Identifying Best Practices in Cardiometabolic Care Programs

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EXECUTIVE SUMMARY

A targeted literature review[a] of studies on cardiometabolic care programs (CMPs) published from 2014 to 2024 in the United States (US) identified several common best practices for program effectiveness, including a designated multidisciplinary care team, evidence-based and comprehensive care practice, regular patient follow-ups, and effective program communication. The findings provide a framework to consider in designing future CMPs.

INTRODUCTION

Cardiometabolic diseases, encompassing conditions such as obesity, type 2 diabetes (T2D), and cardiovascular diseases (CVDs) (e.g., stroke, ischemic heart disease), represent a significant and growing public health challenge.[1] The growing prevalence of cardiometabolic diseases places a substantial strain on the US healthcare system; the total cost impact of obesity-related complications is "beyond additive," with total costs reaching 151%, 218%, and 264% of the sum costs of the individual complications for class 1, class 2, and class 3 obesity,[b] respectively.[2] The overlapping nature of various cardiometabolic diseases underscores the need for comprehensive care strategies that mitigate the risk of adverse cardiovascular events and improve patient outcomes, whereas siloed care can lead to inefficient treatment, high costs, and suboptimal outcomes. Because of the need for an integrated approach, many CMPs have been implemented in the recent decade, aiming to provide coordinated and comprehensive care for people at risk of cardiometabolic diseases. Identifying best practices in these programs helps guide the design and implementation of new programs.

[a] The targeted literature review will be referred to as a "review" throughout this article.

[b] In this study, patients were categorized by the median body mass index in 2019: class 1 obesity, 30.0 to < 35.0 kg/m^2 (Asian Americans, 25.0 to < 27.5 kg/m^2); class 2 obesity, 35.0 to < 40.0 kg/m^2 (Asian Americans, 27.5 to < 40.0 kg/m^2); and class 3 obesity, ≥ 40.0 kg/m^2.[2]

OBJECTIVES

This study analyzed the US CMP landscape to identify evidence-based best practices and support clinical decision-making among healthcare professionals and population-based decision-makers to optimize care for medically complex patients. Specifically, this report summarizes best practices, delivery models, and key performance indicators.

METHODOLOGY

A review of studies on CMPs published during a 10-year period (6 November 2014 to 6 November 2024) within large US healthcare systems and telehealth programs was conducted. Studies on programs managing obesity and/or cardiometabolic-related complications were included (e.g., metabolic syndrome or dysfunction, type 2 diabetes, cardiovascular disease including hypertension). Core clinical outcomes of interest included body weight, body mass index (BMI), hemoglobin A1c (HbA1c), blood pressure (BP), and lipid profiles (total cholesterol, low- or high-density lipoprotein cholesterols [LDL or HDL], and/or triglycerides). Other relevant clinical outcomes included waist circumference, fasting blood glucose level, and scoring based on certain assessment criteria (e.g., Framingham Coronary Heart Disease [CHD] risk score or American Heart Association [AHA] Cardiovascular Health Metrics). Cost outcomes after program implementation were also captured.

The review was conducted in the following databases:

- PubMed/MEDLINE, MEDLINE In-Process
- Embase (using the Elsevier Platform)

Additionally, an internet search was performed for information on large US healthcare systems and direct-to-consumer telehealth vendors (e.g., Virta Health, Omada Diabetes Solution, Verily Lightpath, Heartbeat Health). Due to multiple telehealth vendors in the marketplace, this review focused on telehealth companies that reported clinical outcomes resulting from their services. The Cardiometabolic Center Alliance website (cardiometabolicalliance.org) was also referenced.

RESULTS

The review captured 490 unique references from the database search. Another 15 articles were included from internet research. After two rounds of screening (at title/abstract and full-text levels, respectively), 42 articles were included, of which a total of 39 unique CMPs were identified.

Programs varied in patient profiles, program duration, follow-up period, population size, delivery mode, and outcomes assessed. Most programs reported statistically significant improvements in one or more clinical outcomes. Although each program was unique, several were considered more robust by a qualitative and holistic assessment of program attributes and demonstrated outcomes.

Overview of Identified Cardiometabolic Care Programs

Among the 39 identified CMPs, over half (n = 20) were implemented in healthcare clinics, including 19 with adult participants and one with pediatric participants.[c] The remaining CMPs included five pharmacist-managed, three insurance/employer-based, and 11 telehealth programs. Although specific care and interventions varied across programs, none integrated bariatric surgical interventions, likely because such procedures are typically offered through standalone clinics that focus primarily on weight loss rather than broader cardiometabolic outcomes. Table 1 summarizes key features of the CMPs in the four categories.

Medication outcomes were reported in several CMPs, including either the addition of guideline-concordant medications for disease prevention or de-escalation of medication therapy, likely due to improved disease management (Table 2).

