SUPPORTING A CULTURE OF HEALTH FOR HIGH-NEED, HIGH-COST POPULATIONS:

Opportunities to Improve Models of Care for People with Complex Needs: Literature Review

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INTRODUCTION

Individuals with high rates of avoidable hospital admissions or emergency department (ED) visits—sometimes called “high-need, high-cost patients” or “super-utilizers”—tend to have multiple medical, behavioral health and social needs, resulting in high costs and, typically, poor outcomes. These individuals often have an array of complex social challenges—potentially including unemployment, homelessness, substance use disorders, and food insecurity—which must be addressed in order to sustainably improve health outcomes and reduce their health care utilization.

With support from the Robert Wood Johnson Foundation, and in line with the Foundation’s vision for building a Culture of Health for all Americans,[1] the Center for Health Care Strategies (CHCS) conducted a literature review to explore the evidence base regarding effective approaches to care for high-need, high-cost populations. CHCS organized its analysis of relevant materials around five key domains:

- Care Model Enhancements
- Financing & Accountability
- Data & Analytics
- Workforce Development
- Policy & Advocacy

The literature review was designed to identify: (1) effective strategies for improving outcomes and lowering costs for high-need, high-cost populations; and (2) critical gaps that must be addressed to better integrate health and social services and produce desired outcomes for this population. This synthesis highlights key findings and gaps in information gleaned from the literature review. See also a companion report that synthesizes key findings from a related environmental scan and small group consultation.*

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*The companion report, *Opportunities to Improve Models of Care for High-Need, High-Cost Populations,* includes a sixth domain, *governance and operations,* that was identified subsequent to the completion of the literature review.

METHODS

LITERATURE SEARCH

The review included studies conducted in the United States and published since 2005, as identified through MEDLINE (using the PubMed interface), Cochrane Library, National Guideline Clearinghouse, and Google Scholar. We included people with serious mental illness (SMI), since this population often has a high rate of physical comorbidities, as well as high associated health care costs.[2] The literature search also used Medical Subject Headings (MeSH) terms by the National Library of Medicine, whenever a term was available.[3] For example, searches included keywords such as *comorbidity, severe mental illness*, *delivery of health care*, *integrated, cost saving*s, and/or *patient readmission.* In addition to the primary search term, the literature review used secondary search terms to filter findings that corresponded with the five domains and keyword terms such as: *integrated* + *care* + *management, financial* + *alignment* + *accountability*, *data* + *analytics, workforce* + *strategies*, and *policy* + *advocacy*.

Two reviewers scanned the abstracts of articles identified from the database searches to assess relevance to the search criteria. Discrepancies in inclusion were resolved by discussion and re-review with additional project team members. The search also included non-peer reviewed studies and relevant tools and resources. To search for these secondary sources or "gray material" on the key topics, CHCS relied on the same search terms employed in the peer reviewed material, including the following sources: California HealthCare Foundation; Center for Health Care Strategies; The Commonwealth Fund; *Health Affairs* (for non-peer-reviewed resources in addition to those found through the search described above); Institute for Healthcare Improvement; National Governor's Association; Robert Wood Johnson Foundation; and other reputable health care organizations.

LIMITATIONS

There is an expansive body of literature that arguably could have bearing on efforts to improve care and outcomes for high-need, high-cost populations. For example, strategies to improve outcomes for individuals with SMI are generally relevant to "super-utilizer" programs given the prevalence of SMI among this population. However, a synthesis of the literature around behavioral health treatment modalities for SMI would be a project unto itself. Thus, CHCS limited its review to studies with greatest direct relevance to the goals of this analysis—namely, to inform further development and enhancement of complex care management programs serving high-need, high-cost populations. In the case of the SMI literature, this resulted in the exclusion of studies on modalities specific to treating psychiatric illness (such as cognitive behavioral therapy).

Across a few domains, the literature review was constrained by the relative nascence of this field of study. For example, many programs for super-utilizers are in the early stages of development and implementation, and have not yet tackled issues related to financing and accountability. Many programs lack robust data collection and analysis mechanisms, making evidence on best practices difficult to discern. Further, few randomized trials on interventions for high-need, high-cost populations exist, highlighting the need for more robust evaluations of these programs.

SUMMARY OF FINDINGS

CARE MODEL ENHANCEMENTS

Because traditional models of care delivery are typically not effective for individuals with complex medical, behavioral health, and social needs, enhancements to these models attempt to improve outcomes and decrease costs by increasing connectivity between providers, tailoring clinical interventions, coordinating care, integrating disparate systems, and addressing the social determinants of health.

As reflected in the literature, effective models of care for super-utilizers rely on an **intensive care management** approach. For example, a randomized controlled trial of an intensive care management program that coordinated medical and mental health services for high-risk Medicaid beneficiaries in Washington State showed increased access to care, lower inpatient medical costs, fewer unplanned inpatient admissions, lower likelihood of experiencing homelessness, and fewer deaths.[4] A more recent analysis of a separate Washington State care management program serving high-risk Medicaid beneficiaries with disabilities revealed significant decreases in inpatient hospital costs for individuals in the program, as well as non-significant decreases in total medical costs.[5] Reduced ED use and hospital charges were also observed in various models of intensive care management for frequent ED users.[6–7]

Core components of intensive care management programs that demonstrate positive outcomes for high-need, high-cost patients include: extensive outreach and engagement; initial assessment; goal-setting and care plan development; health education/coaching; frequent care team contact; follow-up with patients after discharge; and linkages to housing, substance use disorder services, and other community resources.[8–11] Several programs incorporate home visiting and round-the clock telephonic access to care managers.[12–13] Programs that provide face-to-face care management directly with patients have more evidence of effectiveness than those that employ telephonic care management services.[14–17] Medication management, pain management, and support for care transitions (e.g., from hospital to community settings) are also highlighted as integral aspects of achieving positive outcomes in care management programs for high-need, high-cost patients.[18–21] Another resource defined super-utilizer programs as "data-driven, high-intensity, community-based, patient-centered models using interdisciplinary teams to deliver high-quality, comprehensive care, while encouraging self-advocacy and personal accountability."[22]

Effective targeting of services to high-risk patients is critical. For example, the Medicare Chronic Care Demonstrations revealed a higher likelihood of reducing hospitalizations among beneficiaries at high risk of hospitalizations than among a general population with chronic conditions.[23]

Care team composition varies among effective programs, but often includes a primary care provider, nurse, social worker, behavioral health specialist, and community outreach staff (e.g., community health workers).[24–26] Care managers may be located on site at a provider practice or hospital; at a centrally located care management agency, providing care management to multiple practices; or at a clinic where an "intensivist"—a physician specializing in the treatment of patients in intensive care—is assigned a high-risk patient panel.[27]

An abundance of research demonstrates the importance of **physical and behavioral health integration** in providing comprehensive health care.[28] Coordination of physical and behavioral health services—through information exchange, joint care planning, or integration into primary care—is often cited as a key aspect of complex care management, especially for individuals with serious mental illness.[29–32] Pilot programs in Pennsylvania that integrated physical and behavioral health services and provided care management for high-need, high-cost Medicaid beneficiaries resulted in lower mental health-related hospitalizations, lower all-cause readmission rates, and fewer ED visits.[33] However, not all approaches to integration are equally effective for high-risk individuals. For example, fully integrated physical and behavioral health care, coupled with care management for individuals with SMI and substance use disorder, has been shown to improve physical and mental health symptoms, as well as overall quality of life.[34] However, simply co-locating primary care providers in substance use disorder treatment facilities without providing care coordination services does not necessarily improve health outcomes for these individuals.[35]

Clinical interventions that incorporate **trauma-informed approaches to care** for high-need, high-cost patients may improve patient engagement and enhance quality and cost outcomes for these populations.[36] Qualitative research with complex patients who have high levels of ED and hospital use highlight a number of psychosocial factors and life experiences that impact their care needs, including: (1) early-life instability and traumas; (2) a history of difficult interactions with health care providers during adulthood; and (3) the importance of positive and "caring" relationships with primary health care providers and the outreach team.[37]

Patient activation—or having the knowledge, skills, and confidence to manage one's health—is recognized as an important factor in the effectiveness of interventions for individuals with complex needs, and also as a potential benefit of these interventions. For instance, the use of peer support providers for individuals with mental illness has shown evidence of increased patient activation.[38–39] Higher patient activation is linked to better health outcomes in the short- and long-term.[40–41]

Acknowledging the critical role of **social determinants of health,** some intensive care management programs for high-utilizing populations use nontraditional health care workers (e.g., community health workers, peers, etc.) to connect individuals to needed social services and supports.[42] As recognition of the impact of social factors on health outcomes continues to grow, **efforts to address housing instability,** in particular, have gained traction as a method for improving outcomes and reducing costs for high-need individuals.[43–44] Housing First interventions—in which high-utilizing patients are provided with stable housing without a medical care component[45]—have been linked to reduced ED visits; fewer hospital admissions; fewer hospital and nursing home days; reduced inpatient costs; and reduced Medicaid expenditures.[46–49] States and communities across the country are increasingly implementing housing interventions for high-risk populations, as these programs prove less costly and more effective than managing homelessness and health problems on the street or in a shelter.[50–53]

Opportunities for Further Exploration

The evidence around effective care models for high-need, high-cost patients is still emerging, with relatively few high-quality studies revealing significant impacts on costs and utilization. Whereas efforts over the last decade have clarified some core program elements as described above, key gaps in understanding remain. For example, given the variation in approach across published studies, there is limited ability to assess the replicability or generalizability of specific findings. Similarly, the **lack of rigorously tested high-quality models** likely creates a significant amount of undocumented variation in approach across participating providers or care team members even within a given study. Future studies should seek to standardize models of care—including clearly defined interventions, frequencies and modes of contact, and follow-up periods—and test their effectiveness across multiple sites.

Outside of a general finding that programs are most effective when targeted to high-risk patients, the literature is not yet convincing on the **most effective way to identify or calculate high risk**. For example, some successful programs rely on predictive modeling, while others specifically target individuals with high rates of recent ED visits or inpatient admissions.[54–55] This highlights the need for greater understanding about how to best target care coordination interventions to individuals for maximum impact.

Effective engagement strategies are another opportunity for future exploration, particularly given the low engagement rates observed across published studies.[56–57] As the transient and vulnerable nature of this population presents challenges for engagement and follow-up, additional qualitative and quantitative studies should be designed to understand why some individuals do not engage in care management when offered as well as strategies for promoting higher engagement rates.[58–59]

Finally, further research to distill the **discrete impact of housing interventions** may be needed. In one instance, high-utilizing patients were provided with ongoing case management in addition to housing support, and researchers were unable to distinguish the impact of the housing support from that of the care management services provided.[60]

FINANCING AND ACCOUNTABILITY

Given the evidence indicating that integration of medical and behavioral health care—and more recently, social services—may improve care and cost outcomes for certain high-need populations, a number of states and communities are testing financial alignment and accountability models that support this integration. The literature revealed a number of promising approaches to the alignment of financial incentives and outcomes that are emerging across the U.S.—particularly in the form of pooled or braided health and social service funding; global and bundled payments; and shared-risk models like Accountable Care Organizations (ACOs).

States are increasingly exploring **administrative, purchasing, and regulatory strategies to better integrate physical and behavioral health care** for high-need, high-cost Medicaid populations.[61] Some states are: (1) consolidating the agencies responsible for overseeing physical and mental health and substance use disorder services; (2) combining responsibility for behavioral health purchasing, contracting, and rate-setting in the Medicaid agency and maintaining licensing and clinical policy authority in the behavioral health agency; or (3) establishing informal collaborations to rationalize strategies across agencies.[62] Purchasing strategies used by states include policies that create linkages across providers and systems (especially in managed care "carve-out" environments) and implementation of fully integrated managed care approaches (e.g., for individuals with SMI).[63] State Medicaid contracts with managed care organizations are one mechanism for aligning incentives across physical and behavioral health systems.[64]

Though models for **integrating health and social services** are still in the fledgling stages, small-scale efforts have shown promise in improving care and cost outcomes, and states are exploring financing options to build on this success.[65–67] Medicaid ACOs across the country are taking preliminary steps to provide non-clinical supports to high-need, high-cost patients, leveraging financial incentives for providers to use social services to maximize the impact of care interventions.[68] Programs in Colorado, Minnesota, New York, Washington, Vermont, and other states are at varying levels of laying the groundwork for social service integration into their Medicaid ACOs.[69] Community-based ACOs—or “accountable health communities”—represent another innovative model, serving a coordinating function and taking accountability for providing and paying for an array of services outside of traditional medical care payments.[70] Shared savings or capitated payment structures may encourage closer collaboration between the health care and social service systems. Current state approaches include, at one end of the continuum, grants to support provider capacity building, and at the other, integrated payment models connecting providers and social services.[71] Future studies are needed to evaluate whether these financing approaches contribute to the end goals of better health and lower costs.

Hennepin Health, an ACO in Minnesota, has developed a model that integrates physical, behavioral health, and social services (e.g., housing) for high-need, high-cost Medicaid beneficiaries using aligned financial incentives.[72] It operates under a braided financing strategy, receiving a fixed per member per month (PMPM) payment for the total cost of Medicaid health services (excluding long-term care) and using grants from the county to cover the cost of some program staff.[73] In the model, social services are paid for with human service funds from pre-existing state and county sources, supplemented by the health plan’s PMPM payments.[74] Hennepin Health’s preliminary results have shown a shift in care from the ED and hospital to outpatient settings, and the percentage of patients receiving optimal diabetes, vascular, and asthma care has increased. Hennepin Health has also achieved a high patient satisfaction rating, with 87 percent of members reporting that they are satisfied with their care.[75]

A number of states including Ohio and Michigan have implemented the **Pathways Community HUB Model,** which coordinates clinical and social services at the community level to reduce duplication of services and create greater efficiency. The model has been shown to reduce costs and improve outcomes in a high-risk pregnancy population.[76]

Opportunities for Further Exploration

While promising approaches to financial alignment and accountability are emerging across the country, there is a need for increased examination of their effectiveness in supporting programs for high-need, high-cost populations. As many of these programs are in the early stages of development and implementation, they do not yet have sustainable financing mechanisms, and so it is difficult to understand **what components of funding and payment structures are most feasible and effective.** Additionally, the U.S. has been cited as lacking in robust population health outcomes, which may be partially attributed to a lack of comprehensive investment strategies to address non-clinical interventions.[77–78]

There are **varying levels of capacity** among states, communities and providers to align physical, behavioral health, and social services when dealing with a diverse set of systems and funders that work primarily in isolation.[79–80] A complicating factor in developing comprehensive payment models is the limited regulatory authority among state Medicaid agencies to pay for non-clinical services, especially in fee-for-service (FFS) arrangements.[81] Despite increased flexibilities to reimburse for non-clinical services under a value-based or PMPM reimbursement system, these services must often meet “medical necessity” criteria under the state definition. In addition, alignment efforts must often show the capacity to yield a return on investment to attract payer interest. This can create challenges as states look to pursue more integrated care models that align multiple funding sources across payers and finance alternative “non-clinical” services.

