return on investment.

Kessler S, Desai M, McConnell W, et al. Economic and utilization outcomes of medication management at a large Medicaid plan with disease management pharmacists using a novel artificial intelligence platform from 2018 to 2019: a retrospective observational study using regression methods. Journal of Managed Care and Specialty Pharmacy. 2021; Sep;27(9):1186-1196. doi: 10.18553/jmcp.2021.21036.

Clinical and economic outcomes of a pharmacogenomics-enriched CMM program

Incorporating pharmacogenomics (PGx) into CMM services has been shown to be valuable in moving patients closer to their treatment goals when compared to standard care. This retrospective study evaluated 452 high-risk patients in an employer-based insurance program who chose to enroll in PGx-enriched CMM (PGx-CMM) services in addition to standard medical care to 1,500 patients who did not opt for the additional service over a 26-month period. Data from the last 13 months of the study were used for comparisons.

- **Better care:** After adjusting for baseline covariates, those participating in the PGx-CMM program had 39% fewer inpatient admissions and 39% fewer emergency department visits (both results statistically significant).
- **Reduced costs:** When compared to the patients receiving standard care, participants in the PGx-CMM group experienced a decrease in total healthcare costs of $128.31 per member per month compared to the control group. This decrease was primarily the result of fewer hospitalizations and emergency department visits.

Fragala MS, Keough M, Golberg SE, et al. Clinical and economic outcomes of a pharmacogenomic-enriched comprehensive medication management program in a self-insured employee population. The Pharmacogenomics Journal. 2024;24:30. doi.org/10.1038/s41397-024-00350-1.

Positive impact of CMM on diabetes outcomes in Federally-Qualified Health Centers (FQHCs)

This retrospective study highlights the results from 8 FQHCs participating in the *Becton, Disckinson and Company Helping Build Healthy Communities* program that used the funding to support integration of CMM services. These centers provided care for diverse patients populations in sites throughout the US: Arizona, California (San Marcos and Los Angeles), Florida, Indiana, Mississippi, New Jersey and Puerto Rico. Within the holistic CMM services provided, diabetes-focused patient education and instructions for self-monitoring were emphasized.

- **Better care:** A total of 2,502 patients were included in the study, with a primary outcome of change in hemoglobin A1c (A1c) at 6 months and a secondary outcome of change in systolic blood pressure (SBP). A statistically significant reduction in A1c was documented between baseline and the 6-month follow-up (9.4 vs 8.2, $p < 0.01$), as well as a statistically significant reduction in SBP (140.8 vs 130.2 mm Hg, $p < 0.05$). Patients demonstrated sustained reductions in both A1c and SBP beyond 6 months, with a reduction in A1c still present at the 24-month evaluation.

Pastakia SD, Clark A, Lewis K, et al. The impact of clinical pharmacist led comprehensive medication management on diabetes care at Federally Qualified Health Centers within the BD Helping Build Healthy Communities program. Journal of the American College Clinical Pharmacy. 2022;5:273-282. doi.org/10.1002/jac5.1679.

Healthcare utilization and outcomes in cardiovascular patients receiving CMM services

This quasi-experimental three-year non-randomized clinical study evaluated the impact of CMM services in older patients (ages 65-80 years) with established cardiovascular disease. Patients could self-refer to a pharmacist providing CMM serves or could be referred by their physician or other providers. Patients receiving usual care (not referred or not electing to have CMM) served as the control group. Parameters compared included blood pressure, A1c, low-density lipoprotein (LDL) and total cholesterol (TC) levels as well as healthcare utilization.

- **Better care:** Patients in the CMM group achieved statistically lower systolic and diastolic blood pressures (mean change -9.02 mm Hg and -4.99 mm Hg, respectively, both $p < 0.001$). Total cholesterol and LDL were also significantly lower in the CMM group compared to controls. While the mean A1c declined to a greater extent in the CMM patients, the difference compared to controls was not statistically significant.
- **Reduced costs:** Hospital admissions were 3.35 times higher in the control group (95% CI 1.16-10.00). Unplanned primary care visits were 2.34 times more frequent in the controls (95% CI 1.52-3.57).

