Caring for High-Need, High-Cost Patients: What Makes for a Successful Care Management Program?

Clemens S. Hong, Allison L. Siegel, and Timothy G. Ferris

Abstract Provider groups taking on risk for the overall costs of care in accountable care organizations are developing care management programs to improve care and thereby control costs. Many such programs target “high-need, high-cost” patients: those with multiple or complex conditions, often combined with behavioral health problems or socioeconomic challenges. In this study we compared the operational approaches of 18 successful complex care management programs in order to offer guidance to providers, payers, and policymakers on best practices for complex care management. We found that effective programs customize their approach to their local contexts and caseloads; use a combination of qualitative and quantitative methods to identify patients; consider care coordination one of their key roles; focus on building trusting relationships with patients as well as their primary care providers; match team composition and interventions to patient needs; offer specialized training for team members; and use technology to bolster their efforts.

OVERVIEW

As the United States grapples with steeply rising health care costs, payers, providers, and policymakers are seeking ways to improve the efficiency of health care delivery. One strategy pursued by nearly all provider groups participating in accountable care organizations that assume financial risk is to manage the care they provide to “high-need, high-cost” patients—those requiring complex, multifaceted care. While there is growing consensus on the importance of this approach to controlling costs, there is little to guide stakeholders as to the best practices for deploying care management programs.

What Is Complex Care Management?

While there are several types of care management interventions, we focus here on programs in which specially trained, multidisciplinary teams coordinate closely with primary care teams to meet the needs of patients with multiple chronic conditions or advanced illness, many of whom face social or economic barriers in accessing services.
Primary care–integrated complex care management (CCM) programs perform four essential activities:

1. Identifying and engaging patients who are at high risk for poor outcomes and unnecessary utilization.
2. Performing comprehensive health assessments to identify problems that, if addressed through effective interventions, will improve care and reduce the need for expensive services.
3. Working closely with patients and their caregivers as well primary care, specialty, behavioral health, and social service providers.
4. Rapidly and effectively responding to changes in patients’ conditions to avoid use of unnecessary services, particularly emergency department visits or hospitalizations.

CCM extends beyond medical issues to address, to the extent possible, how patients’ psychosocial circumstances affect their ability to follow treatment recommendations and achieve a healthy lifestyle. The goals are to maintain or improve patients’ functional status, increase their capacity to self-manage their condition, eliminate unnecessary clinical testing, and reduce the need for acute care services.

To date, there is scant evidence of the effectiveness of primary care–integrated CCM in reducing overall health care costs. Many programs demonstrate improved quality or reduced acute care utilization, but their effects on net costs have been inconsistent across programs. Poor implementation at any point along this pathway reduces effectiveness and may explain the failure to demonstrate cost savings.

To help guide health care providers, administrators, health system leaders, and payers that are investing in and implementing interventions for complex, high-cost patients, in this brief we describe the models and best practices of 18 successful CCM programs. We identified programs through literature review, recommendations of an expert steering committee, and snowball sampling. Appendix Table 1 provides an overview of each of the 18 programs, which are located in rural and urban areas in 14 states and focus on high-risk populations across payer types. Appendix Table 2 summarizes the care utilization, cost, and quality outcomes data for each program. Finally, for our inclusion criteria and data collection approach, see the About This Study box.
WHAT MAKES FOR AN EFFECTIVE CCM PROGRAM?

Following is a summary of key findings based on our investigation of effective CCM programs.

CCM programs must be tailored to their particular context. Contextual factors include practice size, location in an urban or rural area, and program sponsorship and governance.

- Small, independent practices, which are less likely to have a sufficient number of complex patients to justify investment in a CCM team, need to share CCM resources with each other. Regional care management entities that serve multiple practices are particularly well suited for areas where smaller practices predominate—for example, in rural locales.

- CCM programs in rural settings require greater team resources or smaller caseloads to offset the increased travel time and relative scarcity of community resources.

- Larger practices with sufficient numbers of complex patients should have embedded care managers at primary care practices and other key sites. Some CCM team members can be shared across practices.

- Primary care teams familiar with the principles of team-based care and quality improvement processes are likely to be supportive of CCM programs. Conversely, CCM team members may facilitate practice change at primary care sites.

Exhibit 1. Operational Control in CCM Programs: Advantages/Disadvantages of Different Approaches

<table>
<thead>
<tr>
<th>Operational Control Type</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payer-operated</td>
<td>• Greater flexibility</td>
<td>• Greater challenges engaging patients and providers</td>
</tr>
<tr>
<td></td>
<td>• Access to financial resources</td>
<td>• Limit use of CCM resources to their members</td>
</tr>
<tr>
<td>Practice-operated</td>
<td>• Greater opportunity for primary care integration</td>
<td>• Care managers pulled from care management tasks to cover day-to-day clinic duties</td>
</tr>
<tr>
<td>Delivery system-operated</td>
<td>• Central oversight of care management activities</td>
<td>• May limit use of CCM resources to specific members for which the delivery system is at risk</td>
</tr>
<tr>
<td></td>
<td>• Economies of scale—formal training opportunities, peer-learning, improved data integration, and greater connectivity with providers/care managers across the delivery system</td>
<td></td>
</tr>
<tr>
<td>Independent Regional Care Management Organization</td>
<td>• Allow implementation in places where a small number of complex patients make it difficult to embed CCM teams into practices</td>
<td>• Greater challenges engaging patients and providers</td>
</tr>
<tr>
<td></td>
<td>• Economies of scale—formal training opportunities, peer-learning, improved data integration, and quality improvement capacity</td>
<td>• Limit use of CCM resources to their members</td>
</tr>
</tbody>
</table>
In selecting patients, CCM programs aim to identify individuals who are at the highest risk for poor outcomes and who would benefit from the planned care management interventions. This requires alignment between selected populations, interventions, and desired outcomes, and a combined quantitative and qualitative approach appears to work best.

- The most reliable approach combines use of risk prediction software, chronic disease criteria, or utilization thresholds with patient/provider referrals or assessments. In this hybrid approach, providers must clearly understand the program goals and available care management interventions to select the right patients.
- Focusing enrollment around acute care events, such as emergency department (ED) visits and hospitalizations, helps target opportunities to reduce costs and facilitate patient engagement.

