National Governors Association

NGA Paper

Medicaid High-Need, High-Cost Programs: Promising Practices for Evaluation Metrics

Overview

Health system reforms that target the highest users of costly health care services often serve as prototypes for value-based approaches to system transformation. High-need, high-cost Medicaid enrollees typically have multiple chronic conditions that are poorly managed, including mental health and substance abuse challenges, and a host of unmet social needs that result in potentially preventable use of emergency department (ED), inpatient care and other costly services. Successful high-need, high-cost programs focus on reducing the use of costly services that are preventable and not suitable for the intervention needed (for example, for acquiring shelter and food or nonemergent substance use services), increasing access to evidence-based outpatient services and support and reducing the cost of care.

State-led or supported programs often start with Medicaid enrollees, where the top 5 percent of the population account for roughly 50 percent of Medicaid spending, and strategically target the most "impactable" populations—that is, those whose needs are best served through well-coordinated outpatient and social services interventions.[1] Examples include Community Care of North Carolina (CCNC) and Washington state's ER is for Emergencies program.[2,3,4] Both programs have demonstrated significantly reduced cost of care and improved outcomes in a short time. CCNC is a transitional care model with a robust outpatient and social services provider networks and an evidence-based scoring algorithm for determining intensity of services and deployment of resources. ER is for Emergencies is squarely focused on potentially preventable ED use; it employs a Seven Best Practices program and real-time data sharing among providers to redirect care from the ED to the most appropriate setting.[5]

For these and any high-need, high-cost programs, the underlying data strategy is key. Components of this strategy include identifying the impactable population; monitoring, tracking and effectively linking them to care providers; evaluating the impact; and capturing improved outcomes and return on investment (ROI). Rigorous program evaluation is central to developing successful, sustainable programs. By definition, these programs are about improving outcomes, reducing costs and increasing access to evidenced-based-interventions in the community through meaningful care coordination. Thus, most programs begin with core metrics that measure the success of those results.

This document presents core metrics to consider in a robust evaluation of high-need, high-cost programs. It includes a synthesis of commonly used core metrics, important tips from experts and select findings from current research. Descriptions of sample high-need, high-cost programs, including their design, target population, core metrics and evaluation approaches, can be found in the appendix on page 8.

Important Considerations for High-Need, High-Cost Program Metrics

Broad Stakeholder Engagement Helps Legitimize Measures

To build a useful set of core metrics, states should consider closely engaging their stakeholder communities, including providers, patients and families, managed care organizations and academic

experts, throughout the process. A collaborative process with broad stakeholder participation not only helps ensure that states are selecting metrics that providers, health plans and others can use and report on but also that these entities will accept evaluations based on those metrics. In addition, successful states approaches include a process for all parties to provide feedback as part of ongoing program improvement. A key element of this process is cross-walking with other reporting requirements (for example, to other payers, granting entities) to avoid duplication of effort and decrease the reporting burden.

Start with a Few Simple Metrics

This advice is echoed by providers, case managers, administrators, health information technology (IT) specialists and policymakers who have developed high-need, high-cost programs. Many programs measure only a few key metrics, with defined specifications and standardized definitions related to emergency department (ED) use, inpatient admissions and readmissions and total cost of care. The metrics used to measure these programs are interrelated: Measuring ED use alone will not reflect whether the care received was appropriate, inpatient admissions declined or overall cost savings were achieved. A good example is **Washington**'s ER is for Emergencies program, which reports findings in four areas: rate of ED visits, rate of visits that result in scheduled drug prescription (to examine causes of opioid abuse), rate of visits with low-acuity diagnosis and the program's fiscal impact.

Others supplement these metrics with indicators to ensure good continuity of care, such as measuring whether follow-up outpatient visits occurred within a certain time frame. Still others measure patient activation (as a measure of engagement with interventions) or quality of health outcome measures specific to effective management of common chronic diseases.

Metrics should be easily shared and explained, and they should not be unreasonably time-consuming for providers, administrators or project staff to track and interpret. They must provide actionable information that has a high likelihood of effecting change. States must also consider future Medicaid data-collection efforts. For example, states could consider whether the set of metrics they select will fit into broader Medicaid data collection that the state is undertaking currently or planning to undertake and how best to align high-need, high-cost program metrics with those purposes.

Metrics Must Be Valid and Reliable

Valid measures are those metrics that measure what they are intended to measure. Reliable measures are those metrics that have clear specifications and can be measured consistently—that is, they produce the same results with repeated measurements under consistent conditions. For example, if the intention of high-need, high-cost programs is to reduce ED use for a subset of the population, the metric should be narrowly defined to measure ED utilization for that group.

Focus on ROI from the Start

At its core, a program designed for high-need, high-cost populations is about improving the health of individuals with complex care needs *and reducing cost* of care for the individual and the system. It is important, therefore, that these programs prove their cost savings and return on investment (ROI) to policymakers and stakeholders in a reasonable time frame. ROI is expressed as a ratio or percentage measure of the benefit of an investment divided by the cost of that investment. The formula is typically:

$$\frac{\text{(Programmatic Gains – Programmatic Costs)}}{\text{Programmatic Costs}}$$ [6]

Design for Strong Monitoring and Evaluation Plan

Since, at the core, high-need, high-cost programs are about demonstrating results (improved outcomes and reduced costs), monitoring and evaluation must

be integral components of such programs and should be considered early in the program design phase. Two important considerations are frequency of measurement and evaluation design. Many programs use basic evaluation strategies, with a simple pre-intervention/post-intervention comparison for those in the program. Points of evaluation include measurement at baseline (before program initiation) and at follow-up on a biquarterly basis—that is, at 6, 12, 18 and 24 months after program initiation.