A previously published systematic review of interagency collaboration between local health and local government agencies failed to produce any evidence that these partnerships, compared to standard care, led to health improvements.[82] This highlights an opportunity to further explore **how models that work across public systems**—such as Hennepin Health—**can be most effective** in serving high-need, high-cost populations.

DATA AND ANALYTICS

High-quality data and analytics are highlighted in the literature as a critical component of effective programs for high-need, high-cost populations.[83–88] Data are used to identify high-need, high-cost patients for specific interventions and to predict which individuals could be prevented from becoming high-need, high-cost users.[89–92] The literature also highlighted current efforts to use data to inform clinical and care management approaches and identify ways to establish data linkages across providers in the health and social service systems.

A number of articles and resources highlight the value of using predictive modeling and risk stratification to **identify patients at-risk for high ED use and target interventions** appropriately.[93–98] One study found that ‘no-show propensity’ is an independent predictor of poor primary care outcomes, and thus may help health care systems identify patients at-risk for high utilization.[99] Another found that recent criminal justice involvement was associated with higher hospital and ED utilization among individuals with substance use disorder, with psychological disorders, or without insurance.[100] Older patients, Medicaid recipients, individuals living further away from the point of care, and those with diabetes or depression were more likely to be high-utilizers, according to a retrospective and longitudinal analysis of medical records from an urban community health center.[101] In yet another analysis, individuals with substance use disorder who had high-frequency ED, ambulatory, and inpatient medical care use were more likely to be female, African American, homeless, or have a history of substance abuse treatment or ambulatory care visits.[102] An algorithm developed at New York University to classify ED use into various categories—ranging from non-emergent to unavoidable emergent—was used to analyze ED use in Rhode Island. It revealed that over 20 percent of ED visits between 2008 and 2012 were non-emergent, and that non-emergent ED users were more likely to be: between 20-39 years of age, Hispanic, non-Hispanic black, and female.[103–104]

In addition to predicting risk, another aspect of patient identification highlighted in the literature is **predicting care sensitivity**, or the likelihood that an individual will respond to a particular care management intervention.[105] This may involve excluding patients whose needs are unlikely to be addressed by available resources; identifying patients facing certain barriers or care gaps; identifying “windows of opportunity,” such as care transitions; or identifying patients who have previously experienced difficulty with care coordination.[106] As an example, care teams may exclude patients undergoing chemotherapy, dialysis or radiation, because they feel that the care management services may be unlikely to yield positive outcomes when compared to the specialty-based services already in place.[107]

Much of the literature sought to **identify characteristics and develop a profile of high-need, high-cost populations**. In 2009, five percent of Medicaid beneficiaries accounted for 54 percent of costs, and those with disabilities accounted for 30 percent of Medicaid costs.[108] In one analysis, mental health and other behavioral health conditions were the top diagnoses linked to hospital stays among super-utilizers, followed by alcohol-related disorders.[109] Among high-expenditure Medicaid-only enrollees with both substance abuse and a mental health condition in fiscal year 2011, nearly half had no physical health conditions[110] In another analysis of inpatient high-utilizers, behavioral health conditions were disproportionate on their billing records compared to inpatients who were not high utilizers of inpatient services (74.9% v. 32.3%).[111] An additional study revealed heart failure, septicemia, and mental health disorders as the top three reasons for hospital admission among super-utilizers.[112] A number of analyses of high-cost Medicaid beneficiaries revealed patterns of multimorbidity related to higher utilization and expenditures.[113–116] Within the most expensive one percent of beneficiaries in Medicaid acute care spending, nearly 83 percent had three or more chronic conditions.[117] Mental illness is nearly universal among Medicaid's highest-cost, most frequently hospitalized beneficiaries, and the presence of mental illness or substance use disorder is associated with much higher per capita costs and hospitalization rates.[118]

An analysis of Pennsylvania's super-utilizers—patients with five or more admissions to a general acute care hospital in fiscal year 2014—revealed that this population accounted for 10 percent of Medicare admissions, 18 percent of Medicaid admissions, 20 percent of Medicare-Medicaid admissions, and seven percent of commercial payer hospital admissions. These statewide results highlight the importance and collective responsibility for addressing the needs of this population across payers.[119]

Opportunities for Further Exploration

Despite numerous efforts across the country **to precisely predict who is likely to become a high-utilizer**, gaps remain in these methods—many of which rely heavily on past claims data to identify high-risk patients.[120] In fact, many risk prediction models only account for a quarter to a third of the factors that lead to individuals' future expenditure, and typically do not perform well for high-need, high-cost patients.[121]

Integration of data—particularly across health and social services systems—remains a challenge. In order to gain an accurate understanding of which patients to target for which interventions, and to comprehensively address their needs, it is important to see the full picture of health and social service utilization. Some states and localities have started testing how to achieve cross-system data integration, but these efforts are rare and in the infancy stages of development.

While the importance of data to identify and target interventions is not disputed, less clear is **how data can be used to measure quality** among high-need, high-cost patient populations with multiple medical, behavioral health, and social challenges.

Further, there is a **paucity of rigorous evaluation** (e.g., randomized controlled trials, longitudinal analyses) among programs that target super-utilizers, which makes replication of effective programs problematic and limits the policy argument for doing so. Several articles emphasized that it takes significant time to demonstrate the impact of super-utilizer programs, as these individuals are difficult to engage; behaviors are difficult to change and sustain; and often times, costs for utilization increase in the short term, as traditionally disconnected individuals are finally linked with needed services.[122] Regression to the mean can also create difficulties in demonstrating the effectiveness of interventions for high-need, high-cost patients, due to their often erratic utilization patterns, incurring high costs one year and perhaps far lower costs the next—even without intervention.[123] Evaluations of these programs should account for regression to the mean and control for it when possible.[124]

WORKFORCE DEVELOPMENT

The review of literature related to workforce development primarily focused on using **non-traditional health workers**—also referred to as lay health workers, community health workers, or peer support providers—in care delivery for high-need, high-cost populations. Various articles and resources highlighted programs using these non-traditional health workers, revealing a number of successes and challenges related to these alternative workforce models. A few resources discussed how workforce training specific to engaging with complex patients may improve patient/provider experience and patient outcomes, as described further below.

While their **non-traditional role in care delivery is sometimes criticized as ambiguous,** the literature described some common responsibilities for community health workers and peer support providers. One article highlighted seven core roles for community health workers: providing cultural mediation; delivering appropriate education; ensuring connections to needed services; offering informal counseling and social support; advocating; providing direct services; and building capacity.[125] In a model developed at the University of Pennsylvania, community health workers help patients create individualized action plans around self-identified goals.[126] In addition, the literature underscored the unique role of community health workers in addressing persistent health disparities and understanding and responding to the many challenges faced by patients in navigating the health care system, obtaining necessary supportive resources, and building self-efficacy and health literacy.[127]

The Substance Abuse and Mental Health Services Administration's (SAMHSA) definition of a 'peer' is *a person who has lived experience of recovery from mental illness and/or addiction and who wishes to provide peer support services to others who are living with these disorders.*[128] Some of the literature described the role of peer support providers on care teams as more ambiguous than that of community health workers.[129] The development of trusting relationships with patients, based on mutual experience, respect, and hope, is highlighted as a key function of the peer support role.[130] Patient education; social and emotional support; advocacy; assistance with daily tasks; and connection to medical, behavioral health, legal, and financial services are also described as responsibilities of peer support providers.[131–133]

Numerous studies show **promising results based on lay health worker interventions.** A randomized clinical trial of a community health worker model in Philadelphia showed improvements in patient experience and outcomes, and reductions in hospital readmissions.[134] In another randomized controlled trial using lay health workers as care guides, patients were 31 percent more likely to meet evidence-based goals and 21 percent more likely to quit tobacco use.[135] These patients had fewer hospitalizations and ED visits and reported more positive perceptions of their care, including improved social support, individualized care, and understanding of how to improve their health.[136] A program for Medicaid super-utilizers in Oregon, led by a nurse and supported by two community health workers, decreased ED utilization from 78 percent in 2011 to 59 percent in 2013.[137]

Peer support services were broadly recognized in the literature as a promising approach. SAMHSA suggests that recovery-oriented, peer-provided behavioral health services are supported by a growing body of evidence showing improved outcomes—sometimes even superior to non-peer provided services.[138] Similarly, several articles highlighted the potential for peer support services to improve care and produce substantial cost savings.[139] An analysis of a peer-led program for individuals with serious mental illness in New York showed promising results: at six-month follow-up, program participants had a significantly greater improvement in patient activation and higher rates of primary care visits, as well as improvements in quality of life, physical activity, and medication management.[140] Medically and socially vulnerable members of the intervention population showed the greatest improvements in physical health related quality of life.[141] One assessment of current research related to peer support services for individuals with serious mental illness, found that when compared to professional staff, peers were better able to reduce inpatient use and improve a range of recovery outcomes, but that the effectiveness of peers in existing clinical roles was mixed.[142] The same assessment found a number of other promising outcomes across several peer provider models, including, improved relationship with providers; better engagement with care; higher levels of empowerment; and higher levels of hopefulness for recovery.[143] An examination of peer specialist interventions for veterans with serious mental illness also showed positive outcomes related to reduced inpatient use and increased patient engagement.[144]

The review provided some insight into how workforce training can improve patient experience and outcomes for complex patient populations. One article highlighted the importance of **training providers to understand and work within the context of complex patients' lives**—starting with conducting a comprehensive assessment of their array of health and social needs.[145] Another resource, which described **techniques for providers to successfully engage** with super-utilizers, centered around creating trusting relationships. The methods ranged from physical mannerisms and behaviors—such as removing a doctor's coat and making eye contact, to engaging with the patient in a sensitive, respectful, and strengths-based way—for instance, by requesting permission to ask questions or asking what the individual enjoys doing.[146]

Opportunities for Further Exploration

The review revealed significant challenges related to workforce development. In addition to role ambiguity, challenges cited around the use of peer providers included **lack of clear expectations, training, and skills.**[147–149] Additionally, supervisors had **difficulty providing supervision** and evaluating peer provider performance.[150–152] **Low pay and lack of career advancement opportunities** were also mentioned as challenges in the development of a peer support workforce.[153–154]

The literature called for **more rigorous evaluation** of programs that use non-traditional health workers, in order to establish a more robust evidence base of their efficacy in producing improved care and cost outcomes.[155–159] SAMHSA cited lack of an accepted typology as a key hindrance to research and evaluation of peer support programs.[160] Further, programs that are targeted to high-cost or high-utilizing populations are likely to experience regression to the mean (in which costs/utilization naturally normalize toward the population average over time), which may call into question any evidence of savings.[161] While some peer provider and community health worker interventions have shown promising outcomes, these models are typically developed for specific chronic conditions (e.g., diabetes, serious mental illness), leaving a gap in knowledge as to whether these programs work for individuals with more complex health and social needs. And perhaps in part due to these gaps, sustainable funding for non-traditional workforce models remains a challenge.

POLICY AND ADVOCACY

The literature on policy and advocacy related to high-need, high-cost populations provided a range of recommendations to support improvements across the above-mentioned domains. Addressing health system transformation more broadly, one resource suggested that super-utilizer programs—which are rooted in data, clinical redesign, and stakeholder engagement—can serve as a model in transforming the overall health care delivery system.[162]

The **need for payment reforms** that account for the important role of care coordination and multidisciplinary teams in caring for high-need, high-cost patients was widely cited as a critical policy reform.[163–164] Along these lines, one article suggested that payment reform should move toward risk-adjusted per patient payment, and include incentives for quality, services provided by non-clinicians on the care team, and population-oriented panel management.[165] Other payment mechanisms highlighted include care management fees, episodic payments, and shared savings contracts.[166]

An informational bulletin from the Centers for Medicare & Medicaid Services (CMS) described several Medicaid policy authorities for supporting super-utilizer programs, including: enhanced federal match for the design, development, and implementation of Medicaid Management Information Systems; enhanced federal match for health information exchanges; administrative contracts; Medicaid health homes; integrated care models; targeted case management services; and Medicare data access and assistance.[167]

Policies that support improved access to high-quality, real-time, all-payer data were underscored as crucial to the success of programs for high-need, high-cost populations.[168–169] Data can highlight the discrepancy between health expenditures and outcomes, allowing for more precise resource allocation and gradual movement toward a high-value health care system.[170]

One article referenced the important role that **public health strategies** can play in mitigating risk factors associated with chronic diseases, such as those that promote smoking cessation and consumption of healthy foods.[171] The same article recommended developing policies to support expansion of an interdisciplinary primary care workforce.[172]

Opportunities for Further Exploration

Despite some clear policy opportunities related to financing and data, there remain gaps in understanding which policies can best support improvements in care for individuals with complex medical, behavioral health, and social needs. As states continue to test new delivery and payment models for high-need, high-cost populations through health homes, ACOs, and other innovative approaches, policies that support these efforts are likely to germinate.

CONCLUSION

This review of select literature related to high-need, high-cost populations illuminated key areas of promise and remaining gaps in knowledge related to care model enhancements; financial alignment and accountability; data and analytics; workforce development; and policy and advocacy. Numerous opportunities exist to advance improvements care and cost outcomes by addressing the gaps remaining in each of these domains.