### Exhibit 2. Patient Selection in CCM Programs: Advantages/Disadvantages of Different Approaches

<table>
<thead>
<tr>
<th>Patient Selection Approach</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantitative risk-prediction tools</td>
<td>• Well-validated for identifying a subset of high-risk patients</td>
<td>• May not adequately identify psychosocially complex patients, for example, in Medicaid populations</td>
</tr>
<tr>
<td></td>
<td>• Provides the most complete picture of expenditures</td>
<td>• Depends on completeness of claims data; lack of continuous claims data in Medicaid because of frequent disenrollment may reduce precision of predictive modeling</td>
</tr>
<tr>
<td>Acute-care-utilization focused</td>
<td>• Identifies a high-risk population at a time of significant need and opportunity for impact</td>
<td>• Misses high-risk patients who do not use acute care services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Does not identify factors that drive admissions to guide intervention</td>
</tr>
<tr>
<td>High-risk-condition- or medication-focused</td>
<td>• Widely available and easy to implement</td>
<td>• May not adequately identify patients at high risk for utilization/costs</td>
</tr>
<tr>
<td></td>
<td>• More straightforward for providers to address</td>
<td></td>
</tr>
<tr>
<td>Health risk assessment</td>
<td>• Combines the strengths of all the quantitative approaches and brings data together from multiple sources (including qualitative assessments)</td>
<td>• Implementation is resource-intensive</td>
</tr>
<tr>
<td>Referral by physician or staff, or patient self-referral</td>
<td>• Providers prefer to have the ability to refer their patients to CCM programs</td>
<td>• Provider referral identifies patients that are challenging to manage, but not necessarily those at high risk for future utilization/costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Patient self-referral may identify motivated patients, who afford a greater opportunity for impact, but often have higher self-efficacy and more vulnerable patients are excluded</td>
</tr>
<tr>
<td>Hybrid–quantitative and qualitative</td>
<td>• May be most reliable approach to selecting high-risk patients that are most likely to respond to CCM</td>
<td>• More complex to implement</td>
</tr>
<tr>
<td></td>
<td>• Takes advantage of the strengths of different approaches</td>
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</table>
The composition of the CCM team must be tailored to the target population and constructed to effectively deliver the desired outcomes.

- Programs frequently configure multidisciplinary CCM teams around one or more primary care manager(s). This was typically a nurse, although social workers and community health workers may be a better fit for hard-to-engage patients with major psychosocial barriers to care.
- Other key team roles include: care manager, community resource specialist, behavioral health provider, pharmacist, and health coach/community health worker, other clinician specialists (e.g., geriatrician/psychiatrist), and administrative and analytic support staff.
- Sharing some CCM team members (e.g., behavioral health providers and pharmacists) across multiple CCM teams was an effective strategy to improve efficiency.
- Teamwork is facilitated through face-to-face meetings and use of a shared information technology platform for secure communication.

The needs of the patients being served and the CCM team composition determine the appropriate caseload as well as the frequency and location of interactions.

- Caseloads for the primary care manager or CCM team unit ranged from 25 to 500 patients, although not all patients were active at any given time. Care managers typically interact with their patients weekly to monthly, although crisis can drive daily interactions. Program protocols and the care manager’s clinical judgment dictate frequency of scheduled interactions.
- Most interactions took place by telephone. In-person visits typically occurred at primary care practices, but also occurred in hospitals, emergency departments, and patients’ homes.
- Adding additional team members, optimizing team function, effectively prioritizing patients by levels of risk, and selective use of remote monitoring make CCM teams more efficient and able to carry larger caseloads or have more time for face-to-face interactions.

The key task for the CCM team is to build trusting relationships with patients/families as well as with primary care providers and their staff.

- Upon meeting patients, care managers find it effective to have direct recommendations or “warm handoffs” from their primary care physicians. Some care managers accompany patients to their primary care visits.
- Approaching patients during times of high need (e.g., during hospitalization) and addressing language and cultural barriers with concordant and approachable staff are also important.

PATIENT ENGAGEMENT AT CAMDEN COALITION: MAKING THE RIGHT PITCH

The first approach to a patient is important. Camden Coalition, based in Camden, New Jersey, uses a tailored approach to introduce its program to prospective patients. First, a team member tries to approach prospective patients during a hospitalization or emergency department visit—when they are likely to have a number of acute needs and thus be receptive to offers of help. Then, instead of generically presenting Camden Coalition’s services, a team member asks open-ended questions. Armed with an understanding of a patient’s priorities and needs, the team member can then tailor the presentation of Camden’s services to those needs. The coalition reports that few patients decline services when approached in this way.
• Patient assessments should take into account gaps in care as well as functional status, patient activation, behavioral health and social service needs, and barriers to care. It is then important to negotiate a care plan that reflects the priorities and preferences of patients and their families.

• Use of motivational interviewing is an important way to encourage patient activation and self-management.

• Educating providers about the roles and responsibilities of care managers and providing complementary services that fill patient care gaps help generate trust and support.

• Frequent interactions between the CCM and primary care teams improve communication and build trust.

To perform their key role of coordinating patients’ care, CCM teams must ensure all providers share information, secure smooth referrals, and help patients find needed resources in health systems and in communities.

• Programs focus on ensuring safe care transitions through tools such as medication reconciliation and by developing action plans when certain trigger events occur.

• CCM teams that receive timely notifications of their patients’ emergency department visits may be able to intervene to avoid hospitalization.

• CCM teams need to develop protocols for end-of-life services, such as completion of advanced directives. A few programs expanded access to palliative care for patients expected to live longer than six months.

• Care coordination requires CCM teams to assess existing services and develop strategies to fill any gaps. They also must develop effective working relationships with hospitals, skilled nursing facilities, and other clinical providers, as well as with community service providers.

Care coordination is a specialized field like any other: team members require customized training, including both didactic experiences and mentoring/shadowing.

• It is important to seek out care managers and other members of the team who are able to build trust with patients and primary care team members.

Health information technology can be a powerful enabler of effective care management, though there are significant gaps in functionality among existing tools.