Evaluations that include comparison groups provide important insights into program effectiveness and allow for control of *regression to the mean* (a statistical phenomenon in which extreme outlier measurements tend to move closer to average values for the group as a whole in subsequent measurements without any intervention at all). Comparison group designs increases confidence that the measured program impact is a true impact rather than a statistical artifact. From a research perspective, the gold standard evaluation approach is a randomized controlled trial (RTC). However, states typically do not employ an (RCT) approach for program improvement purposes. A useful alternative is a difference-in-differences design in which change over time in the group receiving the intervention is compared to a quasi-control group—that is, a group that generally matched on the characteristics of interest in the intervention group but does not receive the intervention. Finding a credible comparison group may be challenging, but programs typically have capacity for a limited number of people who meet the criteria for the target population, in which case those who do not receive (or are waiting to receive) the intervention may serve as a reasonable comparison group (accounting for any systematic bias in selecting program versus control groups).

Metrics: Basic and Advanced

High-need, high-cost program interventions are multifaceted approaches to improving health. Whether a program saves money is intertwined with improving outcomes, connecting people to better care and empowering them to take control of their health. Many states are in the beginning stages of designing these interventions, however, and with many indicators to choose from are searching for metrics that will prove value and ensure future investment. Although it is important to include patient experience, patient outcomes and health care improvement, states hoping to prove ROI are looking to certain foundational measures. For example, does the intervention decrease inappropriate ED and hospital use? Does it save money in this area?

In recognition of this reality, the discussion of high-need, high-cost metrics is divided into two levels, that reflect the triple aim of health care: reducing per capita costs, improving health and improving experience. Basic high-need, high-cost programs have measures that prove a reduction in cost by reducing unnecessary ED use and hospital readmissions and calculating a positive ROI. More advanced metrics include cost measures but also look at measures of improved health, connections to more appropriate services and better control of chronic conditions. They may also include measures like satisfaction and experience surveys or interviews. These measures can help answer whether high-need, high-cost initiatives improve the health care experience and empower individuals.

Basic Measures: ED and Hospital Use and Cost

Unnecessary or Potentially Preventable ED Use

Most state program use ED data to measure the impact of interventions matched to the target population. Because EDs often serve as an access point for many poorly managed complex care patients, it makes sense to understand patterns of ED utilization before and after an intervention. Programs typically determine ED utilization using through Medicaid claims, encounter or electronic health record (EHR) data or a combination of clinical and administrative data.

Overuse of emergency services is a typical variable used to identify the target population for a high-need, high-cost intervention, and so it follows that measuring the rate of ED visits, both at baseline and at various points in an intervention, is an important measure of effectiveness. It is not uncommon to measure change in utilization per 1,000 members to capture the natural variation in ED use that occurs from year to year. For example, it would be important for a high-need, high-cost program to measure that rate of ED utilization over a year (that is, per 1,000 patients) rather than just absolute reduction in utilization so that the metric accounts for total patient volume fluctuations over time. In addition, states might consider stratifying this measurement by insurance source to understand the program's impact on a specific insurer, such as Medicaid.

It is also important to distinguish between necessary and avoidable or unnecessary (also referred to as potentially preventable or "nonemergent") ED use. To date, clearly distinguishing between avoidable and appropriate ED visits has been challenging, and target populations will vary according to the definition of "avoidable" (for example, defining avoidable as potentially preventable versus nonemergent will yield different selection criteria). Moving forward with clear and consistent definitions of each term is important. For example, some programs measure program members' rate of ED visits with low-acuity diagnoses—that is, those visits in which patients presented with complaints that could have been treated as or more effectively in another care setting, such as urgent care, primary care or social services settings.

Measures for capturing avoidable ED use include:

- Rate of ED visits (per 1,000 program members) stratified by insurance source;
- Rate of ED visits for the high-need, high-cost target population (per 1,000 program members) stratified by medical and psychiatric; and
- Rate of ED visits for low-acuity visits per 1,000 program members.

Potentially preventable Hospitalizations

Similarly, many high-need, high-cost programs include measures of unnecessary or potentially preventable hospital use because hospitals offer the most intensive and costliest levels of care. For this population, a significant portion of hospital care could be avoided through access to and uptake of outpatient interventions that better address current or precursor needs. The main metrics used in these studies are hospital admissions and readmissions as well as the total number of inpatient days. Many programs also look at time between readmissions as an indicator of program effectiveness.

Common metrics for measuring potentially preventable hospitalizations include:

- Rate of 30-day readmission per 1,000 program members;
- All-cause readmission rate for program members (30 days);[7]
- Program members' time to readmission (0–15 days, 30 days, 90 days);
- Inpatient admissions per 1,000 program members; and
- Program members' inpatient days stratified by medical and psychiatric.