Brajkovic A, Bosnar L, Gonzaga do Nascimento MM, et al. Healthcare utilization and clinical outcomes in older cardiovascular patients receiving comprehensive medication management services: A nonrandomized clinical study. International Journal of Environmental Research and Public Health. 2022;19:2781. doi: 10.3390/ijerph19052781.

Impact of health-equity informed criteria to increase access to CMM Services for hypertension

This paper describes the results of a collaboration between the Minnesota Department of Health and an academic health system with 5 primary care clinics and 12 hospitals. The health system employs a large team of CMM pharmacists who practice in 42 primary care and 16 specialty clinics treating an average of 18,000 patients per year. Thirteen urban and suburban clinics located in areas with diverse and socially vulnerable communities were selected to determine the impact of CMM pharmacists in increasing the recruitment and engagement of patients with risk factors for cardiovascular disease. Cultivating relationships between patients at risk and CMM pharmacists resulted in significant improvements in care.

- **Better care:** Patients partnering with CMM pharmacists were also more likely to meet blood pressure and statin goals than those not receiving CMM (81 versus 76%, $p<0.001$) and 90 vs 81%, $p<0.001$, respectively).
- **Improved access to care:** The interventions also resulted in a change in the sociodemographics of the patients, with a significant increase in diversity and patients with place-based social vulnerability (38% vs 35%,$p=0.03$). The 439 patients who partnered with a CMM pharmacist were more likely to connect with other system resources than those without CMM care (social work: 11% vs 4%, $p< 0.001$, medical specialists: 57% vs 46%, $p<0.001$).

Zagel AL, Brummel AR, Chacon M, et al. The impact of health equity-informated eligibility criteria to increase the delivery of pharmacist-delivered comprehensive medication management services for patients with high blood pressure. Journal of Public Health Management and Practice. 2024;30(5):S141-S151. doi:10.1097/ PHH.0000000000001962

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

Synergy Pharmacy Solutions (SPS) initiated a pharmacist-provided transition of care (TOC) program for adults enrolled in a health system-based managed Medicaid health plan who were classified as being at high risk for readmission 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 offered CMM services within two to four days after discharge. If the patient agreed to participate, the SPS team provided CMM services via telephone to resolve any discharge medication-related problems.

- **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 department costs, in six-month increments up to two years.
  - The budget impact model showed that in the first six 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 two, the savings reached over $4 per member per month, for a total of $25.6 million.

Ni W, Colayco D, Hashimoto J, Komoto K, Gowda C, Wearda B, McCombs J. Budget Impact Analysis of a Pharmacist-Provided Transition of Care Program. Journal of Managed Care and Specialty Pharmacy. 2018;24(2):90-96. doi: 10.18553/jmcp.2018.24.2.90.

CMM results in improved care and cost savings in mental health system

Psychiatric patients have multiple risk factors for chronic medical conditions and their need for multiple medications increases the risk of adverse events, drug interactions and poor adherence. This retrospective study of CMM assessed the quality of the service provided and patient outcomes within a mental health system through initial and follow-up visits focused on chronic medical conditions and psychiatric therapy.

- **Better care:** Complex patients were referred to the CMM clinic with a mean of 13.7 medications and 10.1 medical conditions per patient. Providers found an average of 5.6 medication-related problems per patient, the most common being adverse drug reactions, unnecessary medications, inappropriate doses and poor adherence. Overall, clinical status improved in 52% of patients.
- **Reduced costs:** The service projected a net cost avoidance of $90,484 over 2.25 years, or $586.55 per patient from avoidance of hospitalization or emergency department visits (33.7%) and savings in medication costs (66.3%). This resulted in an ROI of $2.80 per dollar spent.
- **Improved patient experience:** A patient satisfaction survey indicated that 93% of patients felt the service was “extremely” or “very helpful”, noting the positive changes made to their medication regimens. The majority of patients (89%) would refer friends or family for a medication review.

Cobb CD. Optimizing medication use with a pharmacist-provided comprehensive medication management service for patients with psychiatric disorders. Pharmacotherapy. 2014;34:1336-1340. doi.org/10.1002/phar.1503.