• Priorities for use of health information technology include: accessing real-time data (e.g., on hospital discharges); facilitating documentation, communication, decision support, and automated reminders; and remote patient monitoring and engagement. Remote monitoring allows the CCM team to track stable patients and alerts the CCM team to declines in patient health. To address communication barriers in high-risk patients, one CCM program even provides free mobile phone services.

GRACE CARE PLANNING PROCESS

The Geriatric Resources for Assessment and Care of Elders (GRACE) program, developed at the Indianapolis-based Wishard Health Services, was created to manage the care of vulnerable elderly patients by an interdisciplinary geriatrics team. To develop care plans, team members consider: dementia, depression, ambulation, urinary continence, nutrition, pain, vision, hearing, medications, health maintenance, advance care planning, and caregiver burden.

A nurse practitioner and social worker assess patients in their homes and then follow standard protocols to develop plans based on their findings. Plans are then presented to the full care management team, whose members prioritize interventions and generate reports for patients’ primary care physicians, who review them and provide feedback. The nurse practitioner and social worker then review each plan with patients to ensure they are consistent with their preferences before implementing them. The assessment and care plan are maintained in a central information technology system, enabling the care manager to update and review it as needed.
CONCLUSION

The science of complex care management is still in its infancy. Nonetheless, we encountered many similarities in the design and operations of a diverse group of successful programs. While the evolving nature of CCM made identifying best practices difficult, program leaders and team members endorsed several operational approaches. Perhaps most important, they thought that they had not exhausted the opportunities to improve care and reduce cost for these complex patients. Both the emergence of key operational characteristics of successful programs and the apparent opportunity for continued improvement of these programs should spur policymakers to reduce barriers to more widespread adoption of primary care–integrated, complex care management programs.

AVERTING UNNECESSARY UTILIZATION: CAREOREGON

CareOregon care managers engage patients in the emergency department (ED) with the goal of connecting high utilizers with patient-centered medical homes. Previously developed ED treatment plans are faxed to the ED at the time of the patient visit. The treatment plan includes reminders to call the CCM program outreach workers and direct the patient back to the primary care practice.

A plan might include language such as, “Working on pain management plan, please do not give the patient opiate.” or “Patient has a history of coronary artery disease, but repeated negative work ups for recurrent chest pain suggest chest pain is related to anxiety.”
## Appendix Table 1. Summary of Primary Care–Integrated, Complex Care Management Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Rural/Urban</th>
<th>State/National</th>
<th>Predominant Payer Type(s)</th>
<th>Definition of Complex Patient</th>
<th>Operational Control</th>
<th>Part of Primary Care Enhancement (PCMH) or High-Risk Strategy?</th>
<th>Level of Primary Care Integration</th>
<th>Funding</th>
</tr>
</thead>
</table>
| Aetna’s Medicare Advantage Provider Collaboration Program | Both | National | Medicare | • Risk score*  
• Frequent admission/ED visits  
• Predictive algorithm for readmission  
• High-risk diagnoses  
• Advanced illness predictive algorithm (risk of death in 12 months) | Payer | High risk | Off-site with frequent interaction: embedded (when >1,000 Aetna patients) | Payer |
| AtlantiCare Special Care Center | Urban | New Jersey | Commercial | Health risk assessment based on diagnoses, medication counts, acute care utilization, psychosocial issues | Delivery system | High risk | Integrated part of primary care team | Payer/employer |
| Camden Coalition | Urban | New Jersey | Medicaid | Two or more chronic disease–related admissions in six months | Regional CM organization | High risk | Off-site with frequent interaction | Grant |
| Care Management Plus | Urban | Oregon/National | Medicare | • Risk score*  
• Frequent admissions  
• Specific high risk medication changes  
• Confirmation by primary care team review | Delivery system | High risk | Embedded but not fully integrated | Grant/health system |
| CareOregon Health Resilience Program (working on behalf of Health Share of Oregon) | Urban | Oregon | Medicaid | • Referral  
• Utilization threshold – >1 non-obstetrics admission or 6+ ED visits in 12 months | Payer and coordinated care organization | PCMH | Embedded, but not fully integrated | Payer |
| Community Care of North Carolina (Community Care of the Sandhills) | Rural | North Carolina | Medicaid | • Frequent admissions—greater than anticipated for disease “burden”  
• Multiple chronic conditions (3M Clinical Risk Groups)  
• Referral from primary care | Regional CM organization | PCMH | Off-site with frequent interaction | Payer |
| The Everett Clinic | Urban | Washington | Commercial/Medicare | • High cost  
• High utilizers | Delivery system | High risk | Embedded | Payer/employer/health system |
| Fletcher Allen Health Care—Vermont Blueprint Community Health Team (CHT)—Burlington | Both | Vermont | All Payer | • Frequent inappropriate utilization  
• Poorly controlled chronic conditions  
• Referral | Delivery system | PCMH | Off-site with frequent interaction | Payer/health system |
| Geisinger ProvenHealth Navigator | Rural | Pennsylvania | All Payer | • Risk score*  
• Referral | Payer/delivery system | PCMH | Integrated part of primary care team/off-site with frequent interaction | Payer/health system |
| Genesys HealthWorks Health Navigator | Urban | Michigan | County Health Plan/Uninsured | • Poorly control chronic conditions  
• Acute medical or social care need  
• Intermediate (not the highest) cost | Payer/delivery system | PCMH | Off-site with frequent interaction/integrated part of primary care team (1 practice) | Payer/health system |
<table>
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<th>Program</th>
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<th>State/National</th>
<th>Predominant Payer Type(s)</th>
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<th>Level of Primary Care Integration</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geriatric Resources for Assessment and Care of Elders (GRACE)</td>
<td>Urban</td>
<td>Indiana</td>
<td>Medicare/Medicaid</td>
<td>• Risk score*: high risk of hospitalization based on probability of repeated admissions (PRA) – score &gt;0.4/hour</td>
<td>Delivery system</td>
<td>High risk</td>
<td>Off-site with frequent interaction</td>
<td>Grant/health system</td>
</tr>
<tr>
<td>Guided Care</td>
<td>Urban</td>
<td>Maryland</td>
<td>Medicare</td>
<td>• Risk score* (original study) • Physician referral (current)</td>
<td>Delivery system</td>
<td>High risk</td>
<td>Embedded but not fully integrated</td>
<td>Grant/health system</td>
</tr>
<tr>
<td>Health Quality Partners</td>
<td>Rural/Suburban</td>
<td>Pennsylvania</td>
<td>Medicare/Medicare/Advantage</td>
<td>• Medicare: One or more high-risk chronic conditions (CHF, CAD, diabetes, and COPD) combined with one or more hospitalizations in prior year • Aetna Medicare Advantage Risk score plus one or more high-risk chronic conditions • Sutter Health Questionnaire</td>
<td>Regional CM organization</td>
<td>High risk</td>
<td>Off-site with frequent interaction</td>
<td>Payer</td>
</tr>
<tr>
<td>King County Care Partners</td>
<td>Urban</td>
<td>Washington</td>
<td>Medicaid</td>
<td>Risk score* combined with annual cost of care</td>
<td>Delivery system</td>
<td>High risk</td>
<td>Off-site with frequent interaction**</td>
<td>Payer</td>
</tr>
<tr>
<td>Massachusetts General Hospital Care Management Program</td>
<td>Urban</td>
<td>Massachusetts</td>
<td>Medicare</td>
<td>Risk score* combined with annual cost of care</td>
<td>Delivery system</td>
<td>High risk</td>
<td>Embedded, but not fully integrated</td>
<td>Payer/health system</td>
</tr>
<tr>
<td>New York City Health and Hospitals Chronic Illness</td>
<td>Urban</td>
<td>New York</td>
<td>Fee-for-service Medicaid</td>
<td>Risk score*</td>
<td>Delivery system</td>
<td>High risk</td>
<td>Embedded/integrated part of primary care team</td>
<td>Grant/health system</td>
</tr>
<tr>
<td>Chronic Illness Demonstration Project: Hospital to Home</td>
<td>Urban</td>
<td>New York</td>
<td>Medicaid</td>
<td>Risk score*</td>
<td>Delivery system</td>
<td>High risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oklahoma SoonerCare Health Management Program</td>
<td>Both</td>
<td>Oklahoma</td>
<td>Medicaid</td>
<td>• Risk score* • One or more chronic conditions</td>
<td>Payer</td>
<td>PCMH</td>
<td>Off-site with frequent (urban) and occasional (rural) interaction</td>
<td>Payer</td>
</tr>
<tr>
<td>Sutter Care Coordination Program</td>
<td>Urban</td>
<td>California</td>
<td>Commercial/Medicare</td>
<td>• Referral • Any one of the following: • Unplanned readmission within 30 days • Two or more admissions in past year • Two or more ED visits in past year • Seven or more medications • Diagnosis of CHF, COPD, or pneumonia • Three or more chronic conditions</td>
<td>Payer/Delivery system</td>
<td>High risk</td>
<td>Embedded/off-site with regular interaction</td>
<td>Payer/health system</td>
</tr>
</tbody>
</table>