Notably, there are a number of rigorous evaluations of intensive or complex care management programs currently underway that promise to add to the collective understanding of what works to improve care and reduce costs for high-need, high-cost patients. Many of these evaluations are related to programs receiving funding through the Center for Medicare and Medicaid Innovation's (CMMI) Health Care Innovation Awards, with results expected to be published over the next several years. In addition to site-specific evaluation efforts, a CMMI-funded evaluation further aims to synthesize key findings across all of the award sites that share a common focus on high-need, high-cost patients.

While these efforts will undoubtedly improve the evidence base, additional multi-site studies—specifically, ones that test the effectiveness of a clearly defined model of care across multiple study locations—will be needed to advance the development of a high-fidelity approach that can be replicated broadly throughout the U.S.

Finally, as the field of "complex care" continues to grow and expand, so will its corresponding evidence base. Thus, a strategy of continuous quality improvement must be implemented to maintain a cutting-edge understanding of this emerging field.

APPENDICES

INDEX OF LITERATURE

All of the documents reviewed for this literature review are indexed in the following pages. The following information is provided for each document analyzed in the literature review: (1) full citation and link as available; (2) target population; (3) key focus; (4) summary of model/intervention; and (5) a summary of key findings. The literature is organized under five core domains: (1) Care Model Enhancements; (2) Financing and Accountability; (3) Data and Analytics; (4) Workforce Development; and (5) Policy and Advocacy.