Only two studies assessed cost outcomes: one in the pharmacist-managed setting and the other in the telehealth setting. Both demonstrated cost savings due to program implementation.

- The cardiometabolic virtual-first care program by Omada Health Inc., which studied patients with diabetes and hypertension, estimated that the total gross medical expenditure savings per person after 1 year of program implementation was $1,342. The total gross medical expenditure savings per person after 5 years was $7,756 for patients with diabetes and hypertension.[10]
- A Markov model using data from the pharmacist intervention program at Kaiser Permanente Northern California showed a lower treatment cost per person ($35,740) in the enhanced care group compared with the control group ($44,528) over 10 years. The enhanced care group also had more life-years (8.9 vs. 8.1) and more quality-adjusted life-years (5.51 vs. 5.02) than the control group over the 10-year period. The enhanced care group had a consistently higher chance of being cost-effective, regardless of willingness-to-pay threshold if a longer time horizon was adapted.[11]

[c] This report focuses on the adult programs.

Table 1. Overview of Key Program Features in Cardiometabolic Care Programs

Healthcare clinics
• Lifestyle modifications[a] were the primary mode of management in all 20 programs. • Five of these programs (all adults) also included medication management. • Participants had obesity, or were overweight, with diabetes, CVDs, metabolic syndrome, or a combination of these conditions, or had risk factors for these conditions. • The most reported clinical outcomes were weight loss and improvements in lipid panel, followed by reduction in BMI and decrease in BP.
Pharmacist-managed
• Medication management and lifestyle modifications were the primary mode of intervention. • Patients enrolled in these programs had T2D/elevated HbA1c and other cardiometabolic risk factors, including uncontrolled BP, elevated atherosclerotic CVD risk, or lipid abnormalities. • All five programs integrated clinical pharmacists as part of the primary care team to provide disease-management education and medication management. • The most reported clinical outcomes in this category were decrease in HbA1c, followed by reduction in BP and improvement in lipid panel.
Insurance/employer-based
• Lifestyle modifications[b] were the primary mode of intervention. • Patients with prediabetes and/or obesity, had ≥ 2 risk factors of cardiometabolic disease, or had metabolic syndrome. • The most reported clinical outcomes were weight loss and reduction in BMI.
Telehealth and remote
• Lifestyle modifications[c] were the primary mode of intervention. • Patients enrolled in these programs had prediabetes, T2D, or CVD. • The most reported clinical outcomes were weight loss and reduction in HbA1c, followed by improved lipid panel, decreased BP, and decreased BMI.

BMI = body mass index; BP = blood pressure; CVD = cardiovascular disease; DPP-GLB = Diabetes Prevention Program–Group Lifestyle Balance; HbA1c = hemoglobin A1c; T2D = type 2 diabetes.

[a] Lifestyle intervention may include education on nutrition, training on physical activities, and/or cognitive and behavioral counseling.

[b] These focused on nutrition, physical activity, and behavioral self-management. The New York Medicaid managed care program and the Bayer Corporation DPP-GLB used monetary incentives to increase participation and/or goal attainment.[3,4]

[c] These included an online lifestyle coach, online peer support groups, and remote recording (i.e., mobile app, digital blood glucose meter, digital wireless scale) for daily health functions (i.e., weight, food intake, exercise).

Table 2. Positive Medication Outcomes Reported in Cardiometabolic Care Programs

CMP category	Addition/increase of guideline-recommended medications	De-escalation of medications
Healthcare clinics	PHASE program by Kaiser Permanente Northern California: Rate of statin prescriptions increased significantly by 0.41% per quarter on average (P < 0.001).[5] CINEMA program at University Hospitals Cleveland Medical Center: Prescriptions of newer therapies (SGLT2 inhibitors and GLP-1 receptor agonists) more than doubled at the first 3-month follow-up visit.[6]	Cardiometabolic Center of Excellence program at the Haverty Cardiometabolic Center of Excellence in Saint Luke's Mid America Heart Institute: Significantly greater reduction in total daily insulin dose (−31.6 vs. +1.1 units; P < 0.001) versus the control group was reported.[7]
Pharmacist-managed	UNC General Internal Medicine Practice: Use of aspirin for CV risk prevention was higher for the intervention group (91%; 87/96) than for the control group (58%; 54/93) (P < 0.0001) at 12-month follow-up.[8]	—
Telehealth	—	Virta Health program: Use of diabetes medications combined (excluding metformin) was reduced significantly (56.9% [SE, 3.1%] to 29.7% [SE, 3.0%]; P < 0.0001).[9]

CINEMA = Center for Integrated and Novel Approaches in Vascular-Metabolic Disease; CMP = cardiometabolic care program; CV = cardiovascular; GLP-1 = glucagon-like peptide-1; PHASE = Preventing Heart Attacks and Strokes Every Day; SE = standard error; SGLT2 = sodium-glucose cotransporter 2; UNC = University of North Carolina.