* A risk score is a product of predictive modeling that generally takes into account age, gender, medical diagnoses and procedures, prescription use, and/or prior utilization or health expenditure.
** King County Care Partners has a “champion” embedded at each primary care site.

Key to Abbreviations
CAD: coronary artery disease
CHF: congestive heart failure
COPD: chronic obstructive pulmonary disease
ED: emergency department
PCMH: patient-centered medical home
### Appendix Table 2. Outcomes from 18 Primary Care–Integrated Complex Care Management Programs

<table>
<thead>
<tr>
<th>Program/Population</th>
<th>Utilization/Cost</th>
<th>Quality</th>
<th>Provider Experience</th>
<th>Quality of Life/ Patient Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Admission/Readmission</td>
<td>Emergency Department Utilization</td>
<td>Cost of Care</td>
<td>in year 3, 99% of patients had an annual office visit. 98% of patients with CHF, diabetes, or COPD had semiannual visits; 99% of patients with diabetes received HbA1c test; 95% of patients discharged from hospital or skilled nursing facility had a follow-up visit within 30 days</td>
</tr>
<tr>
<td>Aetna’s Medicare Advantage Provider Collaboration Program Medicare</td>
<td>Decreased admissions by 38% (year 1), 35% (year 2), 30% (year 3) vs. controls; 30-day all-cause hospital readmission rates were 5% (year 1); 11% (year 2), and 9% (year 3)</td>
<td>Decreased ED visits by 28% (year 1), 28% (year 2), and increase by 12% (year 3) vs. controls</td>
<td>Decreased total cost by 19% (year 1), 26% (year 2), 33% (year 3) vs. controls</td>
<td>In year 3, 99% of patients had an annual office visit. 98% of patients with CHF, diabetes, or COPD had semiannual visits; 99% of patients with diabetes received HbA1c test; 95% of patients discharged from hospital or skilled nursing facility had a follow-up visit within 30 days</td>
</tr>
<tr>
<td>AtlantiCare Special Care Center All Payers</td>
<td>Decreased admissions by &gt;20% for SCC enrollees vs. propensity matched controls</td>
<td>Decreased ED visits by &gt;20% for SCC enrollees vs. propensity matched controls</td>
<td>Decreased cost of care trend from 25% to 4% annual rise post-enrollment</td>
<td>Increased proportion of patients with LDL&lt;100 from 55% to 65%; increased medication adherence rate; decreased smoking rate compared to national average</td>
</tr>
<tr>
<td>Camden Coalition (Link2Care–Camden Care Management Program) Medicaid and Medicare</td>
<td>Decreased admissions by 57% per month among “super-users”</td>
<td>Decreased ED visits by 33% among “super-users”</td>
<td>Decreased costs of care (charges incurred) by 56% among “super-users”</td>
<td>Decreased mortality by 3% (year 1 and 2) vs. control; decreased mortality in diabetes patients by 4% (year 1) and 5% (year 2) vs. control in diabetes patients; HbA1c levels decreased 30% greater than control group</td>
</tr>
<tr>
<td>Care Management Plus Medicare/Mixed</td>
<td>Decreased admissions by 11% (year 1) and 3% (year 2); decreased admissions in diabetes patients by 3% (year 1) and 9% (year 2)</td>
<td>Increased ED visits by 11% (year 1) and 6% (year 2); decreased ED visits by 3% (year 1) and increased ED visits in diabetes patients by 3% (year 2)</td>
<td>Mean reduction of $200K per primary care practice because of avoidance of unnecessary services</td>
<td>Decreased mortality by 3% (year 1 and 2) vs. control; decreased mortality in diabetes patients by 4% (year 1) and 5% (year 2) vs. control in diabetes patients; HbA1c levels decreased 30% greater than control group</td>
</tr>
<tr>
<td>CareOregon Health Resilience Program (working on behalf of Health Share of Oregon) Medicaid</td>
<td>Decreased non-obstetric hospital admissions by 34%</td>
<td>Decreased ED visits by 33%</td>
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## Caring for High-Need, High-Cost Patients