APPENDIX A: CARE MODEL ENHANCEMENTS

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
Aligning Forces for Quality. "Creating Regional Partnerships to Improve Care Transitions." The Robert Wood Johnson Foundation. June 2014. Available at: http://forces4quality.org/node/7600.	Elderly or patients with serious or complex conditions	Care transitions	Basics of partnerships include: establishing a cross-setting oversight team with the common goal of reducing readmissions and improving quality of life; providing care transition coaching services to partner with hospitals with certain conditions/diagnosis; sharing data and results to assess progress toward goals; establishing a subgroup to discuss operational issues, coordinate scheduling of services, and improve communication concerns.	Effective care transitions programs call for building and sustaining strong partnerships with health care providers in the community so they can collaborate to achieve shared goals. Accomplishing this is difficult in single-setting work and becomes even more challenging and complex when bringing providers from different care settings together who do not typically work with one another and approach their work differently. Consider partnering with local hospitals, home health agencies, area agency on aging, and physicians.
L. Barlow. "Hospitals, Physicians Embrace Strategies To Reduce Cost of "Frequent Flyer" ER Visits." Real World Health Care. April 2013. Available at: http://healthwellfoundation.org/sites/default/files/4.9.13.Hospitals.Physicians%20Embrace%20Strategies%20to%20Reduce%20FF%20Visits%20to%20ER.pdf.	High-frequency emergency department (ED) utilizers	Intensive care management	Two models in different states (North Carolina and Washington). In NC, a free clinic integrates medical checkups and group therapy, with doctors providing treatment and patients offering each other tips, ranging from how to obtain legal assistance to saving money on food and shelter. In WA, a community program was joined other hospitals and a regional coalition of providers. It flags patients with 2+ ED visits in a month or 4+ visits in 6 months for further examination and care planning.	The NC model reduced total ED expenses by $405,000 over 12 months. Uninsured participants reduced ED visits from an average of 7 to an average of 3 per year. In WA, ED visits among frequent flyers reduced by 50%, with a cost savings of almost $10,000/patient. The program saw a reduction of $2.2 million in ED and inpatient expenses over two years.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
J. Bell, D. Mancuso, T. Krupski, J.M. Joesch, D.C. Atkins, B. Court, et al. *A Randomized Controlled Trial of King County Care Partners' Rethinking Care Intervention: Health and Social Outcomes up to Two Years Post-Randomization Technical Report.* Center for Health Care Strategies. November 2012. Available at: http://www.chcs.org/resource/randomized-controlled-trial-of-king-county-care-partners-rethinking-care-intervention-health-and-social-outcomes-up-to-two-years-post-randomization/.	Aged, Blind, and Disabled Medicaid beneficiaries with evidence of mental illness and/or chemical dependency, identified as being at risk of having future high medical expenses	Intensive care coordination	Washington State's Rethinking Care intervention included intensive care management from a clinical team of RNs and social workers. Care management included an in-person comprehensive assessment of medical and social needs; collaborative setting of health-related goals; chronic disease self-management coaching; physician visits of clients accompanied by their care managers; frequent in-person and phone monitoring by care managers; connection to community resources; and coordination of care across the medical and mental health system.	Participants in the intervention were likelier to have increased access to care, lower inpatient medical costs, relatively fewer unplanned inpatient admissions, and fewer deaths. In particular, those in the intervention group: (1) had a lower increase in inpatient medical admissions—8% versus a 20% increase in the comparison group; (2) had a 2% decrease in average PMPM cost for inpatient medical admissions following an ED visit (e.g., unplanned admissions) compared to a 49% cost *increase* for the comparison group; (3) had a 5% increase in outpatient medical costs versus a 12% decrease in the comparison group; and (4) were less likely to experience homelessness—there was a 20% decrease in beneficiaries who experienced at least one month of homelessness following the intervention compared to an 18% increase in the comparison group.
T. Bodenheimer and R. Berry-Millett. "Care Management of Patients With Complex Health Needs." Robert Wood Johnson Foundation. December 2009. Available at: http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2009/rwjf49853/subassets/rwjf49853_1.	Individuals with complex health care needs	Complex care management	Key components to care management: (1) identify patients most likely to benefit from care management; (2) assess the risks and needs of each patient; (3) develop a care plan together with the patient/family; (4) teach the patient/family about the diseases and their management, including medication management; (5) coach the patient/family on how to respond to worsening symptoms in order to avoid the need for hospital admissions; (6) track how the patient is doing over time; and (7) revise the care plan as needed.	Mixed results as to whether care management reduces hospital use and health care costs. Stresses on primary care make it difficult to implement effective care management. The most effective programs target complex patients being discharged from the hospital. Home-based care management has largely failed to demonstrate significant cost/quality improvements. More success is seen if the right patients are picked: those that are complex, but not those whose illness is so severe that palliative or hospice care is more appropriate. Medicare demonstrations of care management involving patients with complex health care needs have failed to find consistent cost reductions (with a few exceptions). Care management requires personnel with particular skills not generally taught in traditional health professional educational institutions. Integrated delivery systems have the most resources and capacity to develop care management programs.
T. Bodenheimer. *Strategies to Reduce Costs and Improve Care for High-Utilizing Medicaid Patients: Reflections on Pioneering Programs*. Center for Health Care Strategies. October 2013. Available at: http://www.chcs.org/resource/strategies-to-reduce-costs-and-improve-care-for-high-utilizing-medicaid-patients-reflections-on-pioneering-programs/.	Super-utilizers	Complex care management	Principal sites for complex care management models: health plan, primary care, ambulatory intensive care unit (aICU), hospital discharge, emergency department-based, home-based, housing first, and community-based.	High-utilizer programs can make substantial reductions in hospital admissions, hospital days, ED visits, and total costs of care. Providing permanent housing with case management—with no medical personnel—appears to be the most powerful way to reduce costly health care utilization. There is a big difference between the aICU model and the primary care model. There is no standard composition of care management teams. Most programs perform an initial assessment, develop a care plan, and incorporate regular follow-up by the care management team. Programs tend to have a coaching rather than a rescuing philosophy. Many programs have a home visit component; some allow patients to access the care management team 24/7. Coaching patients to understand their medications and to become more medication adherent is an essential feature of all programs. Caseloads vary with team size, team composition, and patient complexity.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
R.S. Brown, D. Peikes, G. Peterson, J. Schore, and C.M. Razafindrakoto. "Six Features Of Medicare Coordinated Care Demonstration Programs That Cut Hospital Admissions Of High-Risk Patients." *Health Affairs*, 31, no. 6 (2012): 1156-66. Care Management Toolkit." Available at: http://content.healthaffairs.org/content/31/6/1156.abstract.	High-risk Medicare beneficiaries	Intensive care management	The six approaches practiced by care coordinators in the Medicare Coordinated Care Demonstration programs that were effective include: (1) supplementing telephone calls to patients with frequent in-person meetings; (2) occasionally meeting in person with providers; (3) acting as a communications hub for providers; (4) delivering evidence-based education to patients; (5) providing strong medication management; and (6) providing timely and comprehensive transitional care after hospitalizations.	Four of 11 Medicare Coordinated Care Demonstration programs reduced hospitalizations by 8-33 percent among enrollees who had a high risk of near-term hospitalization. Results suggest that incorporating these approaches into medical homes, accountable care organizations, and other policy initiatives could reduce hospitalizations and improve patients' lives. However, the approaches would save money only if care coordination fees were modest and organizations found cost-effective ways to deliver the interventions. None of these programs generated net savings to Medicare.
California Quality Collaborative (2012). "Complex Care Management Toolkit." Available at: http://www.calquality.org/storage/documents/cqc_complexcaremanagement_toolkit_final.pdf.	Individuals with multiple chronic conditions, limited functional status, and psychosocial needs	Complex care management	Typical complex care management models: (1) embedded care manager model (care manager located onsite); (2) centrally located care management agency provides services to multiple practice sites; or (3) "brick and mortar" clinic where an "intensivist" is assigned a high-risk patient panel. Care teams usually consist of a nurse care manager, PCP, social worker, behavioral health specialist, and other care providers as necessary.	Key considerations for building a care model for complex patient populations include: developing levels within your complex care program that vary based on severity of illness; taking a broad and interdisciplinary approach to building your complex care team—build on what you have and align with the needs of the patients you are managing; promoting face-to-face interaction between care managers and patients; emphasizing patient self-management techniques; making care transitions support a priority; and using virtual or in-person multi-disciplinary case conferences.
Corporation for Supportive Housing (2009). "Summary of Studies: Medicaid/Health Services Utilization and Costs." Available at: http://pschousing.org/files/SH_cost-effectiveness_table.pdf.	Criteria varies; primarily individuals who are homeless or unstably housed with multiple chronic conditions	Housing intervention	Variety of housing programs implementing "housing first" interventions for complex-needs individuals. Evaluated for utilization of health and other services.	**Select Key Impacts** **San Francisco:** During the one year after entering supportive housing, individuals had fewer ED visits and fewer inpatient hospital admissions. **Chicago Housing for Health Partnership Program**: Fewer hospitalizations per person per year; fewer ED visits per person per year (24% reduction); 45% fewer days nursing home. **Massachusetts Statewide Pilot**: Medicaid costs after housing intervention significantly decreased.
Connecticut Partnership for Strong Communities (2012). "Connecticut Integrated Healthcare & Housing Neighborhoods." Available at: http://pschousing.org/files/Connecticut%20Integrated%20Healthcare%20and%20Housing%20Neigborhoods%20Summary%20%28March%202012%29.pdf.	Medicaid-enrolled/ eligible high-utilizers who are homeless or at-risk of homelessness, with chronic conditions	Housing intervention	Health home outreach model using assertive outreach and care coordination to link high-cost, high-need clients with primary care, behavioral health care, and supportive/affordable housing. Multidisciplinary health teams established in multiple regions of the state through partnerships between Federally Qualified Health Centers, Local Mental Health Authorities, and supportive housing/ public housing providers, homeless service/ outreach programs, and the state's Medicaid Medical Administrative Services Organization (ASO). High utilizers identified through local hospitals to ensure effective transitions from care.	In Connecticut, an identified cohort of adult Medicaid beneficiaries who are homeless, high-cost utilizers of health services had average annual Medicaid payments of $67,992 per person. This is 9 times more expensive than the average Medicaid beneficiary. In 2011, the state budget dedicated $100 million to affordable housing over two years and $30 million in capital funding to develop 150 new units of additional supportive housing. In February, Gov. Malloy announced his housing proposal for the state budget, which includes $300 million over 10 years for public housing revitalization, an additional $20 million for affordable housing, and 150 new rental assistance vouchers for scattered site supportive housing.
R. Davis and A. Maul. *Trauma-Informed Care: Opportunities for High-Need, High-Cost Medicaid Populations*. Center for Health Care Strategies. March 2015. Available at: http://www.chcs.org/resource/trauma-informed-care-opportunities-high-need-high-cost-medicaid-populations/.	High-need, high-cost Medicaid beneficiaries	Trauma-informed care	Individuals who experience trauma, particularly in childhood, have much higher incidences of chronic disease and behavioral health issues. Trauma-informed care seeks to change the clinical perspective from asking, "What is wrong with you?" to "What happened to you?"	Using trauma-informed care to better engage with this difficult-to-reach population can help providers and case managers build a trusting relationship with individuals with a history of trauma, and may help enhance quality and cost outcomes for the Medicaid program overall.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
M. Gerrity, E. Zoller, N. Pinson, C. Pettinari, and V. King. "Integrating Primary Care into Behavioral Health Settings: What Works for Individuals with Serious Mental Illness." Millbank Memorial Fund. 2014. Available at: http://www.milbank.org/uploads/documents/papers/Integrating-Primary-Care-Report.pdf.	Individuals with serious mental illness and substance use disorder	Behavioral health integration	Behavioral health integration into primary care for individuals with serious mental illness (SMI). The continuum of models ranges from separate systems and practices with little communication among providers, to enhanced coordination and collaboration among providers usually involving care or case managers, to co-located care with providers sharing the same office or clinic, to fully integrated care where all providers function as a team to provide joint treatment planning. In a fully integrated system, patients and providers experience the operation as a single system treating the whole person.	Care management may improve mental health symptoms and mental health related quality of life for patients with bipolar disorder and SMI. Fully integrated care and care management improves use of preventive and medical services and may improve physical health symptoms and quality of life for patients with bipolar disorder and SMI. Co-locating primary care in chemical dependency treatment settings without enhanced coordination and collaboration does not improve mental or physical health outcomes. All interventions required additional staff, training, and oversight except when intervention staff was dually trained in primary care and substance use treatment.