Attributes and Best Practices of a Robust Program

Given the variability in program characteristics and outcomes, a qualitative and holistic approach was taken to assess the robustness of the identified programs. Figure 1 summarizes the attributes for consideration.

Figure 1. Attributes to Assess Program Robustness of Cardiometabolic Care Programs

Basic characteristics

- Program population size (larger enrollment may indicate scalability)
- Longer program duration and/or follow-up length (years or months vs weeks)
- Multiple participating healthcare centers

Program care credential/specialty

- Appropriate care team specialty and training/background (core team with special training in cardiometabolic care)
- Adequate care team coordination (e.g., designated program coordinator)

Program features

- Use of evidence-based clinical practice guidelines/algorithm
- Effective dissemination of program materials
- Regular monitoring/follow-ups (e.g., monthly or quarterly)

Demonstrated improved outcomes

- Statistically significant change in multiple relevant outcomes (mostly clinical outcomes, but can include cost-savings outcomes)
- Good program retention/adherence (if reported)

Using these attributes, several CMPs stood out as robust and demonstrated statistically significant improvements in multiple clinical outcomes. These programs shared several key features that may be considered to inform future program design. Best practices included having a designated, specialty-trained, multidisciplinary care team; evidence-based interventions; individualized care plans; regular checkups; and effective communication between the care team and patients. Additionally, postprogram maintenance checkups may help sustain the effectiveness established during the program period.[12] In contrast, low adherence to program-specified visits appeared to be a key contributor to suboptimal outcomes.[13] Table 3 provides more details of our recommendations for best practice in program design and implementation. Several examples of robust CMPs in various healthcare settings are presented in the Appendix.

Table 3. Recommended Best Practices for Cardiometabolic Care Programs

Best practices	Details
Team-based multidisciplinary approach	• Programs using a team of healthcare professionals with diverse expertise who worked collaboratively demonstrated improved patient outcomes. • Team members were designated to devote effort to program operation, including managing assessments, interventions, counseling, and follow-ups. • Team members had specialty trainings in the care of patients with cardiometabolic diseases. • A designated core member (e.g., a nurse or pharmacist) coordinated and led the operational efforts, ensuring efficiency. Programs including pharmacists could optimize medication management and overcome physician inertia.
Use of evidence-based guidelines	• Applying evidence-based clinical guidelines for treating patients ensured the delivery of high-quality and effective care. • Regular meetings among the healthcare team to keep up to date and adhere to evidence-based clinical guidelines reduced variability in practice and improved efficiency.
Patient-centered individualized care	• Individual patients were assessed for their unique risk profile of cardiometabolic disease, and care plans were tailored to individual needs. • The patient-centricity approach enhanced patient engagement and led to better adherence to program specifications and/or medications and to better outcomes.
Targeting populations at high risk for appropriate comprehensive care	• Programs focusing on patients at high risk of developing cardiometabolic diseases or associated adverse complications in referral systems (e.g., through a diabetes registry) efficiently identified eligible individuals for program participation who could benefit the most from care.
Comprehensive care	• Programs with a multifaceted approach, including nutritional and diet counseling, physical activity training, behavioral and cognitive counseling, and medication management (e.g., proper titration and adherence) demonstrated significant improvement in multiple clinical outcomes.
Regular follow-ups	• Regularly contacting patients (e.g., monthly or quarterly) to monitor progress and provide support ensured sustained improvement. • Continuous communication between program coordinators and patients made patients feel supported, improving motivation, adherence to program specifications and/or medications, and progress. • Mobile monitoring devices allowed program participants to self-monitor, provide biofeedback, and remotely capture data.
Leveraging technology for effective communication and dissemination of program information	• Multiple platforms were used to disseminate program information, including in-person meetings, printed documents, emails, phone calls, clinical tool kits, videoconferencing, small group sessions, lectures, EMR decision support tools, lunch and learns, and online portals for housing program materials and participant/coach communication.
Accessible	• CMPs, whether onsite or telehealth settings, should be readily accessible to patients. • Telehealth programs provide flexibility and reduce the burden of commuting to a clinic. • Employer/insurance-based programs used the workplace for an ideal entry point to introduce the programs because workers spend substantial time at the workplace.
Addressing social determinants	• Recognizing and addressing nonmedical factors that influence health outcomes can be critical for achieving improved outcomes in a diverse population. • Interventions that were tailored to be culturally appropriate were vital for program effectiveness in specific populations. • Programs involving the community/family provided extra support for improved outcomes.
Ample time for program duration	• Most of the programs that demonstrated significant improvement of multiple clinical outcomes had a duration of 6 months or more.

CMP = cardiometabolic care program; EMR = electronic medical record.