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<th>Program/Population</th>
<th>Utilization/Cost</th>
<th>Quality</th>
</tr>
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<tr>
<td><strong>Community Care of North Carolina (Community Care of the Sandhills) Medicaid</strong></td>
<td>Decreased admissions by 7% (adjusting for clinical severity): 67 PKPY in 2009 to 64 PKPY in 2012</td>
<td>Improved outcomes on 17 quality measures (including nine HEDIS measures) in 2012 compared with 2009, and performed better than HEDIS benchmarks for eight of the nine HEDIS measures</td>
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<tr>
<td></td>
<td>Decreased ED visits by 4% (adjusting for clinical severity): 807 PKPY in 2009 to 774 PKPY in 2011</td>
<td><strong>Quality of Care</strong></td>
</tr>
<tr>
<td></td>
<td>Decreased total cost of care by 3% (adjusting for clinical severity): $352 PMPM in 2009 to $332 PMPM in 2011</td>
<td><strong>Provider Experience</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Emergency Department Utilization</strong></td>
<td><strong>Quality of Life/Patient Experience</strong></td>
</tr>
<tr>
<td></td>
<td>Decreased ED visits by 4% (adjusting for clinical severity): 807 PKPY in 2009 to 774 PKPY in 2011</td>
<td>Decreased body-mass index by 59.1%, improved HbA1c 66.7% with an average decrease of 1% and improved in LDL by 31.6% with an average decreased of 24mg/dl; CHT patients six months after graduation had an average weight loss of 14lbs</td>
</tr>
<tr>
<td><strong>The Everett Clinic Medicare/Mixed</strong></td>
<td>Decreased 30-day readmissions by 15%</td>
<td>SF12 physical functioning and mental functioning increased by 15% and 16%, respectively; 18% more patients reported that they “received care as soon as needed”</td>
</tr>
<tr>
<td></td>
<td>Decreased annual per capita spending 20%</td>
<td><strong>Quality of Care</strong></td>
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<tr>
<td><strong>Fletcher Allen Health Care–Vermont Blueprint Community Health Team (CHT)–Burlington All Patients (Payer-Blind)</strong></td>
<td>Decreased admission rates by 21% (from 2006–2011); decreased admission rate by 6% (over three years) vs. 11% in controls</td>
<td>Improved HEDIS measures (LDL control, blood pressure control, HbA1c testing, diabetic eye exam, microalbuminuria, therapy for rheumatoid arthritis, and imaging for low back)</td>
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<td>Decreased ED visit rates by 32.8% (from 2006–2011); decreased ED visit rates by &lt;1% (over 3 years) vs. an increase in controls by 10%</td>
<td>86% of PCPs reported the program allowed them to provide more comprehensive care: 93% of PCPs agree/agree strongly that they would recommend the program to others</td>
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<td>Increased in annual per capita expenditures by 22% vs. 25% in controls</td>
<td>72% of patients believed quality of care was better</td>
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<tr>
<td><strong>Geisinger ProvenHealth Navigator All Patients (Payer-Blind)</strong></td>
<td>Decreased admission rates by 18% (over four years); decreased 30-day readmission rates by 24% (over four years)</td>
<td>Overall patient satisfaction was &gt;98% in all years surveyed</td>
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<td>No change in ED visit rates per 1,000 (over four years) vs. an increase in controls</td>
<td><strong>Quality</strong></td>
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<td>Decreased total expenditures by 8% (over four years)</td>
<td><strong>Quality of Life/Patient Experience</strong></td>
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<tr>
<td><strong>Genesys HealthWorks Health Navigator All Patients (Payer-Blind)</strong></td>
<td>Decreased admission rates by 70% (2008), 25% (2009), and 32% (2010)</td>
<td>Increased in HbA1c checks and annual eye exam rates; patients reported increased healthy behaviors (increased fruits/vegetables/exercise, decreased smoking, increased medication adherence)</td>
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<tr>
<td></td>
<td>Decreased ED visits by 58% (2008), 47% (2009), and 47% (2010)</td>
<td><strong>Quality of Care</strong></td>
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</table>