CMM post-discharge results in fewer readmissions and emergency department visits in high-risk patients

Clinical pharmacists providing telehealth CMM services in a transitions of care clinic reported the results of a quality improvement initiative to reduce hospital readmissions and emergency department (ED) utilization in discharged patients considered to be at high risk for readmission. Patients were referred for CMM

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services based on comorbidities and at least one high-risk medication (anticoagulants, antiplatelet drugs, hypoglycemic agents, immunosuppressants, or anti-infectives). Over 3,000 patients discharged from the 292-bed community hospital met the criteria for eligibility over the 11-month study period, with 889 (29%) enrolling in CMM services.

- **Better care: T**hroughout implementation of the program the authors reported an overall increase in patient enrollment, average patient volume, and patient engagement.
- **Reduced costs:** CMM reduced readmission and ED utilization. There was a 2.9% absolute difference in 30-day readmission rates between the patients not receiving CMM services and those who received CMM ($p = 0.04$). Thirty-day ED utilization also decreased significantly, with a 3.5% difference between the patients not receiving CMM and those who received CMM ($p = 0.03$).

Thai T, Plotke M, Downing G, et al. Telehealth pgharmacist approach to comprehensive medication management in post-discharge high-risk patients: a quality improvement initiative. Telemed J E Health. 2023 Nov 17. doi: 10.1089/tmj.2023.0239.

Effects of clinical pharmacist-led CMM on chronic disease state goal attainment in a patient-centered medical home (PCMH)

This paper provides a retrospective review of CMM in a rural family medicine clinic from 2017 through 2019. Patients were included in the analysis if they had at least one CMM visit following referral by their provider or were identified by chart review by the CMM pharmacist. Rates of diabetes goal attainment for the 207 patients in the review were compared with their historical results. The composite attainment of goals for A1c, blood pressure, and statin use served as the primary endpoint. Attainment of each goal separately served as secondary endpoints.

- **Better care:** At the completion of the assessment period, there was a 26.1% increase in the patients meeting the composite goal (30.9% vs 4.8% at baseline). There were also significantly more patients who attained individual goals: A1c 51.2% vs 24.2% A1c, blood pressure 85.5% vs 43.5%, and statin use 65.7% vs 45.9% ($p < 0.001$ for all comparisons).

Prudencio J, Kim M. Diabetes-related patient outcomes through comprehensive medication management delivered by clinical pharmacists in a rural family medicine clinic. Pharmacy 2020; 8, 115. doi: 10.3390/pharmacy8030115

CMM leads to improvements in diabetes, hypertension and dyslipidemia

In 2008, the Brazil Ministry of Health established the Nucleo de Apoio a Saude da Familia (Family Support Teams), multidisciplinary teams consisting of pharmacists, nutritionists, physical therapists and social workers, to support the primary care physician and nurse. After implementation of CMM services, treatment goals were assessed using a quasi-experimental study design in 1,057 patients covered by five clinical pharmacists over a 2-year period.

- **Better care:** The mean difference from initial to final values showed statistically significant improvement for A1c (-0.8 +/- 0.4), systolic and diastolic blood pressure (-3.3 +/- 1.5 and -1.4 +/- 1.0), low-density lipoprotein cholesterol (-19.5 +/- 6.0) and total cholesterol (-21.0 +/- 7.3).

Santos BD, Nascimento MM, de Oliveira GC, et al. Clinical impact of a comprehensive medication management service in primary health care. Journal of Pharmacy Practice 2019;0897190019866309. doi:10.1177/0897190019866309.

Impact of CMM on total cost of care (TCOC) in a clinically integrated network

A clinically integrated network in Michigan has developed an approach to identifying patients for CMM services in existing Medicare Advantage, Medicaid, and commercial contracts. This paper describes the impact of the model utilizing ambulatory care pharmacists, population health pharmacists, and specially trained pharmacy technicians on the total cost of care within a large integrated health system.