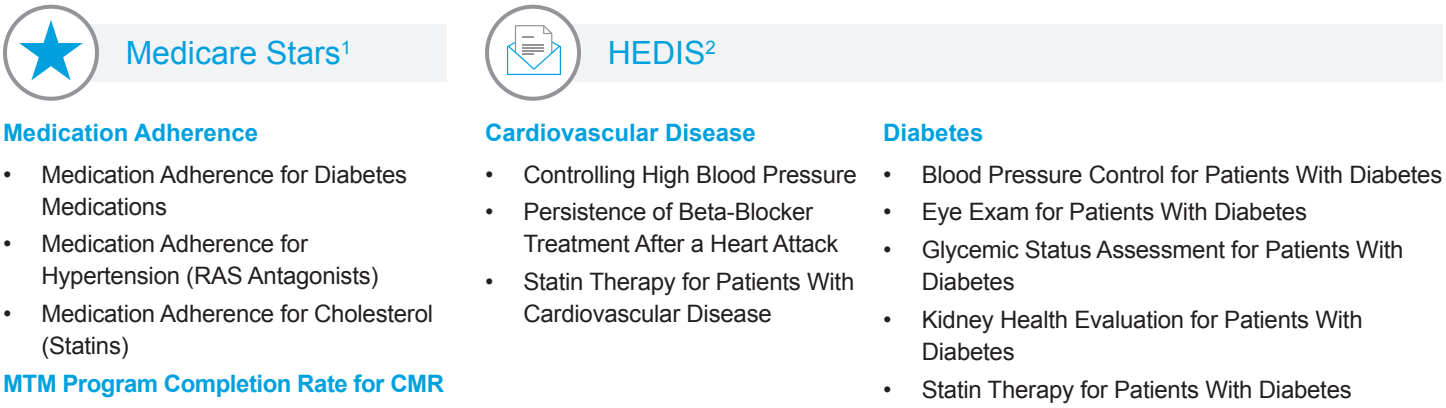
DISCUSSION

Findings from this review suggest that multiple factors can influence the outcome of a CMP; in many robust studies, key attributes involve a highly credentialed care team and close partnership between the care team and program participants.

The coordinated nature of CMPs may have multiple benefits. For example, well-designed CMPs promote interdisciplinary collaborative care, which enhances healthcare delivery and improves patient outcomes. CMPs focusing on preventive care can reduce the incidence of severe cardiometabolic complications. Additionally, cutting-edge technologies and treatments, such as telemedicine and personalized medicine, can be integrated into modern CMPs.

CMPs can simultaneously address multiple quality measures that evaluate the quality of healthcare services provided to patients. Value-based care models have become increasingly common, under which providers or health systems are rewarded financially for delivering high-quality care and achieving positive patient outcomes rather than for volume of services. Medicare Stars and the Healthcare Effectiveness Data and Information Set (HEDIS) measures are often included in these value-based care models (Figure 2). This accountability encourages providers to continuously improve their care delivery, fostering a healthcare system that prioritizes patient outcomes.

Figure 2. CMS Star Ratings and HEDIS Quality Measures Related to Cardiometabolic Healthcare



CMR = Comprehensive Medication Review; CMS = Centers for Medicare and Medicaid Services; HEDIS = Healthcare Effectiveness Data and Information Set; MTM = Medication Therapy Management; RAS = renin-angiotensin system.

Sources: CMS[14]; NCQA[15]

Although CMPs offer a variety of opportunities to improve patient outcomes, implementing an optimal CMP comes with challenges. Integrating a CMP into the existing healthcare systems, including IT systems and workflows, can be complex and time-consuming. Securely managing large volumes of patient data, effectively monitoring outcomes, and adjusting healthcare operations can be difficult if the existing systems lack the technical and human resources. Motivating patients to actively participate in their care plans and adhere to lifestyle changes can also be challenging. Providers may consider creatively incorporating incentives for patients to continue regular follow-ups. Balancing resource allocation, including staff, equipment, and facilities, to support the program may disrupt other services. Assisting patients in accessing newer obesity and diabetes medications may create a heavy administrative burden. Leadership alignment, along with coordinated and continued efforts from multiple decision-makers, is required for implementing and sustaining a CMP. In our findings, pharmacist-managed programs or telehealth services may serve as a valuable starting point for building a full multidisciplinary CMP. Many employer-based programs without direct access to clinics or pharmacists are already using third-party telehealth programs to support their employee wellness.