J. Greene, J.H. Hibbard, R. Sacks, V. Overton, and C.D. Parrotta. "When Patient Activation Levels Change, Health Outcomes And Costs Change, Too." *Health Affairs*, 34, no. 3 (2015): 431-437. Available at: http://content.healthaffairs.org/content/34/3/431.abstract.	Adult primary care patients	Patient activation	Patient Activation Measure (PAM) scores collected during primary care office visits at baseline (in 2010) and two years later (2012) were examined against health outcomes related to cholesterol, triglycerides, PHQ-9, smoking, and obesity.	Higher activation in 2010 was associated with nine out of thirteen better health outcomes—including better clinical indicators, more healthy behaviors, and greater use of women's preventive screening tests—as well as with lower costs two years later. More activated patients were significantly more likely than less activated patients to have HDL, serum triglycerides, and PHQ-9 in the normal range; to be nonsmokers; and not to be obese. Future research is needed to establish whether or not the association represents a causal relationship.
D. Hasselman. *Super-Utilizer Summit: Common Themes from Innovative Complex Care Management Programs*. Center for Health Care Strategies. October 2013. Available at: http://www.chcs.org/resource/super-utilizer-summit-common-themes-from-innovative-complex-care-management-programs/.	Super-utilizers	Intensive care management	Care teams typically include nursing, social work, and community outreach expertise. Interventions include extensive outreach and engagement; 24-hour on-call system; frequent contacts with patients (face-to-face is priority); medication reconciliation/management; patient-caregiver self-management education; timely outpatient follow-up post-discharge; linkage to a primary care provider/medical home; goal setting and care plan development; health education/coaching; pain management; management of chronic conditions (e.g., diabetes, asthma); preparation for provider visits; and linkages to housing, substance abuse treatment, and other community resources.	Individuals' basic needs—housing, jobs, child care, and food insecurity—must be addressed before physical health can be impacted. Programs "frontload social services" and typically use non-clinicians and non-traditional providers such as social workers and community health workers to address gaps in and needs for social services. Essential to figure out which patients need which interventions in which setting by which provider—this complex equation was noted as the "holy grail." Medication management is a critical task that must be done in the patient's home to be most effective.
J. Hibbard, J. Greene, and M. Tusler. "Improving The Outcomes of Disease Management by Tailoring Care to the Patient's Level of Activation.*" The American Journal of Managed Care*, 15, no. 6 (2009): 353-360. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19514801.	Individuals with chronic conditions	Patient activation	A quasi-experimental pre-post design was utilized, with an intervention group, using a tailored approach and a control group was coached in the usual way. Intervention coaches used baseline Patient Activation Measure (PAM) scores to segment patients based on 4 levels of activation. The coaches were then trained and given guidelines to customize telephonic coaching based on the activation level.	Findings suggest that using tailored coaching models to the patients' activation level with alignment of metrics improves outcomes for disease management.
J. Hibbard, J. Greene, Y. Shi, J. Mittler, and D. Scanlon. "Taking the Long View: How Well Do Patient Activation Scores Predict Outcomes Four Years Later?" *Medical Care Research and Review*, Published online, February 24, 2015: doi: 10.1177/1077558715573871. Available at: http://mcr.sagepub.com/content/early/2015/02/24/1077558715573871.abstract.	Individuals with chronic conditions	Patient activation	Researchers examined the extent to which characteristics such as medication adherence, health behaviors, functional health, and costly health care utilization were related to PAM scores at baseline and 4 years later.	The benefits of patient activation are enduring, and include: better self-management, improved functioning, and lower use of costly health care services over time. When activation levels change, many outcomes change in the same direction. Health care delivery systems can use this information to personalize and improve care.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
J.Y. Kim, T.C. Higgins, D. Esposito, A.M. Gerolamo, and M. Flick. *SMI Innovations Project in Pennsylvania: Final Evaluation Report*. Mathematica Policy Research. October 2012. Available at: http://www.chcs.org/resource/smi-innovations-project-in-pennsylvania-final-evaluation-report/.	Adult Medicaid beneficiaries with SMI and co-occurring physical health conditions	Complex care management	The programs varied, but were based on five key principles: (1) information exchange and joint care planning across physical and behavioral health; (2) engaging consumers in care; (3) engaging providers to partner in care and become designated care homes; (4) providing follow-up after hospitalizations and ED visits; and (5) improving medication management. Plans also had performance bonuses.	Although outcomes varied across the two regions, the evaluation identified that one or both pilots were successful at reducing the rate of mental health hospitalizations, all-cause readmissions, and emergency department visits. Compared with projected trends in these outcomes without the interventions: (1) the rate of mental health hospitalizations was an estimated 12 percent lower (Southwest); (2) the all-cause readmission rate was an estimated 10 percent lower (Southwest); and (3) the rate of emergency department (ED) use was an estimated 9 percent lower (Southeast).
K.W. Linkins, JJ. Brya, D.W. Chandler. "Frequent Users of Health Services Initiative: Final Evaluation Report." California HealthCare Foundation. August 2008. Available at: http://www.chcf.org/~/media/MEDIA%20LIBRARY%20Files/PDF/F/PDF%20FUHSIEvaluationReport.pdf.	Frequent emergency department (ED) users	Intensive care management	Six models ranged from various types of intensive case management to less intensive peer- and paraprofessional-driven interventions. All interventions sought to redirect care from the emergency department to lower-cost community-based settings by: assisting frequent users to access and navigate existing resources; decreasing psychosocial problems such as homelessness and substance use; and improving care coordination.	The programs yielded statistically significant reductions in ED use (30%) and hospital charges (17%) in the first year of enrollment. ED utilization and charges decreased by an even greater magnitude in the second year after enrollment. Those connected to housing showed significantly greater reductions in the number of inpatient days (a 27% decrease for those connected vs. a 26% increase for those not connected) and inpatient charges (a 27% decrease for those connected vs. a 49% increase for those not connected).
D.B. Mautner, H. Pang, J.C. Brenner, J.A. Shea, K.S. Gross, R. Frasso, et al. "Generating Hypotheses About Care Needs of High Utilizers: Lessons from Patient Interviews." *Population Health Management*, 16, Suppl. (2013): S26-33. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24070247.	Complex, high-utilizing patients	Social determinants of health	This qualitative study identifies psychosocial factors and life experiences described by complex patients with high levels of emergency and hospital-based health care utilization that may be important to their care needs. Semi-structured interviews were conducted with 19 patients of the Camden Coalition of Healthcare Providers' Care Management Team.	Investigators identified three key themes: (1) Early-life instability and traumas, including parental loss, unstable or violent relationships, and transiency, informed many participants' health and health care experiences; (2) many "high utilizers" described a history of difficult interactions with health care providers during adulthood; (3) over half of the participants described the importance to their well-being of positive and "caring" relationships with primary health care providers and the outreach team. Additionally, the transient and vulnerable nature of this complex population posed challenges to follow-up, both for research and care delivery. Investigators should test new modes of care delivery that attend to patients' trauma histories.
C. Michalopoulos, M. Manno, S.E. Kim, and A. Warren. "The Colorado Regional Integrated Care Collaborative Managing Health Care for Medicaid Recipients with Disabilities: Final Report on the Colorado Access Coordinated Care Pilot Program." MDRC, April 2013. Available at: http://www.mdrc.org/sites/default/files/Managing_Health_Care_FR.pdf.	Blind or disabled Medicaid recipients (considered high-risk for hospitalization)	Intensive care coordination	Colorado Access provided intensive coordinated care services, with a focus on social and nonclinical service delivery. Coordinated care was provided primarily by telephone, care managers sometimes met members in person (facilitated by having care team members in Kaiser Permanente Colorado's clinics).	There is little evidence that the Colorado Access program affected outpatient care. Of the six outcomes examined, there were significant estimated impacts only on the probability of visiting a non-physician. The average number of admissions per 1,000 client months during the first year was 24.0 for the program group compared with 20.0 for the control group.
C.J. Peek, M.A. Baird, and E. Coleman. "Primary Care for Patient Complexity, Not Only Disease." *Family, Systems and Health*, 27, no. 4 (2009): 287-302. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20047353.	Patients with multiple chronic conditions	Assessment	Analysis of what is meant by "complexity" in primary care setting and how to best tailor care delivery to complex patients.	Patient complexity is defined as "interference with standard care and decision-making by symptom severity or impairments, diagnostic uncertainty, difficulty engaging care, lack of social safety or participation, disorganization of care, and difficult patient-clinician relationships. Patient-centered medical homes must address patient complexity by promoting the interplay of usual care for conditions and individualized attention to patient-specific sources of complexity—across whatever diseases and conditions the patient may have.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
B.W. Powers, S.K. Chaguturu, and T.G. Ferris. "Optimizing High-Risk Care Management." *Journal of the American Medical Association*, 313, no. 8 (2015): 795-6. Available at: http://jama.jamanetwork.com.ezproxy.princeton.edu/article.aspx?articleid=2099528.	Individuals with complex, co-occurring conditions	Complex care management	Program structure varies, but most involve care managers who work with panels of high-risk patients to coordinate care across clinicians; engage patients in setting and achieving health-related goals; and monitor and track health outcomes. Although these programs have traditionally been managed by payers or third-party vendors, clinicians and health care organizations are increasingly adopting programs of their own.	High-risk care management programs that are practice-based, payer-catalyzed, and purchaser-supported have the greatest potential to deliver better care at lower cost. Achieving the potential of high-risk care management requires a coordinated strategy in which purchasers, payers, and health care organizations leverage their unique capabilities without redundancy or duplication.
L.S. Sadowski, R.A. Kee, T.J. VanderWeele, and D. Buchanan. "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, no. 17 (2009): 1771-8. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19417194.	Social-worker referred homeless adults with chronic medical illnesses at a public teaching hospital and private nonprofit hospital	Housing intervention	Transitional housing offered after hospital discharge, followed by long-term housing with case management offered on-site at primary study sites, transitional housing, and stable housing sites.	Compared with the usual care group, the intervention group had a relative reduction of 29% in hospitalizations, 29% in hospital days, and 24% in emergency department visits. The researchers did not evaluate the specific types of case management services provided or their costs, and were not able to distinguish housing effects from case management effects.
M. Shumway, A. Boccellari, K. O'Brien, and R.L. Okin. "Cost-Effectiveness of Clinical Case Management for ED Frequent Users: Results of a Randomized Trial." *American Journal of Emergency Medicine*, 26, no. 2, (2008): 155-64. Available at: http://www.ncbi.nlm.nih.gov/pubmed/18272094.	Frequent ED users	Clinical case management	A 24- month randomized trial with 252 frequent ED users were randomized (167 to case management, 85 to usual care(. The study included obtaining data on psychosocial problems through interviews and service usage and cost data from administrative records.	The participants that received case management had statistically significant reductions in ED use and cost. Those individuals that received case management and usual care patients did not differ in use or cost of other hospital services.
R. Voss, R. Gardner, R. Baier, K. Butterfield, S. Lehrman and S. Gravenstein. "The Care Transitions Intervention Translating From Efficacy to Effectiveness." *Archive of Internal Medicine;* 171, no. 14 (2011): 1232-7. Available at: http://archinte.jamanetwork.com/article.aspx?articleid=1105851&resultClick=3.	Medicare patients	Care transitions	Quasi-experimental prospective cohort study conducted in Rhode Island with a sample of fee-for-service Medicare patients, with chronic health conditions (cardiac or respiratory) eligible to receive Care Transitions Interventions (CTI) and a control group that did not receive the intervention. Participants were not randomized, coaches used the patient census lists to identify patients meeting the criteria. CTI is a patient-centered intervention model that consists of home visits and one telephone call designed to empower individuals to manage their health and more effectively engage with providers.	Among the intervention group that received the intervention, the odds of hospital readmissions within 30 days of discharge were lower following hospitalizations, when compared with those who were never approached. The intervention group's reduced readmission rate (36.0% compared with the external control group). The study adds to supporting the use of the CTI upon hospital discharge for medical patients.
J. Xing, C. Goehring, and D. Mancuso. "Care Coordination Program For Washington State Medicaid Enrollees Reduced Inpatient Hospital Costs." *Health Affairs*, 34, no. 4 (2015): 653-661. Available at: http://content.healthaffairs.org/content/34/4/653.full.	Medicaid beneficiaries with complex health care needs	Care coordination	In Washington State, a care coordination intervention, the Chronic Care Management program, was implemented for clinically complex Medicaid beneficiaries who met risk criteria defined by a predictive modeling algorithm. The program involved intensive care management, care coordination, and patient education and training in self-management skills. We used propensity score matching to evaluate the program's impact on health care spending and utilization and mortality.	Large and significant reductions in inpatient hospital costs ($318 per member per month) were found among patients who used the program. The estimated reduction in overall medical costs of $248 per member per month exceeded the cost of the intervention, but did not reach statistical significance. These results suggest that well-designed targeted care coordination services could reduce health care spending for Medicaid beneficiaries with complex health care needs.