States may want to consider the difference between their measure of readmission rates as a percentage of discharge (for example, under the all-cause readmission rate) versus readmission rate per member. A recent study of **North Carolina**'s Medicaid paid claims for 2008 through 2012 showed that the two metrics had a significant impact on the perceived effectiveness of interventions. The study concluded that the 30day readmission rate per member was more useful from a population health management perspective.[8]

It is important to note that some experts indicate that populations identified as ED high utilizers and those identified as hospital inpatient high utilizers tend to be very different populations, with only modest overlap

with respect to illness burden and comorbidities. Both groups may include impactable populations, but the most effective interventions differ. Findings for these outcome measures should be interpreted with this consideration in mind.

Cost

Many high-need, high-cost programs were created in response to rising costs or a budgetary crisis, and so cost is perhaps one of the most important metrics from the state standpoint. Cost data usually come from Medicaid claims data, and metrics generally focus on payments incurred during ED visits or inpatient stays. The metrics generally used are as follows (note that segmenting cost by the modifier variables above—for example, by medical versus psychiatric or insurance type—provides additional actionable information):

- ED payments;
- Inpatient payments;
- Total program cost;
- Total patient cost;
- Total Medicaid cost savings; and
- ROI.

Linkage With Appropriate Primary and Behavioral Health Care

In addition to reducing ED use and controlling costs, high-need, high-cost programs try to channel patients into care that is better matched to their health needs, with a primary care linkage at the core. There are many ways to measure quality or successful linkage with primary and behavioral health (BH) care; the methods often depend on the population that the intervention targets. For example, if the group is characterized by a high rate of prescription drug abuse, a useful metric is the rate of scheduled drug prescriptions. If access to primary care or mental health (MH) services is an obstacle, metrics that measure whether patients are connected with those providers on discharge and attend the appointment within a reasonable time are useful. Metrics may include a combination of the following:

- Rate of visits with scheduled drug prescription per 1,000 members;
- Follow-up visit with primary care provider (PCP) post discharge (within seven days);
- In-home visit by a care manager within three days (often reserved for those most impactable);
- PCP appointment attendance rate per 1,000 members;
- Follow-up after hospitalization for MH or alcohol or other dependence (within 7 days, within 30 days);
- Initiation and engagement of alcohol and other drug dependence treatment; and
- Medication reconciliation.

More Advanced Measures

Utilization and Cost Measures: Other Institutional Care

A substantial subset of Medicaid high-need, high-cost individuals have contact with other institutional settings, such as corrections, nursing homes and state psychiatric facilities, which may limit optimal health outcomes and drive up cost of care. Therefore, some programs also measure utilization and cost in those settings as well as access to community-based interventions.

Examples of common metrics include:

- Rate of stay in a detoxification facility (episode, duration);
- Rate of stay in a state psychiatric facility (episodes of care, duration);
- Rate of incarceration (jail, prison; episodes, duration);
- Rate of nursing home care (episode, duration);
- Total program cost;
- Total patient or inmate cost; and
- Total state or Medicaid cost savings or ROI.

Appropriate Care and Patient Outcomes

Community Care

Similarly, many programs target individuals who are connected with community-based programs to meet their needs for housing, food assistance or income

support. Interventions that attempt to channel patients toward treatment and social support outside hospital-based care and safety net programs often measure the following factors, with linkages on release from jail or prison:

- Individuals enrolled in Medicaid;
- Individuals connected to Supplemental Security Income (SSI);
- Patients connected to housing
- Individuals connected with Temporary Assistance for Needy Families; the Supplemental Nutrition Assistance Program; or Women, Infants, and Children; and
- States may consider investing in making state data related to these factors available for analysis along with and matched to claims data, including data for incarceration, BH services, housing and other social services.

Health Improvement

Healthier, more successful lives for these patients are the ultimate goal for sustainable efforts. When linkages to primary care have been established, quality metrics are incorporated with an eye toward alignment with existing reporting requirements and best-practices interventions. Metrics include health indicators specific to chronic conditions commonly observed in the target population. In addition, most programs are interested in improving patients' engagement with their own health and seek to make patients better consumers of health care services. Researchers have developed several tools that states can consider for high-need, high-cost programs:

- Disease-specific measures (for example, for diabetes: [HbA1C under good control] and cardiovascular disease [percentage of patients who have adequately controlled high blood pressure]);
- Health status measures (for example, Consumer Assessment of Healthcare Providers and Systems; self-reported health status);
- The Patient Activation Measure PAM;
- Activities of daily living (ADL) measures; and
- Quality of life (QOL) and functional status (self-report; physical, mental).

Additional important resources for health outcome metrics include:

- National Committee for Quality Assurance– or National Quality Forum–endorsed measures;
- Institute of Medicine (IOM) psychosocial measures;
- IOM Vital Signs Core Measures Set (addiction death rate, self-reported health); and
- Measures used in the Health Homes and Primary Care Medical Homes models.