Few programs within this review assessed cost outcomes, but it is important to consider the financial implications of CMPs. A significant initial investment should be expected for program development, staff training, and technology implementation. Opportunities for specialty funding and grants may be available for the CMP establishment and operations. Out-of-pocket expenditures for insured patients and how those may vary across payers and prescribed drugs should be considered. Many programs identified in this review did not include newer pharmacologic therapies; hence, future CMPs offering newer medications may need to balance the cost of these agents with the potential for long-term benefits through prevention of adverse cardiovascular events, such as CVDs, and new onset of T2D. Importantly, drug choice should be based on individual patient needs and specific goals of the CMPs. The positive health outcomes and convenient coordinated care may attract new patients and retain existing patients. Furthermore, quality of care and related quality measures may result in better performance in value-based performance models, leading to improved financial outcomes for healthcare organizations.

With the evolving prevention and treatment landscape of cardiometabolic diseases, implementation of CMPs will be a dynamic process. Several gaps remain, which warrant future research to further understand the impact of CMPs:

- Patient and clinician perspectives: It is important to understand the impact of CMPs on patient quality of life, preference of care, and satisfaction with the CMP. Perspectives from healthcare teams in a CMP are also important to evaluate.
- Cost-effectiveness: Although there is preliminary evidence of cost savings, more evidence is needed for long-term cost-effectiveness, particularly for payers and employers who might want to invest in these programs.
- Program and study design: Addressing questions relating to CMP design and evaluation is important to optimize future CMPs, including optimal program duration, long-term impact after program discontinuation, factors influencing program adherence, adaptation of new advancements (including both new treatments and technology, such as AI), and side-by-side comparisons of in-person vs. telehealth programs.
- CMPs for pediatric population: Childhood obesity is a major predictor of adult obesity, and adults with histories of childhood obesity have a worse prognosis than those with late-onset obesity.[16] In the US, approximately one in five children and adolescents have obesity.[17] However, data on CMPs managing obesity in pediatric populations are limited, necessitating future research.

LIMITATIONS

This study comes with several limitations. Although this literature review comprehensively covered publications in the past 10 years (2014-2024) and included major US healthcare systems and telehealth vendors, it was limited mainly due to the targeted nature (e.g., single reviewing process vs. dual reviewing process as in a systematic literature review). Bias and robustness of the selected studies were not formally evaluated. There may be publication bias of the CMPs because programs that have positive results tend to be published more than programs with negative results. Therefore, the factors contributing to these negative results are less known. Lastly, because all programs and patient populations are unique, the performance of any single program may not be generalizable to all patients with cardiometabolic risks.

CONCLUSIONS

Through a review of studies of CMPs in the past 10 years (2014-2024), several common best practice attributes were identified and should be considered when designing new programs including basic characteristics (program population size, longer program duration, multiple participating centers), program features (use of evidence-based clinical practice guidelines, effective dissemination of program materials, regular monitoring), program care credentials (appropriate training/credentials for care team, adequate care team coordination) and demonstrated improved outcomes (statistically significant outcomes, good program retention). As our understanding of cardiometabolic diseases continues to advance and the prevention/treatment paradigm evolves, future research is needed to optimize disease prevention and patient care.

APPENDIX

Case Studies

Boxes 1-5 present five CMP cases that illustrate our best practice recommendations. Two programs, PHASE and CINEMA, are in healthcare clinic settings. The Indiana-based FQHCs were programs managed by pharmacists. MyUP (My Unlimited Potential) was an employer-based program. The eCMP program was in a telehealth setting.

PHASE

Preventing Heart Attacks and Strokes Every Day (PHASE)[5,18]

Multiple community health centers and public hospitals

Location:
Multiple centers and hospitals, California

Launched:
2004

Funded by:
Kaiser Permanente Northern California

Goal:

To deliver evidence-based preventive therapies for risk factors controlling for CVD, such as blood glucose, LDL-C, and BP, among patients with diabetes

Patient eligibility:

diabetes (N = 98,345-122,177)

Staffing:

- Primary care physician
- Pharmacist are managers
- Nurses

Program structure:

- Specialty-trained care managers, nurses, and pharmacists worked under primary care physicians.
- Care managers proactively identified, contacted, educated, engaged, treated, and followed eligible patients and reviewed and shared data to drive provider behavior.
- Program materials were distributed by multiple methods.[a]

Key findings:

This population management program was effective at controlling CVD risk factors in people with diabetes; it may be scalable and transportable to other healthcare systems.

- Compared with the national benchmarks (HEDIS[b]), a substantially greater improvement in risk factor control was observed in PHASE participants.
  - Reduced prevalence of poor glycemic control[c] (AAPC = −4.8; $P < 0.05$)
  - Increased prevalence of BP control[d,e] (77%-82%; AAPC, +1.1; $P < 0.05$)
  - Increased prevalence of lipid control[f,g] (47%-71%; AAPC, +4.3; $P < 0.05$)
- From 2004-2013, the average rate of BP control increased significantly by 0.35% per quarter ($P < 0.001$).
- Rate of statin prescription increased significantly by 0.41% per quarter on average ($P < 0.001$).