APPENDIX B: FINANCING AND ACCOUNTABILITY

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
J. Alper and A. Baciu. "Roundtable on Population Health Improvement: Financing Population Health Improvement." Institute of Medicine, 2014. Available at: http://iom.nationalacademies.org/Reports/2014/Financing-Population-Health-Improvement.aspx.	United States population	Population health	A fundamental but often overlooked driver of the imbalance between spending and outcomes in the U.S. is the nation's inadequate investment in non-clinical strategies that promote health and prevent disease and injury population-wide, strategies that fall under the rubric of "population health."	Given that it is unlikely that government funding for governmental public health agencies, whether at the local, state, or federal levels, will see significant and sustained increases, there is interest in finding creative sources of funding for initiatives to improve population health, both through the work of public health agencies and through the contributions of other sectors, including non-health entities.
D. Bachrach, S. Anthony, and A. Detty. "State Strategies for Integrating Physical and Behavioral Health Services in a Changing Medicaid Environment." The Commonwealth Fund. August 2014. Available at: http://www.commonwealthfund.org/publications/fund-reports/2014/aug/state-strategies-behavioral-health.	Medicaid beneficiaries with comorbid physical and behavioral health conditions	Physical/behavioral health Integration	States are deploying various administrative, purchasing, and regulatory strategies to address or eliminate system-level barriers to integrated care for this medically complex and high-cost Medicaid population.	Administrative strategies include: consolidating the agencies responsible for physical/mental health and substance use disorder services; consolidating behavioral health purchasing, contracting, and rate-setting in their Medicaid agency and retaining licensing and clinical policy in the behavioral health agencies; or informal collaborations to rationalize strategies across agencies. Purchasing strategies include: policies to create linkages across providers and systems, especially in states with carve-out models; and implementation of fully integrated managed care approaches, in some cases targeted to individuals with serious mental illness. Regulatory strategies include: streamlining licensing rules and creating credentialing programs for nontraditional providers; revising Medicaid same-day visit policies; establishing billing codes for emerging treatments; and supporting policies allowing for greater information exchange.
E.H. Bradley, B.R. Elkins, J. Herrin, and B. Elbel. "Health and Social Services Expenditures: Associations with Health Outcomes." *BMJ Quality and Safety*, 20, no. 10 (2011): 826-31. Available at: http://www.ncbi.nlm.nih.gov/pubmed/21447501.	Various	Health care spending	Examined variations in health service expenditures and social services expenditures across Organisation for Economic Co-operation and Development (OECD) countries and assess their association with five population-level health outcomes: life expectancy at birth, infant mortality, low birth weight, maternal mortality, and potential years of life lost.	Health services expenditures adjusted for gross domestic product (GDP) per capita were significantly associated with better health outcomes in only two of five health indicators; social services expenditures adjusted for GDP were significantly associated with better health outcomes in three of five indicators. The ratio of social expenditures to health expenditures was significantly associated with better outcomes in infant mortality, life expectancy and increased potential life years lost, after adjusting for the level of health expenditures and GDP.
J. Corrigan and E. Fisher. "Accountable Health Communities: Insights from State Health Reform Initiatives." The Dartmouth Institute for Health Policy & Clinical Practice, November 2014. Available at: http://tdi.dartmouth.edu/images/uploads/AccountHealthComm-WhPaperFinal.pdf.	Geographically defined populations	Accountable health communities	Three states—Colorado, Minnesota, and Oregon—have health reform plans that envision evolving roles at the community level in health system oversight and financing.	Breadth of vision, local leadership, delivery system integration, payment reform, accountability, and investment strategy for addressing non-health determinants are all important factors in designing these programs. While substantial uncertainty remains, this approach suggests that community-level engagement in health reform—"accountable health communities"—is promising.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
M. Crawford and R. Houston. *State Payment and Financing Models to Promote Health and Social Service Integration*. Center for Health Care Strategies. February 2015. Available at: http://www.chcs.org/resource/state-payment-financing-models-promote-health-social-service-integration/.	High-cost, high-need Medicaid beneficiaries	Financial alignment	While models for integrating health and social services have not yet been fully tested, states are eager to develop new programs and expand existing small-scale efforts to reap the potential health and cost benefits of integration and build a more effective and sustainable health care system. Many states will pursue a gradual transformation toward financing integration, characterized by three phases: (1) pilot or demonstration; (2) intermediate ramp-up/expansion; and (3) advanced, fully operational.	Pilots/demonstrations are typically financed using federal grants, philanthropic funds, or social impact investments. Financing for expansion of integration programs is typically via state trust funds/pools or Medicaid waivers. And fully operational integration programs can be financed using braided/blended funding from Medicaid, federal funds, block grants, state/local budgets. Payment mechanisms that incentivize providers to encourage or facilitate connections include shared savings arrangements, bundled payments, direct payment to social service entities, and a global community health budget, etc.
M. Crawford, T. McGinnis, J. Auerbach, and K. Golden. "Population Health in Medicaid Delivery System Reforms." Milbank Memorial Fund. March 2015. Available at: http://www.milbank.org/uploads/documents/papers/CHCS_PopulationHealth_IssueBrief.pdf.	Medicaid beneficiaries	Population health	Many see policies focused on the health of a population as a vehicle for bringing health care delivery systems, public health agencies, behavioral health, social services, and other entities together to improve health outcomes in their communities.	New opportunities provided by the Affordable Care Act enable states and regional jurisdictions to test innovative payment and delivery system reform initiatives, often through accountable care collaboratives, including Medicaid ACOs and regional care organizations.
M. Evans. "Residential Therapy: Hospitals Take on Finding Housing for Homeless Patients, Hoping to Reduce Readmissions, Lower Cost." *Modern Healthcare*, September 2012. Available at: http://www.modernhealthcare.com/article/20120922/MAGAZINE/309229988.	Chronically ill/ costly patients; homeless patients	Housing first	Pilots programs underway across the country (e.g., Hennepin County, MN, San Francisco, New York City) that provide costly and complex Medicaid patients with housing in an effort to reduce hospital readmissions.	In preliminary results for homeless patients in New York City's pilot, monthly Medicaid spending dropped by one-fifth, or $855, to $3,426 a person. Overall, hospitalizations dropped by 47% and emergency room visits fell by more than half. Spending for hospital care fell by 27% and emergency room spending by 30%. Early results in Hennepin County are promising. Key takeaway: Under pressure to cut costs? Find housing for the most expensive patients who need a place to live.
A. Hamblin, J. Verdier, and M. Au. *State Options for Integrating Physical and Behavioral Health Care.* Center for Health Care Strategies. October 2011. Available at: http://www.chcs.org/resource/state-options-for-integrating-physical-and-behavioral-health-care/.	High-need, high-cost Medicaid beneficiaries	Physical/ behavioral health Integration	Four integration models with various lead organizations serving as the core integrated care entity, including: (1) managed care organizations (MCOs); (2) primary care case management programs (PCCMs); (3) behavioral health organizations (BHOs); and (4) MCO/PCCM and BHO partnerships as facilitated by financial alignment.	Key elements to each model, which can be enforced by state purchasing contracts, include the following: (1) Aligned financial incentives across physical and behavioral health systems; (2) Real-time information sharing across systems to ensure that relevant information is available to all members of a care team; (3) Multidisciplinary care teams that are accountable for coordinating the full range of medical, behavioral, and long-term supports and services, as needed; (4) Competent provider networks; and (5) Mechanisms for assessing and rewarding high-quality care.
S.L. Hayes, M.K. Mann, F.M. Morgan, M.J. Kelly, and A.L. Weightman. "Collaboration Between Local Health and Local Government Agencies for Health Improvement." *Cochrane Database of Systematic Reviews*, October 2012. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23076937.	All population types and all age groups were included	Interagency collaboration	Evaluated the effects of interagency collaboration between local health and local government agencies on health outcomes, by conducting a literature review of studies that reported individual health outcomes arising from interagency collaboration between health and local government agencies compared to standard care.	Collaboration between local health and local government is commonly considered best practice. However, the review did not identify any reliable evidence that interagency collaboration, compared to standard services, necessarily leads to health improvement. Collaborative community partnerships can be established to deliver interventions, but it is important to agree on goals, methods of working, monitoring and evaluation before implementation to protect program fidelity and increase the potential for effectiveness.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
R. Mahadevan and R. Houston. *Supporting Social Service Delivery through Medicaid Accountable Care Organizations: Early State Efforts*. Center for Health Care Strategies. February 2015. Available at: http://www.chcs.org/resource/supporting-social-services-medicaid-accountable-care-organizations-early-efforts/.	Medicaid beneficiaries	Accountable care	Medicaid accountable care organizations across the country that are taking initial steps to provide essential non-medical supports to high-need, high-cost beneficiaries. Financial incentives offer a powerful vehicle for fostering social service coordination.	By instituting a shared savings or capitated payment for ACO programs, states can motivate closer collaboration between the health care delivery system and non-medical agencies and providers. State approaches range from integrated payment models connecting social services and providers, to one-time grants supporting provider capacity-building.
Massachusetts Housing and Shelter Alliance. "Home and Healthy for Good—Permanent Supportive Housing: A Solution-Driven Model." Progress Report, January 2014. Available at: https://givingcommon.guidestar.org/ViewEdoc.aspx?eDocId=2698132&approved=True.	Chronically homeless adults	Housing first	Housing first model in Massachusetts called Home and Healthy for Good (HHG). The state allocated $600,000 to the Massachusetts Housing and Shelter Alliance (MHSA) through the Department of Transitional Assistance to operate the Home & Healthy for Good (HHG) program. The state allocation for HHG is flexible, allowing the resource to be used for supportive services, housing or both. Seventeen homeless service providers now participate in the program as agencies subcontracted by MHSA.	Providing housing and supportive services to chronically homeless individuals through a Housing First model is less costly and more effective than managing their homelessness and health problems on the street or in shelter. Results show a trend toward tremendous savings in health care costs, especially hospitalizations, when chronically homeless individuals are placed into housing with services. Improvements in quality of life and overall health outcomes indicate that Housing First is an effective intervention for chronically homeless individuals.
S.F. Sandberg, C. Erikson, R. Owen, K.D. Vickery, S.T. Shimotsu, M. Linzer, et al. "Hennepin Health: A Safety-Net Accountable Care Organization For The Expanded Medicaid Population." *Health Affairs*, 33, no. 11 (2014): 1975-84. Available at: http://content.healthaffairs.org/content/33/11/1975.abstract.	Medicaid	Accountable care	Hennepin Health assumes full risk for Medicaid expansion patients enrolled in the plan, and receives a per member per month capitation payment from the state to cover the cost of all Medicaid services for the enrolled population. Social services are paid for with human service funds from preexisting state and county sources, supplemented by the health plan's per member per month payments. Monthly social service expenses are tracked to analyze whether savings in medical care are offset by an increase in costs for social services. Hennepin Health has strategically used reinvestment funds from previous years to provide additional training; hire additional team members; and further the overall strategy of coordinating medical, behavioral, and social services.	Hennepin Health has had an impact on shifting care from the ED and the hospital to outpatient settings. Decrease in ED visits of 9.1% per 1,000 member months, with a corresponding increase in outpatient visits of 3.3% during the same time period. The percentage of patients receiving optimal diabetes care increased from 8.6% in the second half of 2012 to 10% in the second half of 2013. The percentage of patients receiving optimal vascular care increased from 25 to 36.1%. The percentage of patients receiving optimal asthma care increased from 10.6% in the last five months of 2012 to 13.8% in the last five months of 2013. Hennepin Health has also achieved a high patient satisfaction rating: 87% of members report that they are satisfied with their care.
L.C. Weinstein, M.D. LaNoue, J.D. Plumb, H. King, B. Stein and S. Tsemberis. "A Primary Care-Public Health Partnership Addressing Homelessness, Serious Mental Illness, and Health Disparities." *Journal of the American Board of Family Medicine*, 26, no. 3 (2013): 279-87. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23657696.	Individuals with SMI who are homeless	Housing first	Jefferson Department of Family and Community Medicine and Pathways to Housing-PA (PTH-PA) formed a formal partnership, and a primary care physician was embedded into the PTH-PA Assertive Community Treatment team to provide on-site primary care and population-based health monitoring and services. The partnership draws from general departmental resources, the St. Elizabeth's community satellite clinic, and the main family medicine practice, Jefferson Family Medicine Associates. Additional clinical, evaluation, and educational partnerships have been formed with the Jefferson's Center for Urban Health, Department of Emergency Medicine, School of Nursing, and School of Public Health.	The intersection of primary care with public health efforts, including the potential overlap of outcomes, is relatively new. Preliminary program evaluation results suggest that this partnership is evolving to function as an integrated person-centered health home and an effective local public health monitoring system. Multiple measures provide preliminary evidence that this model is feasible and can address the challenges of integrated community health services.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
B.P. Zeigler, S.A. Redding, B.A. Leath, and E.L. Carter. "Pathways Community HUB: A Model for Coordination of Community Health Care." *Population Health Management*, 17, no. 4 (2014): 199-201. Available at: http://online.liebertpub.com/doi/abs/10.1089/pop.2014.0041.	Individuals with care needs spanning multiple systems	Integration	The Pathways Community HUB Model is a delivery system for care coordination services provided in a community setting. The Pathways model provides a unique strategy to effectively supplement clinical services with the social services needed to overcome social barriers to health for those most at risk. The HUB coordinates agencies and service providers in the community to eliminate the inefficiencies and duplication that exists among them. At the foundation of the model are these primary features: 1) Core Pathways, 2) the HUB itself, and 3) payments linked to outcomes.	The HUB model requires extensive change on many levels—contracting, payment methodology, and collaboration. The Pathways Community HUB model not only requires that all care coordination activities in a region be transmitted through a central organization (i.e., the HUB), but also that payments are directly aligned with the production of positive outcomes through the Pathways. Payers save money because of efficiencies afforded by dealing with only one HUB rather than a multitude of individual agencies. Savings also accrue because of the reduction/elimination of redundant services.