Housing Solutions for High-Need, High-Cost Populations with Unstable Housing or Homelessness

Homelessness is a primary determinant of health in a large subset of high-need, high-cost Medicaid enrollees. Many states do or are beginning to incorporate a housing strategy into their broader high-need, high-cost programs. Housing First is an evidence-based and cost-effective approach to addressing homelessness. The model prioritizes stable, permanent housing as a primary strategy for ending homelessness and improving outcomes regardless of service uptake (for example, substance use disorder services). Wraparound services are provided according to a patient-centered, consumer-choice philosophy. A growing body of evidence shows that Housing First helps people get housed quickly, stay housed and experience improved health and QOL.[9] Savings realized because of the reduced use of costly sites of care have been reported in multiple states.[10]

Common metrics include housing retention (duration in months; program type) and the reason for exit from supportive housing (graduation, independent living, transition to a higher level of care, dropping out).[11]

Sandra Wilkniss
Program Director
Health Division
NGA Center for Best Practices
202-624-5322

Chelsea Kelleher
Policy Analyst
Health Division
NGA Center for Best Practices
202-624-5342

September 2016

National Governors Association (NGA) would like to thank The Commonwealth Fund for its generous support of the development of this publication and associated NGA Center for Best Practices (NGA Center) work with states to develop effective high-need, high-cost programs.

NGA would also like to thank United Health Foundation for its generous support of NGA Center's overarching work with states to establish and advance high-need, high-cost programs.

Recommended citation format: S.Wilkniss and C.Kelleher. *Medicaid High-Need, High-Cost Programs: Promising Practices for Evaluation Metrics* (Washington, D.C.: National Governors Association Center for Best Practices, September 7, 2016).

Appendix. Select Program-Specific High-Need, High-Cost Metrics

Table 1. State Examples of Program Metrics

	Washington: ER is for Emergencies	Camden Coalition of Healthcare Providers	Hennepin Coordinated Care Center	California Frequent Users of Health Services Initiative	Community Care of North Carolina (CCNC)
Use					
Emergency Department (ED) visits	✓	✓	✓	✓	✓
Inpatient admissions		✓	✓	✓	✓
Inpatient days				✓	
Time to readmission					✓
Cost					
ED charges				✓	
Inpatient charges				✓	
Per-patient cost			✓	✓	✓
Total program cost savings	✓	✓	✓	✓	
Appropriate Care					
Medical care					
Rate of visits with low-acuity diagnosis	✓	✓			
Rate of visits resulting in scheduled drug prescription	✓				
Patients connected to primary care provider (PCP)			✓	✓	
PCP appointment attendance rate			✓	✓	

Medication compliance rate				✓	
Community care					
Patients placed on Medicaid				✓	
Patients connected to housing				✓	
Patients connected to Social Security Insurance				✓	
Patients connected to mental health services				✓	
Patients connected to substance abuse services					
Patient Improvement					
Patient Activation Measure					
ADL Measures (activities of daily living)					✓
Health condition measures (diabetes, cardiovascular)			✓		
Client Satisfaction					
Client satisfaction surveys					

Table 1. State Examples of Program Metrics *Continued*

	CareOregon	AtlantiCare Special Care Center	Stanford Coordinated Care	NY Hospital at Home Program	Geriatric Resources for Assessment and Care of Elders (GRACE)
Use					
Emergency Department (ED) visits	✓	✓	✓	✓	✓
Inpatient admissions	✓	✓	✓		✓
Inpatient days	✓		✓		
Time to readmission					
Cost					
ED charges					
Inpatient charges					✓
Per-patient cost			✓		✓
Total program cost savings		✓	✓		✓
Appropriate Care					
Medical care					
Rate of visits with low-acuity diagnosis			✓		
Rate of visits resulting in prescription of a scheduled drug					
Patients connected to primary care provider (PCP)	✓				
PCP appointment attendance rate	✓				
Medication compliance rate		✓			
Community care					
Patients placed on Medicaid					

Patients connected to housing					
Patients connected to Social Security Insurance				✓	
Patients connected to mental health services					
Patients connected to substance abuse services					
Patient Improvement					
Patient Activation Measure					
ADL Measures (activities of daily living)					✓
Health condition measures (diabetes, cardiovascular)	✓	✓	✓		✓
Client Satisfaction					
Client satisfaction surveys		✓			

Table 1. State Examples of Program Metrics *Continued*

	Boeing Intensive Outpatient Care Program	Seattle Housing First	Chicago Housing First
Use			
Emergency Department (ED) visits			✓
Inpatient admissions	✓		✓
Inpatient days			✓
Time to readmission			
Cost			
ED charges			✓
Inpatient charges			✓
Per-patient cost	✓	✓	✓
Total program cost savings		✓	✓
Appropriate Care			
Medical care			
Rate of visits with low-acuity diagnosis			
Rate of visits resulting in prescription of a scheduled drug			
Patients connected to Primary Care Providers (PCPs)			
PCP appointment attendance rate			
Medication compliance rate			
Community care			
Patients placed on Medicaid			
Patients connected to housing			
Patients connected to Supplemental Security Income (SSI)			

Patients connected to mental health (MH) services			
Patients connected to substance abuse services			
Patient Improvement			
Patient Activation Measure			
ADL Measures (activities of daily living)			
Health condition measures (diabetes, cardiovascular)	✓	✓	
Client Satisfaction			
Client satisfaction surveys	✓		

Specifications of Select High-Need, High-Cost Programs and Relevant Studies

Table 2. Program Examples–Washington State ER is for Emergencies and Seven Best Practices Program