Key strengths:

- Development of comprehensive health system–wide registry of eligible individuals and sharing of performance metrics
- Adoption and use of standardized evidence-based medication protocols to reduce clinical variability; frequently updated evidence base to simplify treatment algorithms
- Participation of qualified multidisciplinary healthcare team members in medication titration and promotion of efficient and cost-effective treatments
- The infrastructure build in PHASE supported sustainability

Key limitations:

- Participants were based on commercially insured populations, so the findings may not be generalized to other populations such as those enrolled in Medicare or uninsured populations.

AAPC = average annual percentage change; BP = blood pressure; CVD = cardiovascular disease; EMR = electronic medical record; $HbA1_c$ = hemoglobin $A1_c$; HEDIS = Healthcare Effectiveness Data and Information Set; LDL-C = low-density lipoprotein cholesterol; US = United States.

[a] The dissemination methods included printed documents, emails, clinical tools, videoconferences, lectures, and EMR decision support tools.

[b] The study by Rana et al.[18] compared the program results with prevalence of control from US national HEDIS commercial data for individuals with diabetes during the same period (2004-2013). HEDIS is used by more than 90% of health plans in the US to measure performance on important dimensions of care and service.

[c] Poor glycemic control was defined as $HbA1_c > 9\%$.

[d] BP control defined as < 140/90 mmHg.

[e] The prevalence of BP control was both significantly higher in the program and on a national level. During 2007-2013, changes observed in PHASE were 77%-82% (AAPC, +1.1; P < 0.05), and changes on a national level were 57%-62% (AAPC, +1.9; $P < 0.05$).

[f] Lipid control was defined as LDL-C < 100 mg/dL.

[g] The prevalence of lipid control also improved on a national level but not significantly (40%-44%; AAPC, +1.4; $P = 0.2$).

CINEMA

Center for Integrated and Novel Approaches in Vascular-Metabolic Disease (CINEMA)[6]

Harrington Heart and Vascular Institute at University Hospitals at Cleveland Medical Center

Location:
Cleveland, Ohio

Launched:
May 2020

Funded by:
University Hospitals Cleveland Medical Center

Goal:

To provide an integrated, patient-centered, and team-based intervention for patients with T2D at high risk for CVD events

Patient eligibility:

T2D with high risk for CVD[a] (N = 206; 113 completed baseline and ≥ 1 follow-up)

Staffing:

- Core care team
- Program administrator
- Cardiologists[b]
- Nurse coordinator
- CDCES[c]
- Pharmacist
- Partners[d]
- Endocrinologists
- Nephrologists

Program structure:

- Initial visit to address all aspects of CVD and T2D care with the core team
- Return at ~3 months to discuss progress
- Maintain contact every 3-6 months with nurse coordinator, CDCES, and physician (if required)

Key findings:

This team-based, patient-centered program was promising to improve control of multiple CVD risk factors and increase the rate of guideline-directed medical therapy.

- Significant improvements in cardiometabolic risk factors were observed in the first 90 days after the initial visit.
- At year 1, patients continued to have significant improvement in multiple CVD risk factors compared with baseline values. These included reduction in body weight (−5%; $P = 0.011$), BMI (−2.7%; $P < 0.001$), $HbA1_c$ (−10.8%; $P < 0.001$), SBP (−4.0; $P = 0.001$), total cholesterol (−7.9%; $P = 0.001$), and LDL-C level (−13.5%; $P = 0.001$).
- Rates of SGLT2i and GLP-1 RA prescription more than doubled at the first 3-month follow-up visit:
  - GLP-1 RA, from 18% at baseline to 58% at first follow-up
  - SGLT2i, from 23% at baseline to 61% at first follow-up
  - GLP-1 RA or SGLT2i, from 37% at baseline to 88% at first follow-up

Key strengths:

- Providers sought to determine the patient's overall risk for future CV events and formulated an **optimal evidence-based pharmacologic strategy** for reducing CV and renal events by weighing several **patient-specific factors**.
- **Continuous communication** between patients and the nurse coordinator made patients feel supported and improved motivation, adherence, and progress.
- Periodic operational meetings with all decision-makers and an internal advisory board with multidisciplinary constituents ensured a **consistent protocol and management approach**.
- **A systematic referral method** involving multiple decision-makers of the health system was important for identifying program participants.

Key limitations:

- Single-health-system program; may not be generalized to other health settings
- Short follow-up period (~3 months)
- Causal relationship between the CINEMA intervention and improved outcomes was not established

BMI = body mass index; CDCES = certified diabetes care and education specialist; CV = cardiovascular; CVD = cardiovascular disease; GLP-1 RA = glucagon-like peptide-1 receptor agonist; $HbA1_c$ = hemoglobin $A1_c$; LDL-C = low-density lipoprotein cholesterol; SBP = systolic blood pressure; SGLT2i = sodium-glucose cotransporter 2 inhibitor; T2D = type 2 diabetes.