APPENDIX C: DATA AND ANALYTICS

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
D.W. Bates, S. Saria, L. Ohno-Machado, A. Shah, and G. Escobar. "Big Data In Health Care: Using Analytics To Identify And Manage High-Risk And High-Cost Patients." *Health Affairs*, 33, no. 7 (2014): 1123-31. Available at: http://content.healthaffairs.org/content/33/7/1123.abstract.	High-risk, high-cost patients	Identification/ Stratification	Examines six use cases for high-risk patients where some of the clearest opportunities exist to reduce costs through the use of big data.	Big data can be particularly effective at reducing costs when focused on: high-cost patients, readmissions, triage, decompensation (when a patient's condition worsens), adverse events, and treatment optimization for diseases affecting multiple organ systems.
J. Billings and M.C. Raven. "Dispelling An Urban Legend: Frequent Emergency Department Users Have Substantial Burden Of Disease." *Health Affairs*, 32, no. 12 (2013): 2099-2108. Available at: http://content.healthaffairs.org/content/32/12/2099.abstract.	Frequent ED utilizers	Identification/ Stratification	Study of Medicaid ED users in New York City, looking retrospectively at Medicaid fee-for-service claims and managed care records for Medicaid patients (ages 18-62). Examined eligibility, use, spending, and diagnostic history to determine whether it is possible to predict who will become a frequent ED user with predictive modeling.	Extremely frequent ED users (those with 10+ visits) represented only 1.7 percent of all ED users; 29 percent of all ED users made 3+ visits. The percentage of ED users who were disabled increased progressively with ED utilization rates. The percentage of patients enrolled in managed care was relatively stable, except that it began to decline with patients who had seven or more ED visits. Levels of chronic illness were relatively high among ED users (50.4 percent overall), with rates increasing from 45.5 percent for patients with a single visit to 84.5 percent for the ultra-high users. The overall burden of disease or condition acuity increased with ED use. Principal diagnoses of substance use and mental illness accounted for a relatively small share of ED visits. Findings suggest that predictive modeling can identify patients who will become frequent users in the coming year at the time of their initial ED visit.
C. Boyd, C. Weiss, B. Leff, J. Wolff, A. Hamblin, L. Martin. *Faces of Medicaid: Clarifying Multimorbidity Patterns to Improve Targeting and Delivery of Clinical Services for Medicaid Populations*. Center for Health Care Strategies. December 2010. Available at: http://www.chcs.org/resource/faces-of-medicaid-clarifying-multimorbidity-patterns-to-improve-targeting-and-delivery-of-clinical-services-for-medicaid-populations/.	Medicaid beneficiaries with disabilities	Identification/ Stratification	Examination of multimorbidity patterns and the implications of specific patterns on hospitalization and cost.	A number of specific conditions and combinations of conditions are frequently associated with high per capita costs and hospitalization rates. Mental illness is nearly universal among the highest-cost, most frequently hospitalized beneficiaries. The presence of mental illness and/or drug and alcohol disorders is associated with substantially higher per capita costs and hospitalization rates.
S. Chakravarty, J. C. Cantor, J. T. Walkup, and J. Tong. "Role of Behavioral Health Conditions in Avoidable Hospital Use and Cost." *Rutgers Center for Health Policy*, e-pub, November 2014. Available at: http://www.cshp.rutgers.edu/Downloads/10530.pdf.	Super-utilizers	Identification/ behavioral health	Using New Jersey uniform billing (UB) data, from Camden, Trenton and Newark and 10 other low income communities, from the Department of Health (DOH), Rutgers Center for Health Policy examined the role of behavioral health conditions in potentially avoidable hospital use and costs for "super utilizers." This research with data from 2008-2011, focuses on reducing avoidable hospitalizations and costs, and the role of BH conditions in preventable hospital utilization patterns and associated costs.	Patients that are high users of hospital care and those with avoidable inpatient hospital use are more disproportionally affected by behavioral health (BH) conditions. BH conditions were disproportionate on billing records of inpatient high users compared to inpatients who were not high users (74.9% v. 32.3%). Among Medicaid beneficiaries the difference was higher (80.8% v. 25.1%). Total inpatient costs associated with BH was $880.1 million, with ED costs at $73.1 million. Conclude that improved behavioral health integration with medical services for complex patients can result in lowed preventable hospital use and cost savings.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
J.A. Fleishman and J. Cohen "Using Information on Clinical Conditions to Predict High-Cost Patients" *Health Services Research*. (2010) Apr; 45 (2): 532-552. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2838159/	High cost patients	Predicting future high users	The study used the Medical Expenditure Panel Survey (MEPS) using cohorts initiated between 1996-1999 and validated between 2000-2003. The MEPD interview collects socioeconomic information and medical conditions on interview participants. The study estimated regression model from year 1 and compared the risk summary based on the diagnostic cost group (DCG) to count chronic conditions and indicators for the top 10 specific highest chronic conditions.	The medical condition information greatly improved prediction of high expenditures beyond using gender, age, with the combination of the DCG risk score in providing the greatest improvements in prediction.
J.W. Frank, J.A. Linder, W.C. Becker, D. Fiellin, and E. Wang. "Increased Hospital and Emergency Department Utilization by Individuals with Recent Criminal Justice Involvement: Results of a National Survey." *Journal of General Internal Medicine*, 29, no. 9 (2014): 1226-33. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24817280.	Adult participants in the National Survey on Drug Use and Health, with recent criminal justice involvement	Identification/ Stratification	Cross-sectional survey to examine hospital and ED utilization and related costs by individuals with recent criminal justice involvement.	Recent criminal justice involvement was associated with both hospital and ED utilization among vulnerable subgroups: uninsured, those with a substance use disorder, and those reporting serious psychological disorders. The findings of the potential independent effect of criminal justice involvement on hospital and ED utilization which may be explained by disruptions in insurance coverage, access to outpatient care and prescription medications, and use of acute care services (EDs) for non-urgent or preventable conditions.
T. Gilmer and A. Hamblin. *Hospital Readmissions among Medicaid Beneficiaries with Disabilities: Identifying Targets of Opportunity.* Center for Health Care Strategies. December 2010. Available at: http://www.chcs.org/resource/hospital-readmissions-among-medicaid-beneficiaries-with-disabilities-identifying-targets-of-opportunity/.	Medicaid beneficiaries with disabilities	Identification/ Stratification	Analysis of Medicaid beneficiaries with disabilities through a variety of lenses: by number and type of chronic conditions; by state; and by whether or not beneficiaries had a physician visit between discharge and readmission.	The 30-day readmission rate for Medicaid beneficiaries with disabilities was 16 percent, rising to 53 percent within one year. Fifty percent of those readmitted within 30 days did not visit a physician between discharge and readmission. The likelihood of readmission increased with the number of chronic conditions.
Government Accountability Office. (2014). "A Small Share of Enrollees Consistently Accounted for a Large Share of Expenditures." (GAO Publication No. GAO-15-460) Washington, DC: US Government Printing Office. Available at: http://www.gao.gov/assets/680/670112.pdf.	Medicaid beneficiaries	Identification/ stratification	Analysis of the characteristics among high-expenditure beneficiaries for preventable/ avoidable ED use.	From 2009 through 2011, the most expensive 5 percent of Medicaid-only enrollees accounted for almost half of the expenditures. The least expensive 50 percent of Medicaid-only enrollees accounted for less than 8 percent of the expenditures for these enrollees. There was wide variation on the distribution of Medicaid-only enrollees' expenditures (from 0 to 75 percent).
D. Hasselman. *Super-Utilizer Summit: Common Themes from Innovative Complex Care Management Programs*. Center for Health Care Strategies. October 2013. Available at: http://www.chcs.org/resource/super-utilizer-summit-common-themes-from-innovative-complex-care-management-programs/.	Super-utilizers	Program evaluation	Super-utilizer programs need ongoing support from funders to evaluate and demonstrate the impact of complex care management and to build the evidence base of what works, for whom, when, etc.	Demonstrating the impact of super-utilizer programs takes significant time. It takes a long time enroll a sufficient number of patients into super-utilizer programs. Patients are not only difficult to engage, but to keep engaged. Changes to behavior and utilization do not happen overnight. Utilization and costs often increase in the beginning of the care management program because the patient engages with the system and finally gets the treatment he/she needs.
C.S. Hong, A.S. Hwang, and T.G. Ferris. "Finding a Match: How Successful Complex Care Programs Identify Patients." California HealthCare Foundation. March 2015. Available at: http://www.chcf.org/~/media/MEDIA%20LIBRARY%20Files/PDF/F/PDF%20FindingMatchComplexCare.pdf.	High-need, high-cost patients	Identification/ Stratification	The two key aspects to patient identification are (1) Predicting risk in specific patients along the outcomes of interest, and (2) predicting care sensitivity—the likelihood that a particular high-risk patient will respond to the care management intervention.	Successful complex care management programs align the selected population, the planned interventions, and the outcomes of interest by performing the following three tasks: (1) Specify, prioritize, and agree on the outcomes of interest and the time frame for achieving them; (2) Identify a sufficiently high-risk and care-sensitive target population; and (3) Match the planned staffing/resources and interventions to the target population, building on existing services.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
A.S. Hwang, S.J. Atlas, P. Cronin, J.M. Ashburner, S.J. Shah, W. He, et al. "Appointment "No-Shows" Are an Independent Predictor of Subsequent Quality of Care and Resource Utilization Outcomes." *Journal of General Internal Medicine*, e-pub, March 17, 2015. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25776581.	Patients with a high propensity for appointment "no-show"	Identification / Stratification	No-show propensity factor (NSPF) was calculated for patients using 5 years of outpatient appointment data. Patients were then divided into three NSPF risk groups and the association between NSPF and clinical and acute care utilization outcomes was evaluated.	NSPF appears to be an independent predictor of suboptimal primary care outcomes and acute care utilization. NSPF may play an important role in helping health care systems identify high-risk patients. Compared to patients in the low NSPF group, patients in the high NSPF group were significantly more likely to have incomplete preventive cancer screening for colorectal, cervical, or breast cancer; above-goal chronic disease control measures for HbA1c and LDL; and increased rates of acute care utilization for hospitalization and emergency department visits.
Y. Jiang, A.P. Novais, S. Viner-Brown, and M. Fine. "Non-emergent Hospital Emergency Department Use and Neighborhood Poverty in Rhode Island." *Rhode Island Medical Journal*, 97, no. 7 (2014): 47-51. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24983023.	Patients who use ED for non-emergent visits	Identification/ Stratification	Uses New York University ED classification algorithm, Rhode Island ED database, and American Community Survey (ACS) data, to describe characteristics of patients in Rhode Island who use ED for non-emergent visits and examine whether ED non-emergent use is associated with neighborhood poverty, how those patients are distributed geographically, and how the distribution is correlated with neighborhood poverty status.	Data reveal that 1 of every 5 ED visits (20.3%) in 2008-2012 was non-emergent. ED use for non-emergent conditions was higher for patients' ages 20-39 years of age, Hispanics, and non-Hispanic blacks and females. Non-emergent ED users were especially common among self-pay patients or Medicaid beneficiaries. Non-emergent ED visit percentages were moderately correlated with neighborhood poverty level. The highest percentages of ED visits for non-emergent conditions were in four core-city census tract codes. Profiling algorithm can identify characteristics of non-emergent ED use. The NYU algorithm provided an opportunity to study the quality of ED care to improve health care efficiency.
H.J. Jiang, M.L. Barrett, and M. Sheng. "Characteristics of Hospital Stays for Nonelderly Medicaid Super-Utilizers, 2012." Healthcare Cost and Utilization Project. November 2012. Available at: http://www.hcup-us.ahrq.gov/reports/statbriefs/sb184-Hospital-Stays-Medicaid-Super-Utilizers-2012.jsp.	Medicaid super-utilizers	Identification/ Stratification	Analysis of data from the Healthcare Cost and Utilization Project 2012 State Inpatient Databases (SID) shows patient demographics and characteristics of hospital stays for Medicaid super-utilizers. Patients were tracked across hospital stays.	Medicaid super-utilizers had more hospital stay (5.9 to 1.3) longer length stays were 6.1 to 4.5 higher hospital cost per stay 11,766 to 9,032. Mental and behavioral health conditions were the top diagnosis linked to hospital stays among super-utilizers. Alcohol-related disorders followed.
Kaiser Family Foundation (2013). "Medicaid: A Primer—Key Information on the Nation's Health Coverage Program for Low-Income People." Available at: http://kff.org/medicaid/issue-brief/medicaid-a-primer/.	Medicaid beneficiaries	Identification/ Stratification	Analysis of Medicaid spending based on data from the Medicaid Statistical Information System.	In FY 2011, Medicaid spending excluding administration totaled about $414 billion. Roughly two-thirds of Medicaid spending is attributable to seniors and people with disabilities, and a relatively small share of Medicaid beneficiaries with very high costs account for more than half of total spending. Dual eligible beneficiaries account for nearly 40% of all Medicaid spending. In FY 2009, the 5% of beneficiaries with the highest health and long-term care costs accounted for 54% of all Medicaid spending. The disabled individuals among these high-cost beneficiaries alone accounted for 30% of total Medicaid expenditures.
R.G. Kronick, M. Bella, T.P. Gilmer. *The Faces of Medicaid III: Refining the Portrait of People with Multiple Chronic Conditions*. Center for Health Care Strategies. October 2009. Available at: http://www.chcs.org/resource/the-faces-of-medicaid-iii-refining-the-portrait-of-people-with-multiple-chronic-conditions/.	Medicaid beneficiaries with multiple chronic conditions	Identification/ Stratification	Analysis of two Medicaid data sets—pharmacy claims and five years of diagnostic data—to refine what is known about Medicaid beneficiaries with multiple chronic conditions.	The proportion of Medicaid beneficiaries with disabilities diagnosed with three or more chronic conditions increased from 35% to 45%. The frequency of psychiatric illness among Medicaid beneficiaries with disabilities increased from 29% to 49% versus solely looking at diagnostic data. Costs for Medicaid-only beneficiaries with three or more chronic conditions increased from 66% to 75% of total spending for beneficiaries with disabilities.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
R.G. Kronick, M. Bella, T.P. Gilmer, and S.A. Somers. *The Faces of Medicaid II: Recognizing the Care Needs of People with Multiple Chronic Conditions.* Center for Health Care Strategies. October 2007. Available at: http://www.chcs.org/resource/the-faces-of-medicaid-ii-recognizing-the-care-needs-of-people-with-multiple-chronic-conditions/.	Medicaid beneficiaries with multiple chronic conditions	Identification/ Stratification	Analysis of patterns of multiple chronic conditions among Medicaid beneficiaries.	Within the most expensive 1% of beneficiaries in acute care spending, almost 83% had three or more chronic conditions, and over 60% had five or more chronic conditions. For Medicaid-only persons with disability, each additional chronic condition is associated, on average, with an increase in costs of approximately $700/month, or approximately $8,400 per year. The top most prevalent diagnostic pairs of diseases among the highest cost 5% of patients are: cardiovascular-pulmonary; cardiovascular-gastrointestinal; cardiovascular-central nervous system; central nervous system-pulmonary, and pulmonary-gastrointestinal.
A. Lind. *Measuring Quality for Complex Medicaid Beneficiaries in New York.* Medicaid Institute, United Hospital Fund. December 2011. Available at: http://www.uhfnyc.org/publications/880803?tr=y&auid=9958859.	Individuals with multiple chronic conditions, behavioral health conditions, and long-term care needs	Quality Measurement	Most states and health care organizations leverage existing measurement systems—whether HEDIS or similar ones—to collect data on the care and outcomes of individuals with complex conditions.	Disease-specific measurement (e.g., diabetes, asthma) works for relatively healthy individuals and those with a single chronic disease, but it is inadequate for assessing care for high-need, high-cost Medicaid beneficiaries. Quality measures for high-risk populations should be closely aligned with requirements for care management organizations. Sharing data at the provider level has multiple positive effects—providers use information to improve care for individual beneficiaries, and data-sharing improved the overall collection of quality measurement information. Underdeveloped sets of measures for Medicaid beneficiaries with multiple chronic conditions, behavioral health conditions, and long-term care needs are moving forward at a rapid pace.
A. Linden. "Assessing Regression to the Mean Effects in Health Care Initiatives." *BMC Medical Research Methodology*, 13, no. 119 (2013). Available at: http://www.biomedcentral.com/1471-2288/13/119#refs.	High-need, high-cost populations	Program evaluation	Individuals at risk for high utilization in health care may represent outlier values on utilization, cost, or clinical measures. Typically, such individuals participate in an intervention intended to reduce their level of risk, and after a period of time, a follow-up measurement is taken. However, individuals initially identified by their outlier values will likely have lower values on re-measurement in the absence of an intervention. This statistical phenomenon is known as "regression to the mean" (RTM) and often leads to an inaccurate conclusion that the intervention caused the effect.	Concerns about RTM are rarely raised in connection with most health care interventions, and it is uncommon to find evaluators who estimate its effect. This may be due to lack of awareness, cognitive biases that may cause people to systematically misinterpret RTM effects by creating (erroneous) explanations to account for it, or by design.
A. Miller, M. Cunningham, and N. Ali. "Bending the Cost Curve and Improving Quality of Care in American's Poorest City." *Population Health Management*, 16, Suppl. 1 (2013): S17-19. Available at: http://online.liebertpub.com.ezproxy.princeton.edu/doi/pdf/10.1089/pop.2013.0038.	Super-utilizers	Predictive modeling	Camden Coalition's data initiative is supported primarily by a health information exchange, which offers Camden city and regional health care providers real-time access to patients' important medical information. This resource makes it possible to perform accurate predictive analyses, enabling better, more cost-effective care, reducing unnecessary duplication and inefficiencies, and fostering improved treatment coordination. Innovative use of this data drives the patient engagement cycle. An individual may graduate from the Coalition's intervention program in 30 to 90 days, but his or her progress is monitored for up to 1 year to confirm sustained improvement.	Used correctly, data can uncover system deficiencies and inform disease-specific metrics to identify high-utilizing patients. Once the patient intervention is completed, data are an effective means to continually monitor progress. Although qualitative feedback from patients is valuable, the numbers are critical to assess the population's health and identify gaps in the care delivery system. In the long term, data make it possible to track patient utilization and gauge improvement.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
NYU Center for Health and Public Service Research. *ED Utilization Algorithm*. NYU Wagner. Available at: http://wagner.nyu.edu/faculty/billings/nyued-background.	ED utilizers	Identification/ Stratification	An algorithm developed to classify ED utilization, based on an examination of a sample of almost 6,000 full ED records. Data abstracted from these records included the initial complaint, presenting symptoms, vital signs, medical history, age, gender, diagnoses, procedures performed, and resources used in the ED. Based on this information, each case was classified into one of the following categories: non-emergent; emergent/primary care treatable; emergent—ED care needed—preventable/avoidable; and emergent—ED care needed—not preventable/avoidable.	Non-emergent—The patient's initial complaint, presenting symptoms, vital signs, medical history, and age indicated that immediate medical care was not required within 12 hours. Emergent/ Primary Care Treatable—Based on information in the record, treatment was required within 12 hours, but care could have been provided effectively and safely in a primary care setting. Emergent—ED Care Needed—Preventable/ Avoidable—ED care was required based on the complaint or procedures performed/resources used, but the emergent nature of the condition was potentially preventable/avoidable if timely and effective ambulatory care had been received during the episode of illness. Emergent—ED Care Needed—Not Preventable/Avoidable—ED care was required and ambulatory care treatment could not have prevented the condition.
Partnership to Fight Chronic Disease (2012). "Understanding and Addressing "Hot Spots" Critical to Bending the Medicaid Cost Curve." Available at: http://www.scribd.com/doc/95465593/Understanding-and-Addressing-Hot-Spots-Critical-to-Bending-the-Medicaid-Cost-Curve.	Super-utilizers	Identification/ Stratification	A small portion of Medicaid enrollees account for a large share of spending. This concentration presents opportunities for targeted, well-designed interventions particularly when these high costs persist over time with the same individuals. Analyzing claims data for extreme uncoordinated care provides a clear view of where there are ripe opportunities for care coordination and targeted care management services to bring down costs and improve outcomes.	States need the technology that enables data mining to identify and understand driving forces behind the "hot spots" in their Medicaid programs, to match effective interventions with the people most likely to benefit based on predictive modeling and to measure and track changes. Risk stratification and predictive modeling target interventions to identify the patients for whom an intervention holds the greatest promise. Supportive public policies enable states to deploy health information technology, analytics predictive modeling, and delivery system reforms that both improve health for individuals affected and manage costs for the system.
Pennsylvania Health Care Cost Containment Council (2014). "Pennsylvania's "Super-Utilizers" of Inpatient Hospital Care." Available at: http://www.phc4.org/reports/researchbriefs/super-utilizers/2014/docs/researchbrief_super-utilizers_2014.pdf.	Super-utilizers	Identification/ Stratification	Analysis of utilization and costs among super-utilizers admitted to a Pennsylvania hospital five or more times during FY 2014. Medicare payments analyzed include fee-for-service patients only; Medicaid payments include managed care and fee-for-service patients (2012 data). The figures represent general acute care discharges for adult PA residents only, and do not include maternity care, rehabilitation, or ED visits.	Super-utilizers represent 3% of hospitalized patients; 11% of hospital admissions; and 14% of hospital days. The average length of stay was 5.9 days for patients admitted five or more times, compared to 4.4 days for patients admitted 1-2 times. Ten percent of Medicare admissions and 18% of Medicaid admissions were for super-utilizers. $545 million (14%) of Medicare payments for inpatient stays were for super-utilizers. $216 million (17%) of Medicaid payments for inpatient stays were for super-utilizers.
J.A. Savageau, M. McLoughlin, A. Ursan, Y. Bai, M. Collins, and S.B. Cashman. "Characteristics of Frequent Attenders At a Community Health Center." *Journal of the American Board of Family Medicine*, 19, no. 3 (2006): 265-75. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16672680.	Frequent attenders/ High-utilizers	Identification/ Stratification	Through medical record abstraction, retrospective and longitudinal patient data were obtained for a 30-month time period for 382 established patients. Profile and comparison of frequent attenders/high-utilizers of an urban community health center in MA vs. non-high utilizers.	Older patients 45 to 64 years and Medicaid recipients were more likely to be frequent attenders. Patients residing furthest away from the community health center were also the most frequent of attenders as were those with a diagnosis of diabetes or depression. Patients who used the ED more had the highest number of visits, although those patients who missed more appointments as a proportion of the number of scheduled appointments were less likely to be frequent attenders.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
T.P. O'Toole, R. Pollini, P. Gray, T. Jones, G. Bigelow, and D.E. Ford. "Factors Identifying High-Frequency and Low-Frequency Health Service Utilization Among Substance-Using Adults." *Journal of Substance Abuse Treatment*, 33, no. 1 (2007): 51-9. Available at: http://www.ncbi.nlm.nih.gov/pubmed/17588489.	Medically ill substance-using adults	Identification/ Stratification	A retrospective/prospective cohort study of 326 medically ill substance-using adults to identify factors associated with 12-month high-frequency utilization of ambulatory care, ED, and inpatient medical care.	High-frequency ED use was independently associated with being female, being African American, being homeless, having a history of substance abuse treatment, and a history of ambulatory care visits. The combination of having certain chronic conditions (seizure disorder, hepatitis B, and hepatitis C) and accessing ambulatory care was protective against high-frequency use of ED. In contrast, high frequency ambulatory care use was independently associated with having insurance (Medicare/ Medicaid), having HIV/AIDS, and receiving substance abuse treatment during the study period.