Organization	Washington State Health Care Authority, with multi-stakeholder workgroup
Population	Medicaid patients with high Emergency Department (ED) utilization; focus on chronic conditions and drug-seeking behavior
Model	• Adoption of the Emergency Department Information Exchange (EDIE) system; • Active dissemination of patient education materials (not just for patients—physicians, chief executive officers, others, received materials as well); • Designation of hospital personnel and ED physicians to receive and appropriately disseminate information about Medicaid patients, including monthly utilization reports for frequent ED users; • Assistance of Medicaid enrollees/beneficiaries in visiting a Primary Care Provider (PCP) within 72 to 96 hours of the ED visit when follow-up is appropriate • Implementation of narcotics guidelines that discouraged narcotics-seeking behavior; • Physician enrollment in the state's prescription monitoring program to collect data on patients who are prescribed controlled substances; and • Designation of hospital staff and ED physicians to review the state's Medicaid utilization management feedback reports and respond appropriately.

Metrics	Claims data from fee-for-service (FFS) and managed care Medicaid enrollees/beneficiaries on: • Rate of ED visits by frequent patients (defined as those with five or more visits annually); • Rate of visits resulting in prescription of a scheduled drug; • Rate of visits with a low-acuity diagnosis; and • Fiscal impact (reduction in Health Care Authority budget).
Evaluation	To analyze changes in these metrics, the state examined claims data from both fee-for-service (FFS) and managed care Medicaid enrollees/beneficiaries' ED utilization before and after the program. They found reductions in the rate of ED visits, rate of visits by frequent users, visits resulting in prescription of a scheduled drug and rate of visits with low-acuity diagnosis. Because of the observational nature of the data and lack of a control group, however, changes cannot be definitively linked to the program. For more information, see *ER is for Emergencies*.[12]

Table 3. Program Example–Camden Coalition of Healthcare Providers

Organization	Camden Coalition of Healthcare Providers
Population	Camden, New Jersey, residents who have had two or more inpatient admissions in the past six months; other criteria include chronic disease–related admissions and multiple prescriptions.
Model	Care management model, with care management teams conducting home visits, reaching out to homeless patients and helping patients access primary care.
Metrics	The Coalition built a longitudinal, all-payer, community-based claims data system. In 2014, Camden implemented a Randomized Control Trial (RCT) to study the program's effectiveness. Primary outcome: • Hospital readmissions (specifically, within 180 days of discharge). Secondary outcomes: • ED visits; and • Readmission characteristics—number of days, procedures, hospital charges, hospital receipts.
Evaluation	Evaluation is forthcoming, but the plan is to compare a large group of high-need, high-cost people divided into treatment and control groups. Evaluation will focus on the effect of being offered the treatment (intent to treat).

Table 4. Program Example–Hennepin Coordinated Care

Organization	Hennepin County Medical Center (HCMC)
Population	Patients who have had three or more hospital admissions in the past year.
Model	Clinic in which high-utilizing, complex patients can receive primary care services.
Metrics	Data gathered include: • Hospital admissions per 1,000 member months; • Emergency Department (ED) visits per 1,000 member months; • Primary care outpatient visits; • Total charges per patient; and • Patient satisfaction.
Evaluation	HCMC has collected observational data that summarize monthly rates of health care use by enrollees since the beginning of the program. Results are preliminary but suggest that ED visits per 1,000 member months decreased by 9.1 percent in addition to reductions in outpatient visits and an increase in outside care for asthma, vascular problems and diabetes. There are limitations, however, because of the small number of enrollees and the observational nature of the data. For more information, see *Hennepin Health: A Safety-Net Accountable Care Organization for the Expanded Medicaid Population*.[13]

Table 5. Program Example–California Frequent Users of Health Services Initiative, Santa Clara County

Organization	Silicon Valley Health Coalition and multiple stakeholders.
Population	Medicaid or uninsured patients who have had 8 or more Emergency Department (ED) visits in 12 months.
Model	ED-based model with outreach and home visits, housing services and attempts to link to primary care in the community clinic system.
Metrics	Cost and utilization measures included: • ED visits per client; • ED payments per client; • Inpatient admissions per client; • Inpatient payments; and

Metrics *continued*	• Inpatient days. • Process and outcome measures included: • Homeless patients connected to housing; • Uninsured patients placed on Medicaid; • Patients assisted in receiving Supplemental Security Income (SSI) benefits; • Patients assigned a Primary Care Provider (PCP); • Patients attending clinic appointments; • Patients connected to mental health (MH) services; and • Patients connected to substance abuse services.
Evaluation	The program was evaluated with a host of other, similar programs in California through qualitative measures (document review, site visits, interviews) and quantitative measures, including outreach and enrollment data, client demographics and characteristics, stability measures, and cost and utilization data. Limitations included lack of consistent data, problems with data and regression to the mean. For more information, see *Frequent User Programs: How Services Are Provided to People Who Frequently Use Emergency Departments in California*.[14]