[a] High risks included established atherosclerotic CVD, elevated coronary artery calcium score > 100, chronic heart failure with reduced ejection fraction, and/or chronic kidney disease stages 2-4.

[b] Five cardiologists with special interest in T2D, prevention, cardiovascular imaging, and vascular medicine.

[c] CDCES was also a registered dietitian nutritionist to target diet and lifestyle and provide medical nutrition therapy.

[d] The program partnered with endocrinology and nephrology providers, but they were not routinely included in CINEMA care visits.

CVRR FQHC

Pharmacist-Managed CVRR Clinics[19]

Eight pharmacist-managed CVRR FQHCs

Location:
Multiple clinics in Indiana

Launched:
2007

Funded by:
Federal funding

Goal:

To address chronic disease states, such as hypertension, diabetes, dyslipidemia, and smoking cessation and to reduce healthcare costs and CVD burden

Patient eligibility:

Patients with elevated $HbA1_c$ ± uncontrolled BP ± elevated ASCVD risk or lipid abnormalities (N = 631)

Staffing:

- Pharmacists
- Prescribers/primary care providers

Program structure:

- Pharmacists work under a CPA for medication management of diabetes, hypertension, hyperlipidemia, and tobacco use.[a]
- CVRR pharmacists usually meet one on one with patients for 30 minutes appointments every 4-6 weeks to review laboratory results, provide disease-management education, adjust medications, and address barriers to care.

Key findings:

- Patients who consistently received care from pharmacist-managed CVRR clinics in FQHCs demonstrated sustained improvements in clinical outcomes related to CV risk for a minimum of 6 months.
- At the 3- to 5-month evaluation, there were statistically significant improvements in CV risk factors when compared with baseline values.
  - Reduced $HbA1_c$ (mean difference, 1.6%; 95% CI, −1.8 to −1.4; $P < 0.01$)
  - Reduction from mean baseline SBP (mean difference, −2.3 mmHg; 95% CI, −4.1 to −0.4; $P < 0.05$)
  - Reductions of LDL-C at both the 3- to 5-month timepoint (mean difference, −4.3 mg/dL; 95% CI, −6.6 to −1.1; $P < 0.05$) and the 6- to 8-month timepoint (mean difference, −7.75 mg/dL; 95% CI, −11.3 to −4.2; $P < 0.05$)

Key strengths:

- The CPA was **based on current clinical disease-management guidelines** (ADA Standards of Medical Care in Diabetes) and was reviewed and updated annually.
- Referral to a pharmacist service allowed for **additional one-on-one time** dedicated to a focused set of related disease states as opposed to managing both chronic and acute concerns in a shorter primary care visit.
- Pharmacist training and expertise related to the medication distribution process were **optimal for ensuring medication access** despite common barriers such as financial burden, insurance coverage changes, and manufacturer shortages or recalls.

Key limitations:

- Data were available only for patients with regular follow-ups, potentially excluding those with lower engagement or greater barriers to care.
- Temporary service interruptions, missing records during pharmacist absences, and inconsistencies in documentation for glucose levels and follow-up transitions limited data completeness.
- Retrospective nature, absence of a control group, and single healthcare system setting may limit generalizability and strength of conclusions.

ACE = angiotensin-converting enzyme; ADA = American Diabetes Association; ASCVD = atherosclerotic cardiovascular disease; BP = blood pressure; CI = confidence interval; CPA = collaborative practice agreement; CV = cardiovascular; CVD = cardiovascular disease; CVRR = cardiovascular risk reduction; DPP4 = dipeptidyl peptidase 4; FQHC = federally qualified health clinic; GLP-1 = glucagon-like peptide-1; $HbA1_c$ = hemoglobin $A1_c$; LDL-C = low-density lipoprotein cholesterol; SBP = systolic blood pressure; SGLT2 = sodium-glucose cotransporter 2.

[a] Commonly used medication classes: diabetes—metformin, SGLT2 inhibitors, GLP-1 agonists, DPP4 inhibitors, and insulin; hypertension—ACE inhibitors, diuretics, calcium channel blockers; dyslipidemia–statins; and other medication classes to manage cardiovascular risk.