- **Reduced costs:** Pharmacy and medical claims were evaluated in 1,199 patients over a 6-month period prior to and following the initial CMM encounter. Statistically significant differences were found for total costs ($1,427.84, p<0.001), prescription drug costs ($222.82, p<0.001), and medical costs ($462.26, p<0.001) between the pre-CMM visit and post-CMM period. In addition, the authors identified a 16% reduction in hospital admissions. The authors found a statistically significant difference in TCOC in each of the 3 types of coverage.

Earby JA, Jenkins TN, Johnson AM, et al. An analysis of the impact on total cost of care within a pharmacist-led comprehensive medication management program. Journal of the American College of Clinical Pharmacy. 2024;7:984-995. doi: 10.1002/jac5.2007

Team-based care with CMM shows benefit in children with medial complexity

This case series provides the first data demonstrating the value of CMM in a pediatric practice for medically complex patients. A total of 102 children were followed for a 9-month period to identify medication treatment problems (MTPs) and evaluate the impact of CMM on medication use, hospitalization or emergency department (ED) utilization, and costs.

- **Better care:** Pharmacists providing CMM to patients at least once per month identified, prevented, or resolved 1,355 MTPs during the study period, with an average of 13 interventions per child. The majority of interventions involved medication dose optimization and the development of monitoring plans to avoid or mitigate adverse drug effects. Medication burden, a significant issue for this patient population was also reduced, with the average number of medications per patient reduced from 23 to 20.

- **Reduced costs:** A subset analysis of 244 interventions by the CMM pharmacists resulted in a monthly direct cost savings of $44,304 ($434 per patient per month) and a monthly cost avoidance of $48,835 ($479 per patient per month). Twenty-eight ED visits and 61 clinic or urgent care clinic visits were avoided. Hospital admissions were reduced by 44%.

Quinn J, Monk Bodenstab H, Wo E, et al. Medication management through collaborative practice for children with medical complexity: a prospective case series. Journal of Pediatric Pharmacology and Therapeutics. 2024;29(2)::119-129. doi: 10.5863/1551-6776-29.2119

II. Summary of Data on Improved Quality of Care, Patient and Provider Experience, and Patient Access to Care after Implementing CMM

Veterans give their experience with clinical pharmacists providing CMM high marks

Evaluation of patient experience is an important component of assessing health care quality. Clinical pharmacy specialists (CPS) in Veterans Health Administration (VHA) facilities operate as advanced practice providers, seeing patients independently for CMM services under their scope of practice.

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- **Improved patient experience:** In a 9-month assessment conducted in 2021, patient experience surveys were sent to randomly selected veterans via email to evaluate a recent outpatient health care encounter with a CPS. A total of 743 surveys were completed with a response rate of 20%.
  - For individual domains of patient experience, the percentage of respondents selecting scores of 4 o 5 on a 5-point Likert scale (agree or strongly agree) were 94.4% for ease and simplicity of getting to the appointment, 91.9% for quality, 94.9% for employee helpfulness (provider willingness to listen and provide explanations), 95% for patient satisfaction and 91.9% for confidence and trust in the facility.
  - Results demonstrate that veterans' experiences with clinical pharmacists providing CMM were highly positive in every patient experience domain.

McFarland MS, Tran M, Ourth HL, et al. Evaluation of patient experience with Veterans Affairs clinical pharmacist practitioners providing comprehensive medication management. Journal of Pharmacy Practice. 2023 Dec;36(6):1356-1361. doi: 10.1177/08971900221117892.

Effect of an integrated clinical pharmacist on the drivers of primary care provider burnout

Family medicine and internal medicine providers at Mayo clinic facilities in Minnesota and Wisconsin participated in a cross-sectional quality improvement survey to assess the perceived efficacy of the integration of clinical pharmacists into the clinic team. A total of 119 providers (physicians, nurse practitioners and physician assistants) responded to the survey for a 40% response rate. The majority had worked with an integrated clinical pharmacist on a daily to weekly basis for 2 to 5 years.