Table 6. Program Example–Community Care of North Carolina

Organization	CCNC (nonprofit that consists of 14 community networks)
Population	All Medicaid recipients (with some populations excluded) stratified by risk, with higher-risk patients receiving more case management; the majority have chronic illness and may need transitional care.
Model	Primary care/transitional care model, with care managers embedded in hospitals to coordinate discharges; care management teams headed by registered nurses (RNs), who help primary care practices manage complex care patients.
Metrics	Data from the North Carolina Medicaid eligibility and enrollment files and Medicaid claims data: • Time to readmission following discharge; • Inpatient admissions per 1,000 Medicaid members per year; and • Emergency Department (ED) visits per 1,000 per year; • Diabetes measures; • Cardiovascular disease measures; and • Risk-adjusted per-patient per-month costs

Evaluation	Patients were sorted into transitional care cohorts and a group receiving usual care for comparison, with groups stratified by risk. The main outcome of the study was time before readmission. Analysis showed that transitional care patients were less likely to be readmitted than usual care patients, though effects differed by risk strata. For more information, see *Transitional Care Cut Hospital Readmissions for North Carolina Medicaid Patients With Complex Chronic Conditions*.[15]

Other Relevant Programs and Studies

These programs are not specifically geared toward high utilizers, but states and communities have used them to address complex care patients' needs. These metrics and study designs may be useful in designing state high-need, high-cost programs, especially if a state's high-need, high-cost population shares characteristics with these programs' target populations.

Table 7. Program Example–AtlantiCare Special Care Center

Organization	AtlantiCare hospital system
Population	Low-wage immigrant workers, primarily in the Atlantic City, New Jersey, restaurant and casino industries; multiple chronic diseases.
Model	Special care center clinic designed to serve chronically ill patients; medical assistants, licensed practical nurses and others serve as health coaches in a high staff-to-patient ratio where they meet with patients, help set goals, give reminders and lead health classes.
Metrics	Used Electronic Health Record (EHR), surveys and data collected during the study to measure: • Cost savings—patient cost before and after; • Emergency Department (ED) visits; • Hospitalizations; • Length of admission; • Medication compliance rate; • Smoking rates; • Blood cholesterol levels; and • Patient satisfaction.
Evaluation	Simple before-and-after comparison—no control group for comparison. For more information, see *The Special Care Center—A Joint Venture to Address Chronic Disease*.[16]

Table 8. Program Example–Stanford Coordinated Care

Organization	Stanford University
Population	Stanford employees and dependents with multiple chronic conditions.
Model	High-risk clinic combined with primary care connections; patients have care managers who act as go-betweens.
Metrics	Data collected through a dashboard system developed by the university's information technology (IT) department and clinical and business analytics: • Ambulatory admissions; • Emergency Department (ED) visits; • Bed days; • Total cost of care; • Instances of care avoided; and • Multiple clinical measures.
Evaluation	No evaluation undertaken yet.

Table 9. Program Examples–Hospital at Home Program, New York City Health and Hospitals Corporation

Organization	New York City Public Hospitals
Population	Medicaid beneficiaries at high risk of hospital readmission based on diagnoses and the previous three years of service use.
Model	Community-based care management, with social workers and connections to housing; care managers, social workers and housing specialists work to manage care, housing, transportation, medication adherence and other care management.
Metrics	Medicaid encounter and claims data were used to look at ED use and housing statistics.
Evaluation	None conducted yet.

Table 10. Program Example–Geriatric Resources for Assessment and Care of Elders

Organization	Wishard Health Services in Indianapolis, Indiana
Population	Low-income seniors—most on Medicare, many dually eligible, many 200 percent below the Federal Poverty Level.
Model	Patients consult with primary care providers (PCPs) and receive care management from a care manager who consults with a geriatrics interdisciplinary team; hospital-to-home transitional care.
Metrics	Data gathered from the program reported measures such as: • Emergency Department (ED) visits; • Hospitalization rates; • Physician satisfaction with care; • Quality of care (flu shots, care coordination); • Geriatrics-specific care (falls, depression); • QoL measures (RAND Health 36-Item Short Form Survey; survey of ADLs); • Chronic and preventive care costs; • Acute care costs; and • Total costs.
Evaluation	Randomized control trial conducted over a two-year period showed that ED visits were stable in the first year but decreased by the second year. Cost savings began in year three. For more information, see: • *Geriatric Care Management for Low-Income Seniors: A Randomized Controlled Trial*;[17] • *Geriatric Resources for Assessment and Care of Elders (GRACE): A New Model of Primary Care for Low-Income Seniors*;[18] and • *The 'GRACE' Model: In-Home Assessments Lead to Better Care for Dual Eligibles*.[19]

Table 11. Program Example–Boeing Intensive Outpatient Care Program

Organization	The Boeing Company, with local health plans and medical centers serving Boeing employees in the Puget Sound region of Washington state.
Population	Highest-cost quintile of Boeing employees and their adult dependents; average patient has four chronic conditions.
Model	High-risk clinic mixed with primary care; all patients received a registered nurse (RN) care manager; larger care management team helps develop a care plan; patients risk-stratified, with intensity of care based on risk.