### Evidence Level
- **Evidence Level 1**: Limited evidence from one good quality randomized controlled trial.
- **Evidence Level 2**: Good evidence from at least one well-conducted randomized controlled trial or multiple well-conducted non-randomized studies.
- **Evidence Level 3**: Evidence from at least one well-conducted non-experimental study (e.g., well-conducted cohort or case-control study) or multiple follow-up studies or multiple well-conducted non-experimental studies.
<table>
<thead>
<tr>
<th>Program/Population</th>
<th>Admission/Readmission</th>
<th>Emergency Department Utilization</th>
<th>Cost of Care</th>
<th>Quality of Care</th>
<th>Provider Experience</th>
<th>Quality of Life/Patient Experience</th>
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</thead>
<tbody>
<tr>
<td>Geriatric Resources for Assessment and Care of Elders (GRACE) Medicare/Dual Eligible</td>
<td>Decreased admission rates by 12% (year 1), 44% (year 2), and 40% (year 3 post-intervention)25, 22 and decreased readmission rates by 74% (7-day), 45% (30-day), and 40% (90-day)23, 19 for those at highest risk of hospitalization [Evidence Level 1]</td>
<td>Decreased ED utilization rates by 5% (year 1), 35% (year 2), and 21% (year 3 post-intervention)25, 22, 16 for those at highest risk of hospitalization [Evidence Level 1]</td>
<td>Average total cost of care was $10.7K vs. $10.9K in controls (year 1), $7.5K vs. $9K (year 2), and $6.6K (year 3, post-intervention)30, 25</td>
<td>Mortality rate was 7.0% vs 7.8% in controls (year 2); “dramatic improvements” in ACOVE quality indicators—general health care (immunizations, continuity), and geriatric conditions (falls, depression)15, 12 [Evidence Level 1]</td>
<td>Physicians were much more satisfied with the resources available to treat patients in the GRACE program vs. usual care5, 15 [Evidence Level 1]</td>
<td>SF-36 scores improved in four of eight scales: general health, vitality, social function, and mental health3, 5 [Evidence Level 1]</td>
</tr>
<tr>
<td>Guided Care Medicare</td>
<td>Decreased admission rates by 6% vs. controls; decreased 30-day readmissions by 13% vs. controls26, 18 [Evidence Level 1]</td>
<td>Increased ED visits by 2% vs. controls21 [Evidence Level 1]</td>
<td>Average net savings of $75,000 per Guided Care nurse per year21 [Evidence Level 1]</td>
<td>Mortality was not different in intervention group vs. controls; “aggregate quality of chronic care” was higher vs. controls (at 32 months)21, 21 [Evidence Level 1]</td>
<td>Physician satisfaction higher with patient/family communication and knowledge of their patients’ clinical characteristics (at 1 year)24 [Evidence Level 1]</td>
<td>Increased odds (OR 1.66) of “excellent or very good” access to telephone advice vs. controls18 [Evidence Level 1]</td>
</tr>
<tr>
<td>Health Quality Partners (HQP) Medicare</td>
<td>Decreased admissions among higher-risk subgroups by 25%–39%25; decreased same-hospital 30-day readmissions by 26%22 among higher-risk subgroups [Evidence Level 1]</td>
<td>Decreased ED visits for higher-risk patients by 37%5 in high-risk subgroups [Evidence Level 1]</td>
<td>Decreased net expenditures among higher-risk subgroups by 10%–28%28; decreased skilled nursing facility costs by 64%25 [Evidence Level 1]</td>
<td>Mortality among intervention participants was 9.9% vs. 12.9% in controls (over 4.2 years)—a 25% lower relative risk of death [Evidence Level 1]</td>
<td>67% of physicians, on average, felt that the program increased patients’ overall quality of care; 80% said they would recommend the program to patients and colleagues; “physicians widely agreed that the programs made things easier for the physicians’ office staff and did a good job of monitoring and follow-up9 [Evidence Level 1]</td>
<td>Patient reported improved ability to get answers from physicians, explain medical terms, and explain warning signs; Health Quality Partners received consistently higher ratings from their patients than did the other programs30 [Evidence Level 3]</td>
</tr>
<tr>
<td>King County Care Partners Medicaid</td>
<td>Decreased admission per 1,000 members by 1.8 vs. controls25 [Evidence Level 1]</td>
<td>No difference in ED visits vs. controls25 [Evidence Level 1]</td>
<td>Decreased mean total cost of care by $321 PMPM vs. controls; no differences in total Medicaid medical costs, inpatient costs, ED costs, long-term costs, in-home services costs, and prescription costs21 [Evidence Level 1]</td>
<td>Mortality was 63% lower in the intervention group vs. controls5, 25 [Evidence Level 1]</td>
<td>95% indicated they would recommend program to a friend; 83% indicated that services helped them deal more effectively with their problems25 [Evidence Level 3]</td>
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<td>Program/Population</td>
<td>Utilization/Cost</td>
<td>Quality</td>
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<td><strong>Massachusetts General Hospital Care Management Program Medicare</strong></td>
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<td>Decreased admission rates by 20%; no change in 90-day readmissions*</td>
<td>Decreased mortality for intervention group (16% vs. 20%) (at 36 months)**</td>
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<td>Increased readmission (13%** vs. 17%* [Evidence Level 2])</td>
<td>67% of the PCPs agreed that the program improved their quality of practice; 73% of the PCPs agreed the CM improved the quality of care***</td>
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<td>Decreased ED visit rates by 13%** [Evidence Level 2]</td>
<td>Patients reported improvements in discussion of treatment choices and communication with health providers S**</td>
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<td>86% (Tier 1) and 84% (Tier 2) of patients reported being very satisfied with the program [Evidence Level 3]</td>
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<tr>
<td><strong>New York City Health and Hospitals Chronic Illness Demonstration Project: Hospital to Home Medicaid</strong></td>
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<td>Decreased admission rates by 16% (non-homeless), 47% (homeless and housed), and 11% (homeless, not housed) (year 1) and inpatient days by 26% (non-homeless), 75% (homeless and housed), and 3% (homeless, not housed) (year 1)** [Evidence Level 3]</td>
<td>Decreased total PMPM costs by 6% (non-homeless), 12% (homeless and housed), and increased total PMPM costs by 11% (homeless, not housed) (year 1)** [Evidence Level 3]</td>
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<td>Decreased ED visit rates by 22% (non-homeless), 17% (homeless and housed), and 4% (homeless, not housed) (year 1)** [Evidence Level 3]</td>
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<td><strong>Oklahoma SoonerCare Health Management Program Medicaid</strong></td>
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<td>Decreased inpatient days by 65% (Tier 1) and 56% (Tier 2) vs. MEDai forecast (year 1)** [Evidence Level 2]</td>
<td>Participant completion rate for 17 of the 21 diagnosis-specific measures increased vs. controls; significant for certain asthma, heart failure, CAD, diabetes, and hypertension measures* [Evidence Level 2]</td>
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<td>Decreased ED visit rates per 1,000 patients by 5% (Tier 1) and 18% (Tier 2) vs. MEDai forecast (year 1)** [Evidence Level 2]</td>
<td>87% of practices surveyed reported improved chronic disease care; 68% reported being very satisfied with the program [Evidence Level 3]</td>
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<td>Increased total PMPM costs by 3% (Tier 1) and decreased by 1% (Tier 2) vs. MEDai forecast (year 1)** [Evidence Level 2]</td>
<td>86% (Tier 1) and 84% (Tier 2) of patients reported being very satisfied with the program** [Evidence Level 3]</td>
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<tr>
<td><strong>Sutter Health Care Coordination Program Medicare</strong></td>
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<td>Decreased 30-day readmission rate by 5.7% (year 1), 6% (year 2), and 6% (year 3) vs. control*** [Evidence Level 3]</td>
<td>Decreased HbA1c by 1.5% and decreased LDL by 40mg/dl in patients with diabetes vs. controls** [Evidence Level 2]</td>
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<td>Decreased ED visits per 1,000 patients by 699 visits vs. baseline*** [Evidence Level 3]</td>
<td>Decreased PCP costs by 20%, decreased specialist costs by 48%, decreased acute care costs by 48%, and decreased ED visit costs by 38%*** [Evidence Level 2]</td>
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* = statistically significant.
* Data represent finding from the entire enrolled population at Community Care of the Sandhills, and not specifically the high-risk subset. Other Community Care of North Carolina sites may have had different outcomes.
** Within the Chittenden County Program.
*** Overall.