MyUP

My Unlimited Potential (MyUP)[20]

Baptist Health South Florida

Location:
Miami, Florida

Launched:
2010

Funded by:
South Miami Hospital Foundation

Goal:

To address the emerging epidemic of obesity and its related healthcare use burden in an employee population at high risk for CVD

Patient eligibility:

Employees of Baptist Health South Florida who had ≥ 2 cardiometabolic risk factors[a] (N = 297)

Staffing:

- Advanced nurse practitioner
- Registered dietician
- Exercise physiologist
- Certified diabetes educator
- Registered nurse

Program structure:

- 12-week program with follow-up of up to 12 months
- Preprogram assessment with the advanced nurse practitioner and weekly monitoring
- Physical activity/training with the exercise physiologist
- Individualized nutritional plan from the registered dietician

Key findings:

- The comprehensive workplace wellness program resulted in improved health outcomes in patients with ≥ 2 cardiometabolic risk factors.
- By the 12-month follow-up, there were statistically significant improvements in cardiometabolic risk factors.[b]
  - Decreases in mean SBP (mean difference, −5.5 mmHg; 95% CI, −7.5 to −3.4) and DBP (mean difference, −4.3 mmHg; 95% CI, −5.6 to −2.9
  - Significant mean weight loss (mean difference, −3.9 kg; 95% CI, −4.6 to −3.2) and decreases in mean BMI (mean difference, −1.4; 95% CI, −1.7 to −1.2)
- By the 12-month follow-up, 46% of participants who were eligible for bariatric surgery at baseline no longer met the criteria for bariatric surgery, denoting significant improvements in cardiometabolic health.

Key strengths:

- Multidisciplinary wellness team provided **individualized care plans** for program participants.
- **Multifaceted lifestyle improvement program** focused on health education, disease management, physical activity/training, and individualized nutritional plans with access to fresh produce and recipes at specific timepoints.
- The workplace provides an **ideal entry point** for the introduction of cardiometabolic programs because workers spend at least one-quarter of their day in the workplace.

Key limitations:

- Small sample size and lack of a control group may affect the generalizability of these findings.
- Dropout rate increased, particularly among bariatric surgery–eligible patients.

BMI = body mass index; CI = confidence interval; CVD = cardiovascular disease; DBP = diastolic blood pressure; $HbA1_c$ = hemoglobin $A1_c$; SBP = systolic blood pressure.

[a] Employees were considered eligible for participation in the program if they had ≥ 2 of the following cardiometabolic risk factors: total cholesterol ≥ 200 mg/dL, SBP ≥ 140 mmHg or DBP ≥ 90 mmHg, $HbA1_c$ ≥ 6.5%, and BMI ≥ 25.

[b] Statistical significance was claimed by the authors; however, specific *P* values were not provided in the original source.

eCMP

Electronic Cardiometabolic Program (eCMP)[21]

An outpatient multispecialty group practice organization in Northern California

Location:
Burlingame, California

Launched:
March 2014

Funded by:
Palo Alto Medical Foundation

Goal:

To reduce cardiometabolic risk by improving diet, physical activity, and mental health behaviors through lifestyle change

Patient eligibility:

Adults at high risk (N = 74) in need of primary prevention of CVD and/or:

- Diabetes (BMI ≥ 35 and prediabetes, previous gestational diabetes, and/or metabolic syndrome)
- Secondary prevention (BMI ≥ 30 and T2D and/or CVD)

Staffing:

- Physicians
- Nutritionists
- Exercise physiologists
- Lifestyle coaches

Program structure:

- 6-month comprehensive program relying on weekly face-to-face group meetings via video conferencing and the delivery of evidence-based curricula using online tools and prerecorded didactic videos
- 24 virtual group sessions offered alternatively between stress management and behavioral lifestyle counseling
- 7 in-person sessions for group-based physical activity
- Portable mobile devices for data collection

Key findings:

- The eCMP intervention showed potential for decreasing cardiometabolic risk among individuals at high risk and emphasized stress management as a key component.
  - Overall mean reduction in BMI (−1.0; 95% CI, −1.5 to −0.5; $P < 0.05$)
  - Mean weight loss was significant at 6 months (−3.1 kg; 95% CI, −4.7 to −1.5; $P < 0.05$)
  - Waist circumference reduction was significant at 6 months (−4.1 cm; 95% CI, −6.5 to −1.7; $P < 0.05$)
  - Nonsignificant but consistent tendency of improvements for BP and lipid laboratory results
- Overall satisfaction scores were high, with health coaches and facilitators rated as the highest satisfying component vs. other components

Key strengths:

- Comprehensive lifestyle intervention for the prevention and treatment of obesity, metabolic syndrome, diabetes, and CVD
- Evidence- and theory-based curriculum
- Online platform and participant portal for hosting program materials and participant-coach communication
- Mobile monitoring devices for participant self-monitoring, biofeedback, and remote data capture
- Coach-led virtual small group sessions to deliver curriculum content for weight management, healthy eating, and stress management
- Coach-led in-person sessions for exercise curriculum content delivery

Key limitations:

- Possibility of selective response to the feedback surveys among participants. Participants who responded might have been those who were more committed and more positive toward the intervention.
- Methodological limitations (e.g., small sample size and short follow-up) are reflective of a pilot study.

BMI = body mass index; BP = blood pressure; CI = confidence interval; CVD = cardiovascular disease; eCMP = electronic cardiometabolic program; T2D = type 2 diabetes.

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