Metrics	The program collected data on: • Per-patient spending; • Hospital admissions; • Physical functioning (survey scale); • Mental functioning (survey scale); • Patient satisfaction; and • Work days missed.
Evaluation	Patients were matched with Boeing employees in the high-cost quintile who did not participate. Findings included a 20 percent decrease in cost from the baseline, a 28 percent decrease in admissions, improvements in mental functioning and greater satisfaction with care. For more information, see *Are Higher-Value Care Models Replicable?*[20]

Table 12: Program Example–Seattle Housing First (1811 Eastlake)

Organization	Seattle Downtown Emergency Service Center
Population	Homeless individuals with chronic alcohol abuse.
Model	"Wet housing," or Housing First, addresses health and housing problems before tackling substance abuse problems. Case management is at the site.
Metrics	Data were analyzed for: • Cost per person; • Cost of the program; • Cost savings; • Reduction in Medicaid spending; and • Number of drinks per day.
Evaluation	Analysis compared costs for individuals enrolled in the program to those on the waitlist. Costs per person dropped significantly during the program in both the control and treatment groups, but savings were more significant for the treatment group. Costs continued to fall as individuals spent more time in housing. Housed individuals also saw a 30 percent reduction in drinks per day. For more information, see *Health Care and Public Service Use and Costs Before and After Provision of Housing for Chronically Homeless Persons With Severe Alcohol Problems*.[21]

Table 13: Program Example–Chicago Housing First

Organization	John H. Stoger, Jr. Hospital of Cook County, with partnered respite cites and housing agencies.
Population	Homeless adults with chronic illness.
Model	Transitional housing given after hospital discharge, followed by placement in long-term housing; case management offered on site at primary study sites, transitional housing and stable housing sites.
Metrics	Data were collected from multiple sources: • Electronic Health Records (EHRs) for hospital, emergency department (ED) and ambulatory medical and mental health (MH) visits; • Institutional and regional databases for days in respite centers, jails or prisons; and • Interviews for days in nursing homes, shelters, substance abuse treatment centers and case manager visits; total costs estimated using unit costs for each service.
Evaluation	A randomized controlled trial (RCT) at a large teaching hospital compared the usual care group with the intervention group. The usual care group had unadjusted annualized mean reductions of 0.5 hospitalizations, 2.7 fewer hospital days and 1.2 fewer ED visits. The intervention group had a relative reduction of 29 percent in hospitalizations, 29 percent in in-hospital days and 24 percent in ED visits. Compared to usual care, the intervention group generated an average annual cost savings of $6,307 per person. For more information, see: • *Effect of a Housing and Case Management Program on Emergency Department Visits and Hospitalizations Among Chronically Ill Homeless Adults: A Randomized Trial*;[22] and • *Comparative Cost Analysis of Housing and Case Management Program for Chronically Ill Homeless Adults Compared to Usual Care*.[23]

Endnotes

[1] U.S. Government Accountability Office, *Medicaid: A Small Share of Enrollees Consistently Account for a Large Share of Expenditures* (Washington, DC: Government Accountability Office, 2015), http://www.gao.gov/assets/680/670112.pdf (accessed May 15, 2016).

[2] C.T. Jackson and C.A. DuBard, "Identifying Highest Yield Transitional Care Opportunities," *CCNC Data Brief* No. 5 (Raleigh, NC: Community Care of North Carolina, 2015).

[3] C.T. Jackson and C.A. DuBard, "Identifying Highest Yield Transitional Care Opportunities," *CCNC Data Brief* No. 5 (Raleigh, NC: Community Care of North Carolina, 2015).

[4] Washington State Health Care Authority, *Emergency Department Utilization: Update on Assumed Savings From Best Practice Implementation* (Seattle: Washington State Health Care Authority, 2014), http://www.wsha.org/quality-safety/projects/er-is-for-emergencies (accessed March 11, 2016).

[5] Washington State Medical Association, "Know Your Choices Ask Your Doctor: ER is for Emergencies," https://wsma.org/wcm/For_Patients/ER_is_for_Emergencies/For_Physicians/wcm/Patients/Know_Your_Choices/ER_is_for_Emergencies_for_Physicians.aspx?hkey=d6caf97e-ee2d-43bd-bda2-f26ea4fae4b5#bestpractices (accessed May 15, 2016).

[6] There are multiple formulas for calculating ROI, depending on the program's inputs and outcomes. One calculation suggested by a health IT expert who designs software for such programs is provided below. Please note that ED visits may represent a small portion of the cost relative to inpatient and other, potentially preventable costs (for example, imaging, multiple physician consultations, redundant diagnostic evaluations), and those costs could be incorporated into an ROI calculation: (Net high-needs, high-cost visit reduction × Direct ED cost)/(Total program cost).

[7] Center for Medicaid and CHIP Services, *Core Set of Health Care Quality Measures for Medicaid Health Home Programs: Technical Specifications and Resource Manual for Federal Fiscal Year 2013 Reporting* (Washington, DC: Centers for Medicare & Medicaid Services, 2014), http://www.medicaid.gov/state-resource-center/medicaid-state-technical-assistance/health-homes-technical-assistance/downloads/health-home-core-set-manual.pdf (accessed August 22, 2016).

[8] A. DuBard, J.C. Vann, and C. Jackson, "Conflicting Readmission Rate Trends in a High-Risk Population: Implications for Performance Measurement," *Population Health Management* 18 no. 5 (2015): 351–357.