Key to Abbreviations
ACOVE: Assessing Care of Vulnerable Elders
CAD: coronary artery disease
CHF: congestive heart failure
COPD: chronic obstructive pulmonary disease
ED: emergency department
HbA1c: Hemoglobin A1c
HEDIS: Healthcare Effectiveness Data and Information Set
LDL: Low-density lipoprotein (LDL cholesterol)
## Appendix 3. List of Interviewees

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michelle M. Crook, R.N., B.S.N., C.C.M.</td>
<td>Aetna’s Medicare Advantage Provider Collaboration Program</td>
</tr>
<tr>
<td>Randy Krakauer, M.D.</td>
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<tr>
<td>Cathy Spencer, R.N.</td>
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<tr>
<td>Sandy Festa, L.C.S.W., C.A.D.C.</td>
<td>AtlantiCare Special Care Center</td>
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<tr>
<td>Maudis Parks</td>
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<tr>
<td>Jennifer Puzziferro, R.N., M.S.N.</td>
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<tr>
<td>Katherine Schneider, M.D.</td>
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<tr>
<td>Kelly Craig, M.S.W., L.S.W.</td>
<td>Camden Coalition</td>
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<tr>
<td>Sue Liu, M.P.A.</td>
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<tr>
<td>Jason Turi, R.N., M.P.H.</td>
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<tr>
<td>David Dorr, M.D., M.S.</td>
<td>Care Management Plus</td>
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<tr>
<td>Kerri Frazier</td>
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<tr>
<td>Ann Larsen, R.N., C.D.E.</td>
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<tr>
<td>Kelli Radican</td>
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<tr>
<td>Liza Widmeir, B.S.N.</td>
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<tr>
<td>Laurie Lockert, M.S., L.P.C.</td>
<td>CareOregon Health Resilience Program (working on behalf of Health Share of Oregon)</td>
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<tr>
<td>Rebecca Ramsay, B.S.N., M.P.H.</td>
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<tr>
<td>Amy Vance, M.S.W.</td>
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<tr>
<td>Brenda Sedberry, R.N.</td>
<td>Community Care of North Carolina (Community Care of the Sandhills)</td>
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<tr>
<td>Vivian C. McNinis, R.N.</td>
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<tr>
<td>Tammie K. McClean, R.N., B.S.N.</td>
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<tr>
<td>Brenda Rogers, R.N., M.S.N.</td>
<td>The Everett Clinic</td>
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<tr>
<td>Kristi Stevens</td>
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<tr>
<td>Jennifer Wilson-Norton, R.Ph., M.B.A.</td>
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<tr>
<td>John Brumsted, M.D.</td>
<td>Fletcher Allen Health Care–Vermont Blueprint Community Health Team (CHT)–Burlington</td>
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<tr>
<td>Pam Farnham, R.N.</td>
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<tr>
<td>Kerry Sullivan, M.S.W.</td>
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<tr>
<td>Diana Jackson</td>
<td>Geisinger ProvenHealth Navigator</td>
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<tr>
<td>Diane Littlewood, R.N., B.S.N., C.D.E.</td>
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<tr>
<td>Janet Tomcavage, R.N., M.S.N.</td>
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<tr>
<td>Erin Conklin</td>
<td>Genesys HealthWorks Health Navigator</td>
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<tr>
<td>Lisa Horne, M.S.W.</td>
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<tr>
<td>Trissa Torres, M.D., M.S.P.H.F.A.C.P.M.</td>
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<tr>
<td>Carrie Bone, M.S.N., G.N.P.</td>
<td>Geriatric Resources for Assessment and Care of Elders (GRACE)</td>
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<tr>
<td>Jenny Grover, M.S.W.</td>
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<td>Steven Counsel, M.D.</td>
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<tr>
<td>Lois Cross, R.N., B.S.N., A.C.M.</td>
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<tr>
<td>Kathy Frank, R.N., Ph.D.</td>
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<tr>
<td>Kathleen Grieve, R.N., B.S.N., M.H.A.</td>
<td>Guided Care</td>
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<tr>
<td>Gary Noronha, M.D., F.A.C.P.</td>
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<tr>
<td>Lora Rosenthal, R.N., B.A.</td>
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<tr>
<td>Ken Coburn, M.D., M.P.H.</td>
<td>Health Quality Partners</td>
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<tr>
<td>Maryellen Keller, R.N., B.S.N.</td>
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<tr>
<td>Sherry Marcantonio, M.S.W.</td>
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<tr>
<td>Tia Hallberg, R.N.</td>
<td>King County Care Partners</td>
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<tr>
<td>Daniel Lessler, M.D., M.H.A.</td>
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<tr>
<td>Mary Pat O’Reilly</td>
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<tr>
<td>Eileen Fagan, R.N., B.S.N.</td>
<td>Massachusetts General Hospital Care Management Program</td>
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<tr>
<td>Robin Grossman, R.N.</td>
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<tr>
<td>Joanne Kaufman, R.N., M.S.N.</td>
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<tr>
<td>Eric Weil, M.D.</td>
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<tr>
<td>Rachel Davis, M.P.A.</td>
<td>New York City Health and Hospitals Chronic Illness Demonstration Project: Hospital to Home</td>
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<tr>
<td>Ruth Freeman, M.D.</td>
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<tr>
<td>Ross Wilson, M.D.</td>
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<tr>
<td>Tirzha Buczek, R.N.</td>
<td>Oklahoma Soonercare Health Management Program</td>
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<tr>
<td>Bobbie Jo McKenzie, R.N.</td>
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<tr>
<td>Carolyn Reconnu, R.N., B.S.N.</td>
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<td>Ronda Scruggs</td>
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<tr>
<td>Lois Cross, R.N., B.S.N., A.C.M.</td>
<td>Sutter Care Coordination Program</td>
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<tr>
<td>Michaela Robertson, R.N.</td>
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<tr>
<td>Jan Van Der Mei, R.N., S.M., A.C.M.</td>
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ABOUT THIS STUDY