- **Better care:** 91% of providers were extremely satisfied with the clinical pharmacy services in their clinic, with 90% agreeing that clinical pharmacists help patients make progress towards their health care goal, improve quality measures and assist with effective management of the patient panel. The most commonly reported collaborative activities were consults, chronic disease management, and CMM.
- **Improved provider experience:** More than 95% of providers indicated that pharmacists were critical members of the health care team. They also strongly agreed that working with clinical pharmacists decreased their workload and allowed them to find greater meaning in their work. Providers believed the integration of clinical pharmacists into their clinics gave them more time to focus on the aspects of their work that were more professionally fulfilling.

Haag JD, Yost KJ, Kosloski KA, et al. Effect of an integrated clinical pharmacist on the drivers of provider burnout in the primary care setting. Journal of the American Board of Family Medicine. 2021;34:553-560. doi: 10.3122/jabfm.2021.03.200597.

Assessing the impact of integration of clinical pharmacists into teams on access to care for rural veterans

This observational study evaluated team perceptions on the success of a program to integrate the VA clinical pharmacy specialists (CPS) providing CMM. Using a mixed methods evaluation, the CPS and their clinical team members were surveyed using the medication use process matrix (MUPM) as well as semi-structured interviews. The study reflected team interactions during 496,323 patient encounters from October 2017 to March 2020. A total of 124 CPS (90% response rate) and 1,177 other clinical team members (70% response) completed the self-administered web-based questionnaire. An additional 22 interviews were completed with CPS and other clinicians.

- **Improved provider experience:** The evaluation indicated good integration of the CPS in the primary care teams, as perceived by the other team members.

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- Both primary care team members and the CPS agreed on the high level of contributions provided in all 5 domains of the MUPM, with mean scores of 2.3 to 2.9 on a scale of 0 to 3.
- Findings from the interviews supported the perception that the majority of providers believed the CPS are making substantial contributions to patient care. Provider interviews highlighted the important role the CPS plays by providing CMM to relieve provider burden of care.
- The study also found that CPS reported higher job satisfaction when compared to previous data, citing less burn out and better role fit.

McCullough MB, Zogas A, Gillespie C, et al. Introducing clinical pharmacy specialists into interprofessional primary care teams: Assessing pharmacists' team integration and access to care for rural patients. Medicine (Baltimore). 2021 Sep 24;100(38):e26689. doi: 10.1097/MD.0000000000026689.

Fidelity to CMM Framework Improves Quality and Access for Veterans

Utilization of clinical pharmacy specialists (CPS) providing CMM has been shown to improve the quintuple aim of healthcare. However, fidelity to the CMM process of care is not yet consistent. Two Veterans Health Administration (VHA) facilities using specific standardized CMM practice components were compared to national averages for CPS in VHA facilities to evaluate quality and access.

- **Better care:** Facilities using the standardized CMM process of care had a higher proportion of patients meeting a composite metric for diabetes and hypertension treatment goals and statin use than the average score for VHA facilities nationally (77.6% versus 76.5%, $p < 0.05$).
- **Improved access to care:** Utilization of CPS was higher in the facilities using the standardized process than the national average (13.9% vs 7.3%, $p < 0.05$). Average time to the third next available primary care appointment was lower (8.2 vs 13.9 days).

Gould K, McFarland SM, Seckel E, et al. Quality and access outcomes in 2 Veterans Health Administration facilities with fidelity to the comprehensive medication management framework. American Journal of Health-System Pharmacy. 2024.zxae209. doi: 10.1093/ajhp/zxae209.

Primary care providers believe that CMM improves their work-life

Part of a larger study of CMM implementation in Minnesota and North Carolina, this series of structured interviews was conducted with 16 primary care providers (PCPs) to identify 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 experience:** 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.

Funk K, Pestka D, McClurg M, et al. Primary care providers believe that comprehensive medication management improves their work-life. Journal of American Board of Family Medicine. 2019; 32(4): 462-473. doi: 10.3122/jabfm.2019.04.180376.