[9] S. Tsemberis and R. Eisenberg, "Pathways to Housing: Supported Housing for Street-Dwelling Homeless Individuals With Psychiatric Disabilities," *Psychiatric Services* 50 no. 4 (2000): 487–493; and L. Gulcur et al., "Housing, Hospitalization, and Cost Outcomes for Homeless Individuals With Psychiatric Disabilities Participating in Continuum of Care and Housing First Programs," *Journal of Community & Applied Social Psychology* 13 no. 2 (2003): 171–186.

[10] S. Tsemberis and A. Stefancic, "Housing First for Long-Term Shelter Dwellers With Psychiatric Disabilities in a Suburban County: A Four-Year Study of Housing Access and Retention," *The Journal of Primary Prevention* 28 no. 3–4 (2007): 265–279; and Jennifer Perlman and John Parvensky, *Denver Housing First Collaborative: Cost Benefit Analysis and Program Outcomes Report* (Denver: Colorado Coalition for the Homeless, 2006), https://shnny.org/uploads/Supportive_Housing_in_Denver.pdf (accessed August 22, 2016).

[11] Note: Isolated evaluations of housing programs often include similar utilization, cost and health outcome metrics as those used in high-need, high-cost program evaluations. Thus, if a state is incorporating a housing strategy into a more comprehensive high-need, high-cost program, measuring the interaction between housing and other program elements is important for understanding housing's unique contribution.

[12] WSHA.org, "ER is for Emergencies," Washington State Hospital Association, http://www.wsha.org/quality-safety/projects/er-is-for-emergencies/ (accessed August 15, 2016).

[13] Shana F. Sandberg et al, "Hennepin Health: A Safety-Net Accountable Care Organization For The Expanded Medicaid Population," Health Affairs 33(11) (November 2014): 1975-1984, http://content.healthaffairs.org/content/33/11/1975.full?ijkey=klt839xeNmixM&keytype=ref&siteid=healthaff (accessed August 15, 2016).

[14] The Corporation for Supportive Housing, "Frequent User Programs: How Services Are Provided to People Who Frequently Use Emergency Departments in California," (New York: Corporation for Supportive Housing, August 2010), http://www.csh.org/wp-content/uploads/2011/12/Report_FrequentUserPrograms.pdf (accessed August 15, 2016).

[15] Carlos T. Jackson et al, "Transitional Care Cut Hospital Readmissions for North Carolina Medicaid Patients With Complex Chronic Conditions," Health Affairs 32(8) (August 2013): 1407-1415, http://content.healthaffairs.org/content/32/8/1407.abstract (accessed August 15, 2016).

[16] Lisel Blash, Susan Chapman, and Catherine Dower, The Special Care Center – A Joint Venture to Address Chronic Disease (San Francisco: Center for the Health Professions, 2011), http://www.iorahealth.com/wp-content/uploads/2014/07/UCSF_The_Special_Care_Center_A_Joint_Venture_to_Address_Chronic_Disease.pdf (accessed August 15, 2016).

[17] Steven R. Counsell et al, "Geriatric Care Management for Low-Income Seniors," Journal of the American Medical Association 298(22) (December, 2007): 2623-2633, http://jama.jamanetwork.com/article.aspx?articleid=209717 (accessed August 15, 2016).

[18] Steven R. Counsell et al, "Geriatric Resources for Assessment and Care of Elders (GRACE): A New Model of Primary Care for Low-Income Seniors," Journal of American Geriatrics Society 54(7) (June 2006): 1136-1141, http://onlinelibrary.wiley.com/doi/10.1111/j.1532-5415.2006.00791.x/abstract?deniedAccessCustomisedMessage=&userIsAuthenticated=false (accessed August 15, 2016).

[19] Christina Bielaszka-DuVernay, "The 'GRACE' Mode: In-Home Assessments Lead to Better Care For Dual Eligibles," Health Affairs 30(3) (March 2011): 431-434, http://content.healthaffairs.org/content/30/3/431.full (accessed August 15, 2016).

[20] Arnold Milstein and Pranav P. Kothari, "Are Higher-Value Care Models Replicable?" Health Affairs Blog, entry posted October 20, 2009, http://healthaffairs.org/blog/2009/10/20/are-higher-value-care-models-replicable/ (accessed August 15, 2016).

[21] Mary E. Larimer et al, "Health Care and Public Service Use and Costs Before and After Provision of Housing for Chronically Homeless Persons With Severe Alcohol Problems," Journal of the American Medical Association 301(13) (April 2009): 1349-1357, http://jama.jamanetwork.com/article.aspx?articleid=183666 (accessed on August 15, 2016).

[22] LS Sadowski et al, "Effect of a Housing and Case Management Program on Emergency Department Visits and Hospitalizations Among Chronically Ill Homeless Adults: A Randomized Trial," Journal of the American Medical Association 301(17) (May 2009):1771-1778, http://www.ncbi.nlm.nih.gov/pubmed/19417194?dopt=Abstract (accessed August 15, 2016).

[23] Anirban Basu et al, "Comparative Cost Analysis of Housing and Case Management Program for Chronically Ill Homeless Adults Compared to Usual Care," Health Services Research 47(1 Part 2) (February 2012): 523-543, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3393008/ (accessed August 15, 2016).