The aim of our study was to identify key operational attributes and best practices of successful primary care-integrated complex care management (PC-CCM) programs. We posed the following primary research questions:
1) What are the core operational attributes and best practices of successful programs? and 2) How are successful programs customized for specific populations or contexts?

We selected sites for potential inclusion in the study based on review of the peer-reviewed and grey literature and snowball sampling, starting with recommendations from an eight-member expert steering committee and involving study participants. Based on inclusion criteria approved by our study steering committee, we selected 20 total sites for inclusion in the study. The criteria were:

1. Focus on complex populations: PC-CCM programs must select a complex population that they deem to be at increased risk for poor health outcomes or high cost (based on any definition).
2. Aligned with primary care: close integration with existing primary care teams.
3. Comprehensive care management focus: focus on the whole person and multimorbidity, rather than a single disease process.
4. Existing data on performance indicating improved outcomes.
5. Currently in operation.

Each site received at least two email invitations to participate in the study. Once sites agreed to participate, they chose a representative site in their system and identified three key informants for interview (see below).

Study Design

We assessed each program using semistructured key-informant interviews and review of published manuscripts and program materials obtained from each of the sites. We performed at least three one-hour, semistructured interviews per site with the following key informants: 1) an executive leader involved in developing or supporting the PC-CCM program, 2) a program director responsible for managing program operation, and 3) a frontline care manager responsible for direct delivery of care to patients. We performed additional interviews, as necessary, to obtain further clarification and detail. We assessed six study domains through these semistructured interviews:

1. Program context and structure
2. Patient selection
3. CCM team structure
4. Scope of work
5. Hiring and training
6. Use of information technology

Program Outcomes

We obtained reports of outcomes from each site. Although some of these programs were evaluated with rigorous methods, not all of these reports were research studies or formal evaluations. As a result, we applied a simplified framework, based on the U.S. Preventive Task Force Methodology, to classify the level of evidence:

- Level I: Evidence obtained from at least one properly designed randomized controlled trial.
- Level II: Evidence obtained from well-designed, cohort case controlled trials, or controlled trials without randomization.
- Level III: Evidence obtained from multiple time series with or without the intervention or dramatic results in uncontrolled trials.

Twenty sites were selected for final inclusion in the study, and 18 sites completed the semistructured interviews. We reviewed program outcomes and ensured that each program met basic criteria for success, defined as positive findings in at least one quality domain and one cost or utilization domain. One site refused to participate and another site did not respond to multiple requests for interviews.
NOTES


5. Snowball sampling uses existing study subjects to recruit new ones among their peer group.


7. L. Blash, S. Chapman, and C. Dower, The Special Care Center—A Joint Venture to Address Chronic Disease (San Francisco: Center for the Health Professions, 2011).


11. “Primary Care Managers Supported by Information Technology Systems Improve Outcomes, Reduce Costs for Patients with Complex Conditions,” Service Delivery Innovation Profile (Rockville, Md.: Agency for Healthcare Research and Quality).


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J. Van Der Mei, Sutter Care, Powerpoint presentation.
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About the Authors

Clemens S. Hong, M.D., M.P.H., is a practicing primary care general internist and health services researcher at Massachusetts General Hospital (MGH) and director of Research & Development at Prevention and Access to Care and Treatment at Partners in Health. He practices primary care at an MGH-affiliated community health center in Charlestown, Mass., and his research focuses broadly on improving primary care delivery to vulnerable populations, with a specific focus on the integration of community health workers into primary care teams, the care of formerly incarcerated individuals, the identification of complex, high-risk patients in primary care, and primary care–integrated complex care management of high-cost Medicaid patients. Dr. Hong is a graduate of the University of Washington and Tufts University School of Medicine, completing internal medicine training in the San Francisco General Hospital Primary Care Program at the University of California, San Francisco, and a general medicine fellowship at Harvard Medical School.

Allison L. Siegel, M.P.H., is a consultant at Slalom Consulting in Seattle. She was previously a program manager and medical home coach at Massachusetts General Hospital/Stoeckle Center for Primary Care Innovation, where her work focused on implementing population health management practice redesign strategies with clinical teams. Ms. Siegel holds a master’s degree in public health from Tufts University School of Medicine.

Timothy G. Ferris, M.D., M.P.H., is a practicing general internist and pediatrician, medical director of the Massachusetts General Physicians Organization, and vice president of Population Health Management at Partners HealthCare, a network of hospitals and physicians in Boston. He is also a senior scientist in the Mongan Institute for Health Policy and an associate professor of Medicine and Pediatrics at Harvard Medical School. Dr. Ferris has over 90 publications in the areas of health care quality measurement, risk adjustment, population management, and information technology. He has led efforts at Partners HealthCare to improve the care of patients with multiple chronic conditions. He is the principal investigator for an ongoing six-year Medicare demonstration project examining how best to redesign care to improve quality and decrease costs for Medicare beneficiaries. Dr. Ferris holds degrees from Middlebury College, Oxford University, Harvard School of Public Health, and Harvard Medical School.

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