Pharmacists providing CMM gain increased efficiency in patient access through use of telemedicine

This retrospective review evaluated the efficiency of patient-aligned care team (PACT) clinical pharmacy specialists (CPS) in Veterans Health Administration (VHA) facilities who provide CMM using objective patient metrics to evaluate if the quality of care had been compromised during the COVID-19 pandemic. Data collection focused on the number and type of clinic encounters, the number of disease states managed, insulin use, A1c and blood pressure in patients from 2019 (pre-pandemic) and 2020 (during the pandemic).

- **Improved access to care:** The total number of PACT CPS encounters increased 32% in 2020, and the number of unique patients seen by the CPS increased by 12%.
  - There was a statistically significant increase in telephone visits from 5,230 to 18,715 (accounting for 32% of visits to 87%) while in-person visits decreased from 9,099 to 1,093 (accounting for 56% of all visits to only 5%). Video visits increased but remained a relatively uncommon method of patient encounter.
  - Rates of canceled appointments and patients not showing up for their appointments also decreased significantly between 2019 and 2020.
- **Sustained outcomes:** Patient metrics indicated no negative impact of a change in patient and CPS communication method.
  - There was no significant difference in the average change in A1c, with an average reduction of 0.57% in the 2019 cohort and 0.58% in the 2020 cohort.
  - Average reductions in systolic (SBP) and diastolic (DBP) blood pressures showed no significant change with a mean reduction in SBP of 3.1 mmHg and 3.2 mmHg in 2019 and 2020, respectively, and a mean reduction in DBP of 1.1 mmHg in 2019 and 2 mmHg in 2020 ($p = 0.3$).

Thomas AM, Baker JW, Hoffman TJ, et al. Clinical pharmacy specialists providing consistent comprehensive medication management with increased efficiency through telemedicine during the COVID19 pandemic. Journal of the American College of Clinical Pharmacy. 2021;4: 934-938. doi: 10.1002/jac5.1494.

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

In 2010, the Veterans Health Administration (VHA) integrated the patient-centered medical home (PCMH) model as the delivery method of primary care. This review highlights the results of multiple studies demonstrating the impact of primary care clinical pharmacy specialists (CPS) providing CMM as advance practice providers in increasing access and improving the quality of care for veterans. In fiscal year 2019, more than 1,850 VHA primary care CPS documented 2,561,124 CMM interventions during 1,248,635 patient care encounters.

- **Better care:** Improved quality indicators have been demonstrated in multiple published studies.
  - Significant reduction in median A1c values to 7.7% (interquartile range [IQR] (0.5); $p < 0.001$) from a baseline A1c of 10.0% (IQR + 0.7).

- **Improved access to care:** VHA CPS demonstrated that 27% of primary care return appointments could be averted to a CPS, freeing time in the schedules of other providers.

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- 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; $P < 0.001$).
- CPS coordinated follow-up after hospital or ED within 30 days led to patients having a 0% composite readmission rate to the ED or hospital for a COPD exacerbation within 30 days of discharge.

McFarland MS, Nelson J, Ourth H, et al. Optimizing the primary care clinical pharmacy specialist: Increasing patient access and quality of care within the Veterans Health Administration. Journal of the American College of Clinical Pharmacy. 2020;3:494-500. doi: 10.1002/jac5.1177.

Impact of CMM in treating substance abuse disorder

This descriptive report of a partnership between a community-based center for alcohol and drug treatment and a clinical pharmacist providing CMM demonstrates the value of medication optimization in this patient population. Within the first 18 months, 187 CMM encounters were delivered to 112 people (99% had opioid use disorder, with 95% receiving methadone).

- **Better care:** Over 200 medication therapy problems (MTPs) were identified, with the most common being the need for additional therapy (31%). Care team members were given a post-encounter survey to assess their agreement with the CMM consult, with 100% of surveys returned showing agreement or strong agreement with the recommendations.
- **Improved provider experience:** Care team members found CMM services helped to bridge existing gaps in access to care, ensure medication optimization, and improved medication use care coordination.

Tran L, Hager KD. Pharmacist-delivered comprehensive medication management in a substance use disorder clinic, an 18-month descriptive study. Journal of the American College of Clinical Pharmacy. 2023;6.346-53. doi: 10.1002/jac4.1768.

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