APPENDIX D: WORKFORCE DEVELOPMENT

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
R. Adair, D.R. Wholey, J. Christianson, K.M. White, H. Britt, and S. Lee. "Improving Chronic Disease Care by Adding Laypersons to the Primary Care Team: A Parallel Randomized Trial." *Annals of Internal Medicine,* 159, no. 3 (2013): 176-84. Available at: http://annals.org/article.aspx?articleid=1722498.	Adults with hypertension, diabetes, or heart failure	Lay health workers	Randomized controlled trial to determine whether patients with chronic disease working with lay "care guides" would achieve more evidence-based goals than those receiving usual care. Care guides were 12 laypersons who received brief training about these diseases and behavior change.	Patients with care guides achieved more goals than usual care patients; reduced unmet goals by 30.1% compared with 12.6% for usual care patients; and improved more than usual care patients in meeting several individual goals, including not using tobacco. Estimated cost was $286 per patient per year.
Association of American Medical Colleges (2014). "Tips and Sample Questions for Interviewing Patients Who Have Been Hospitalized Three or More Times in the Last Six to Nine Months." Available at: https://www.aamc.org/initiatives/hotspotter/toolkit/356828/patientinterviewquestions.html.	Super-utilizers	Patient engagement	Providers can behave in a manner and ask certain questions to elicit a more positive, trusting, and engaged response from patients at high risk for hospital and ED use.	Sitting next to the patient at the bedside, making eye contact, removing the white coat, introducing oneself, and asking the patient if he or she would mind if you ask a few questions to get to know him or her better are good preliminary strategies. If the patient does not want to talk to you, respect his or her decision. Ask if the patient would like you to come back if he or she is admitted to the hospital again. If the patient is willing to talk, some sample questions include: *What are some of the things you enjoy doing? Can you tell me about some of your good and bad experiences with the health care system? Do you have any problems getting the care you need?* It may take time to draw out the patient. Work more on forming a connection with the patient and getting to know him or her, rather than following a rigid script.
L. Blash, S. Chapman, C. Dower. "The Special Care Center—A Joint Venture to Address Chronic Disease." Center for the Health Professions at UCSF. November 2011. Available at: http://www.iorahealth.com/wp-content/uploads/2014/07/UCSF_The_Special_Care_Center_A_Joint_Venture_to_Address_Chronic_Disease.pdf.	Patients with multiple chronic illnesses	Complex care management	The Atlantic City HEREIU Local 54 Health and Welfare Fund and AtlantiCare Regional Medical Center partnered to develop the "Special Care Center" (SCC), a new clinic that provides coordinated care management to patients with multiple chronic illnesses. The center recruited and trained a group of frontline health workers to serve the functions of both health coaches and medical assistants. The SCC developed a new job category and wage scale within the AtlantiCare system to recognize the challenging and vital work of this group of Patient Care Assistants.	Costs escalated in the first 12-18 months, likely due to an increase in care, but now numbers for emergency visits and non-planned hospital stays leveling off. Initial analysis suggested that the model had the potential to produce first year savings of up to 38% of net total spending for the care of the highest-risk quintile of patients.
L.M. Cabral, H. Strother, K. Muhr, L.A. Sefton, J.A. Savageau. "Clarifying the Role of the Mental Health Peer Specialist in Massachusetts, USA: Insights from Peer Specialists, Supervisors and Clients." *Health and Social Care in the Community*, 22, no. 1 (2013): 104-112. Available at: http://onlinelibrary.wiley.com/doi/10.1111/hsc.12072/abstract.	Individuals with mental illness	Peer specialists	Although the number of peer specialists in use has been increasing, their role in care teams is less defined than that of the community health worker. Mental health peer specialists develop peer-to-peer relationships of trust with clients to improve their health and well-being, functioning in ways similar to community health workers. Peer specialists reported that the most important role they play is to develop a relationship with another peer based on mutuality, respect and hope. They also educate others about recovery.	People receiving services overall had positive experiences. Challenges included: lack of expectations and role ambiguity. Supervisors had difficulty providing supervision and evaluating performance. More guidance from the state mental health authority, as the entity that funds the peer specialist training, may make for a smoother implementation. The integration of peer specialists into health teams could foster collaboration. However, this would need to be done in an environment where team members' roles are clear and training on care team participation has been provided.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
M. Chinman, P. George, R.H. Dougherty, A.S. Daniels, S.S. Ghose, A. Swift, et al. "Peer Support Services for Individuals With Serious Mental Illnesses: Assessing the Evidence." *Psychiatric Services*, 65, no. 4 (2014): 429-41. Available at: http://ps.psychiatryonline.org/doi/abs/10.1176/appi.ps.201300244	People with a serious mental illness or co-occurring mental and substance use disorders	Peer services	Three service types for individuals with serious mental illnesses or co-occurring mental and substance use disorders: peers added to traditional services, peers in existing clinical roles, and peers delivering structured curricula.	Results were mixed. The effectiveness varied by service area/ type. A majority of studies of two service type peers added and peers delivering curricula/education, showed some improvement favoring peers. When compared with professional staff, peers were better able to reduce inpatient use and improve a range of recovery outcomes. One study found a negative impact. The effectiveness of peers in existing clinical roles was mixed. Across the service types, the following outcomes were observed: reduced inpatient service use; improved relationship with providers; better engagement with care; higher levels of empowerment; higher levels of patient activation; and higher levels of hopefulness for recovery.
M. Chinman, K. Henze, and P. Sweeney. "Peer Specialist Toolkit: Implementing Peer Support Services in VHA." VISN 1 New England MIRECC Peer Education Center and VISN 4 MIRECC Peer Resource Center. March 2013. Available at: http://www.mirecc.va.gov/visn4/peer_specialist_toolkit.asp.	Veterans diagnosed with serious mental illness	Peer specialists	Peer specialists are required in Veterans Health Administration transformation. Peer Specialists promote recovery by sharing their own recovery stories, providing encouragement, instilling a sense of hope, and teaching skills to Veterans.	Eight of 14 studies in non-VA clinical settings showed some positive benefits of peer support, such as less inpatient use and better treatment engagement. Challenges related to peer support include: role confusion, staff resistance, and unequal treatment
B.G. Druss, L. Zhao, S.A. von Esenwein, J.R. Bona, L. Fricks S. Jenkins-Tucker, et al. "The Health and Recovery Peer (HARP) Program: A Peer-Led Intervention to Improve Medical Self-Management for Persons with Serious Mental Illness." *Schizophrenia Research*, 118 (2010): 264–270. Available at: http://www.integration.samhsa.gov/workforce/Druss_HARP_2010.pdf.	People with SMI and chronic medical illness	Peer services	New York's Health and Recovery Program (HARP), employs a manualized, six-session intervention, delivered by mental health peer leaders, to help participants become more effective managers of their chronic illnesses.	This peer-led, medical self-management program was feasible and showed promise for improving a range of health outcomes among mental health consumers with chronic medical comorbidities. The HARP intervention may provide a vehicle for the mental health peer workforce to actively engage in efforts to reduce morbidity and mortality among mental health consumers. At six month follow-up, participants in the HARP program had a significantly greater improvement in patient activation than those in usual care, and in rates of having one or more primary care visit. Intervention advantages were observed for physical health related quality of life, physical activity, and medication adherence. Improvements in physical health related quality of life were largest among medically and socially vulnerable subpopulations.
E.B. Fisher, M.M. Coufal, H. Parada, J.B. Robinette, P.Y. Tang, D.M. Urlaub, et al. "Peer Support in Health Care and Prevention: Cultural, Organizational, and Dissemination Issues." *Annual Review of Public Health*, 35 (2014): 363-83. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24387085.	Many populations	Peer support services	Four key peer support functions include: assistance in daily management, social and emotional support, linkage to clinical care and resources, and continual support.	Appreciable evidence is emerging for the cost-effectiveness of peer support services interventions in a variety of settings and types of application. Peer support services that addresses adherence, provide emotional support and encouragement, and encourage appropriate contact with providers has potential to produce substantial cost savings. Peer support needs to reflect its contexts—intended audience, health problems, organizational and cultural settings. Dissemination policies that lead to flexible response to contexts, rather than overly prescriptive guidelines, are critical.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
M. Hutchison and A. Hunt. *Why Lay Healthcare Workers in Care Delivery?* Care Copilot Institute. October 2014. Available at: http://www.healthcarecopilot.com/wp-content/uploads/2014/08/Article_Why-Lay-Healthcare-Workers_white-border_0100114.pdf.	Individuals living with chronic illness in its later stages (LifeCourse Project)	Lay health workers	LHWs perform various functions for patients and families while supporting traditional healthcare roles and enhancing care. In one lay health worker model, the LifeCourse Project, a care guide works with the patient and their care providers to strive toward a unified approach in gathering information and discussing options for medical and non-medical care.	Patients working with care guides in the LifeCourse Project were 31% more likely to meet evidence-based goals and 21% more likely to quit tobacco use than usual care patients. Care guide patients had fewer hospitalizations and ED visits and reported significantly more positive perceptions of their care. Recent research and evaluation supports the value lay healthcare workers provide in the way of quality outcomes and patient engagement. However, these studies are limited in number, scope, and quality, therefore identifying a need for further research and evaluation of lay healthcare worker programs and models in order to clearly examine their full impact on patient experience, outcomes, and cost of care.
G.S. Moran, Z. Russinova, V. Gidugu, and C. Gagne. "Challenges Experienced by Paid Peer Providers in Mental Health Recovery: A Qualitative Study." *Community Mental Health Journal*, 49, no. 3 (2012): 281-91. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23117937.	Individuals with psychiatric conditions	Peer providers	Research in the last two decades has demonstrated that peer providers have beneficial impact on recipients of their services; less is known about the challenges and outcomes of those employed in peer roles, who have lived experience of mental illnesses.	Themes related to the challenges faced by mental health peer support providers include: work environment, occupational path, and peer providers' mental health status. Challenges in the work environment differed between conventional mental health settings and consumer-run agencies. Occupational domain challenges included lack of clear job descriptions, lack of skills for using one's life story and lived experience, lack of helping skills, and negative aspects of carrying a peer provider label. Personal mental health challenges included overwork and symptom recurrence. Further investigation into challenges related to work environment are suggested, especially examining sources of resilience in successful peer-run organizations.
National Center for Chronic Disease Prevention and Health Promotion Division for Heart Disease and Stroke Prevention. *Addressing Chronic Disease Through Community Health Workers: A Policy and Systems-Level Approach*. Centers for Disease Control and Prevention. 2011. Available at: http://stacks.cdc.gov/view/cdc/12052.	Individuals with or at risk of developing chronic disease	Community health workers	Seven core community health worker roles include: cultural mediation; appropriate education; ensuring connections to needed services; informal counseling and social support; advocating; providing direct services; and building capacity.	A variety of studies support community health worker involvement with patients who have hypertension and diabetes. Community health workers can play an important role in facilitating the prevention and control of chronic diseases among a variety of populations, especially those that have disparities in health.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
Substance Abuse and Mental Health Services Administration (SAMHSA). "Equipping Behavioral Health Systems and Authorities to Promote Peer Specialists/Peer Recovery Coaching Services." Expert Panel Meeting Report, 3/21-22, 2012. Available at: http://www.naadac.org/assets/1959/samsha_2012_expert_panel_meeting_report_-_equipping_behavioral_health.pdf.	Individuals with mental illnesses and/or addictions	Peer support providers	A peer is a person who has lived experience of recovery from mental illness and/or addiction and who wishes to provide peer support services to others who are living with these disorders. Peers motivate through hope and inspiration and support many pathways to recovery. Peers function as an advocate for the person in recovery, teaches the person how to accomplish daily tasks, teaches how to acquire needed resources, including money; help the person find basic necessities; use language based on common experiences; and help the person find professional services from lawyers, doctors, psychologists, financial advisers.	A growing body of evidence suggests that peer-provided, recovery-oriented behavioral health services produce outcomes as good as—and in some cases superior to—services from non-peer professionals. Programs likely to be successful in implementing peer support/recovery coaching have strong recovery values and principles that guide their service delivery. Lack of an accepted typology hinders research and evaluation of peer services. The literature that does exist tends to be descriptive and lacks experimental rigor. Lack of training and lack of peer-focused supervision and support can create confusion in the workplace because the staff is unclear about the peer's role in the workplace. Among the major concerns for peers are low—or no—pay and a lack of career advancement opportunities. Misunderstanding and discrimination continue to be key challenges to integrating peers into the workforce. Suggestions for the future: develop "how-to" manuals for behavioral health programs to implement peer support, and for States to develop, fund, and monitor such programs.
M. Takach and R. Yalowich, National Academy for State Health Policy. *Transforming the Workforce to Provide Better Chronic Care: The Role of a Community Health Nurse in a High-Utilizer Program in Oregon*. AARP Public Policy Institute. January 2015. Available at: http://www.nashp.org/sites/default/files/NursingCareinOregon_Spotlight.pdf.	Medicaid super-utilizers	Community health nurses/workers	Yamhill Community Care Organization's (YCCO) Community HUB program provides care to individuals with chronic conditions with the goals of reducing inappropriate emergency department use and improving connections to primary care. A community health nurse leads the program and works with two community health workers to achieve these aims. The nurse educates providers and hospitals about the program, manages the program, and identifies potential high-utilizer patients through claims and referrals.	YCCO decreased emergency department utilization from 77.7 percent in 2011 to 58.9 percent in 2013. Key recommendations based on the program include: invest time in patient engagement; keep the program flexible; regularly engage outside input; use a combination of data and referrals to identify patients; improve opportunities for more immediate communication with providers; and develop more resources for patients with chronic pain.

APPENDIX E: POLICY AND ADVOCACY

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
T. Bodenheimer, E. Chen, and H.D. Bennett. "Confronting The Growing Burden Of Chronic Disease: Can The U.S. Health Care Workforce Do The Job?" *Health Affairs*, 28, no. 1 (2009): 64-74. Available at: http://content.healthaffairs.org/content/28/1/64.long.	Individuals with chronic conditions	Delivery system and payment reform	The paper addresses four specific policy questions: (1) Can dramatic public health prevention slow down the rate of increase of chronic disease prevalence? (2) Should chronic care be delivered chiefly by specialist physicians, generalist physicians, or multidisciplinary teams of health personnel? (3) Is the future health care workforce optimally positioned to provide the best care for patients with chronic diseases? (4) Is fee-for-service payment the best way to reimburse personnel who care for patients with chronic conditions?	A larger interdisciplinary primary care workforce is needed, and payment for primary care should reward practices that incorporate multidisciplinary teams. Multidisciplinary teams in primary care can improve care, and at times lower costs, for patients with chronic diseases. Many highly prevalent chronic illnesses have risk factors that can be mitigated by effective public health measures, such as policies that reduce tobacco use; cut consumption of unhealthy foods; and increase physical activity. Payment reform should move toward risk-adjusted per patient payment with incentives for quality, services provided by non-clinician team members, and population-oriented panel management.
CMCS Informational Bulletin. "Targeting Medicaid Super-Utilizers to Decrease Costs and Improve Quality." Center for Medicaid and CHIP Services. July 24, 2013. Available at: http://www.medicaid.gov/federal-policy-guidance/downloads/CIB-07-24-2013.pdf.	Medicaid super-utilizers	Medicaid policy	Key policy questions for states related to super-utilizer programs include: (1) whether to pursue a super-utilizer program; (2) which payers are involved; (3) who will provide the services and the relationship to primary care; (4) what is the targeting strategy; (5) what services are provided; and (6) what is the funding strategy.	Medicaid can support states in building super-utilizer programs in a number of ways, including: enhanced federal match for design, development, and implementation of MMIS; enhanced federal match for health information exchanges; administrative contracts; Medicaid health homes; integrated care models; Targeted Case Management services; and Medicare data access and assistance.
D. Hasselman. *Super-Utilizer Summit: Common Themes from Innovative Complex Care Management Programs*. Center for Health Care Strategies. October 2013. Available at: http://www.chcs.org/resource/super-utilizer-summit-common-themes-from-innovative-complex-care-management-programs/.	Super-utilizers	Policy and advocacy	Targeting complex care management services and supports to high-cost, complex patients is an increasingly well-recognized best practice in health care; however, this approach is still no "slam dunk."	Overcoming society's cognitive bias that more medical care, more expensive medical care, and more high-tech medical care is better remains challenging. The current U.S. health care system is not designed to flexibly and creatively address the complexity and uniqueness of each super-utilizer, so taking super-utilizer programs to scale within our health care system is also an unsolved challenge. There is a need to shift the role of hospitals from treating people who are sick to keeping more people healthy. If the concept of health expands from delivering medical care to creating healthy populations and communities, the concept of the health care team must also expand. A linkage between traditional medicine and population health must be forged.
E. Rich, D. Lipson, J. Libersky, and M. Parchman. "Coordinating Care for Adults With Complex Care Needs in the Patient-Centered Medical Home: Challenges and Solutions." Agency for Healthcare Research and Quality. January 2012. Available at: http://pcmh.ahrq.gov/page/coordinating-care-adults-complex-care-needs-patient-centered-medical-home-challenges-and.	Individuals with complex health and social needs	Care coordination	Essential elements of care coordination for complex populations: conducting and regularly updating a comprehensive needs assessment; developing and updating an individualized care plan; facilitating access to medical care and home- and community-based services; and regularly monitoring a patient's health status, needs and services, and communicating among all service providers.	Policies and strategies that can support care coordination for complex patients include: primary care provider payment reforms that take into account care coordination services; expansion of organization's clinical competence, through expert consultation or hired staff with specific clinical expertise; systematic quality improvement; and extra resources to manage urgent concerns.

Citation	Target Population	Key Focus	Summary of Model/Intervention	Key Findings/Outcomes
W. Warning, J. Wood, A. Letcher, N. Srouji, C. Echterling, and C. Carpenter. "Working with the Super Utilizer Population: The Experience and Recommendations of Five Pennsylvania Programs." Aligning Forces for Quality, The Highmark Foundation. 2014. Available at: http://www.aligning4healthpa.org/pdf/High_Utilizer_report.pdf.	Super-utilizers	Policy	Super-utilizer (SU) programs are data-driven, high-intensity, community-based, patient-centered, inter-disciplinary team that engages patients to deliver high-quality, comprehensive care, while encouraging self-advocacy and personal accountability. The five programs in the South Central Pennsylvania Super-Utilizer Collaborative vary in terms of structures and processes, but share the common goal of working with SU patients to improve quality of care and quality of life, and to reduce preventable utilization. Four of the programs are based in health systems; one is based in a neighborhood health center. Patients may be engaged during a hospital admission, in the ED, or in a primary care practice.	Policy recommendations related to supporting SU programs include: Provide state support for the development of health information exchanges that deliver real-time, all-payer data to programs on a daily basis, including utilization data from all hospitals. (A crucial step would be to facilitate access for super-utilizer programs to Medicaid data including medical, behavioral and substance abuse data from all sources.) Use alternative payment mechanisms such as case management fees, for SU programs. Provide access to: 1) real-time utilization data for super-utilizer patients, and 2) current and historical charge, payment and cost data for super-utilizer patients.

ENDNOTES

1 For more information, visit: http://www.rwjf.org/en/about-rwjf/annual-reports/presidents-message-2014.html.

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11 Xing, et al., op cit.

12 Ibid.

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14 R.S. Brown, D. Peikes, G. Peterson, J. Schore, and C.M. Razafindrakoto. "Six Features Of Medicare Coordinated Care Demonstration Programs That Cut Hospital Admissions Of High-Risk Patients." *Health Affairs*, 31, no. 6 (2012): 1156-66. Available at: http://content.healthaffairs.org/content/31/6/1156.abstract.

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