



Health Care Innovations to Improve Outcomes and Equity



As value-based care continues to make its way across the healthcare industry, we see further innovations that support equitable and outcome-based healthcare delivery transformation. Aligning with the Center for Medicare and Medicaid Innovation (CMMI) [strategic refresh](#), CMMI wants every Medicare beneficiary in an accountable care relationship by 2030 with equity at the forefront.

We are excited to sponsor this content collection in collaboration with NEJM Catalyst that highlights innovations in value-based care delivery focused on evidence-based, data-driven interdisciplinary methodologies as drivers of equitable and outcome-based care.

Since 2007, the Centers for Medicare & Medicaid Services (CMS) has publicly reported [clinical outcomes measures](#) for select medical conditions to hold providers accountable and promote higher-quality healthcare. Leveraging our experience supporting the management of alternative payment models, in February 2021, Signify Health implemented the interdisciplinary, evidence-based, virtual-first [Transition to Home \(TTH\) program](#) with select partners. In an effort to reduce hospital readmissions, the program provided older adults with additional support during their transition from hospital to home.

By incorporating social care coordination as a key part of the interdisciplinary team, we found that social determinants of health (SDOH) play a key role in the post-discharge recovery period for older adults. Comprehensive SDOH assessment and care coordination during the transitional care period is critical for the prevention of adverse events that lead to readmissions.

Over the course of 12 months, more than 3,000 SDOH gaps were identified and nearly 55% have been successfully addressed or resolved, through coordination with local providers, community-based social services organizations, and family members. These results highlight the need to shift the focus of transitional care programs beyond the traditional 30-day benchmark, particularly as more providers examine new models to address the total cost of care.

Leveraging technology in collaboration with interdisciplinary care to improve clinical and quality outcomes and operational efficiencies holds significant promise in enhancing resource efficiency and coordination that is critical to the scaling of innovative value-based care solutions.

Programs that incorporate interdisciplinary care, leverage technology to improve clinical and quality outcomes, and invest in social drivers of health for populations with complex needs offer the greatest opportunity to improve quality of care, enhance experience for the patient, and reduce overall costs to the healthcare system.

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Chief Medical Officer
Signify Health*



Health Care Innovations to Improve Outcomes and Equity

Marc Rothman, MD



Chief Medical Officer

Marc Rothman, MD, has served as Chief Medical Officer of Signify Health since June 2020. Prior to joining Signify, Dr. Rothman served as Deputy Chief Medical Officer at Aspire Healthcare, where he led a nationwide palliative care medical practice and implemented and grew new clinical models and business lines. He also served as Enterprise Chief Medical Officer at Kindred Healthcare, Inc., where he oversaw medical affairs, clinical quality, patient experience and pharmacy services. Additionally, he served as the Chief Medical Officer of Kindred's Nursing Center Division, leading the medical and pharmacy leadership team. Dr. Rothman holds an MD from New York University School of Medicine and a BA in Philosophy from the University of Wisconsin, Madison. He completed his postgraduate clinical training at Yale New Haven Hospital and is triple boarded in Internal, Geriatric and Hospice & Palliative Medicine.



Signify Health is a leading healthcare platform that leverages advanced analytics, technology and nationwide healthcare networks to create and power value-based payment programs. Signify Health leverages its industry leading capabilities in closing hard-to-reach gaps in care, including engaging people in their homes and connecting primary care providers with the actionable insights required to be successful in value-based models. Signify's aim is to give providers, payors and the people they serve the data, tools and support needed to achieve the best possible health outcomes — and to do so in a cost-effective manner. We are committed to positively impact a fragmented healthcare system in partnership with risk-bearing providers and payers.

For more information please visit us at: <https://www.signifyhealth.com/contact-us>



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How an Interdisciplinary Care Team Reduces Prolonged Admissions Among Older Patients with Complex Needs [Page 19](#)

A subset of patients cared for by the San Francisco Veterans Affairs Health Care System (SFVAHCS) are older and have complex medical, psychological, and social needs. To improve coordination and care for these patients, SFVAHCS created the Transitions Referral and Coordination team, which holds a once-weekly interdisciplinary meeting for managing geriatric complexity.

QualityImpact: A Data-Driven Quality Improvement Model That Improves Clinical Care and Reduces Cost [Page 35](#)

The Consortium for Southeast Healthcare Quality (COSEHQ) created QualityImpact, a data-driven clinician performance improvement initiative for managing cardiovascular conditions, and scaled it across the Southeast United States between 2016 and 2019.

Measuring Health Disparities in a Commercially Insured Population: The First Step to Incorporate Equity into Value Transformation [Page 50](#)

Improving the value of the health care system cannot occur unless we improve the quality of care for all, not just for a subset of the population.



CASE STUDY

Transition to Home: Rapid Scaling of a Multistate Readmission Prevention Program for Advanced Alternative Payment Model Participants

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Reducing unnecessary readmissions to acute care hospitals is a key lever of success in many advanced alternative payment models. Despite the proven effectiveness of evidence-based transitional care, hospitals and health systems often have difficulty scaling and sustaining postdischarge transitional care programs. As the United States' largest convener of Medicare's Bundled Payments for Care Innovation Advanced (BPCI-A) program, Signify Health implemented and rapidly scaled a virtual-first, evidence-based, interdisciplinary transitional care program now serving patients in 15 states. In the first 12 months since its inception on February 1, 2021, the Transition to Home (TTH) program has coordinated care for more than 8,000 patients discharged from 68 hospitals participating in either BPCI-A or an ACO. By focusing on care plan review, facilitating access to home- and community-based services and supports, and reconnecting patients with their primary care and specialty providers, the TTH program has successfully reduced both 30- and 90-day rehospitalization rates. Early challenges included language barriers, documentation for proxy decision-making, and excessive precall preparation time.

KEY TAKEAWAYS

- » With access to appropriate data, technology, and product and administrative support, interdisciplinary care teams can scale and sustain evidence-based, virtual-first transitional care programs across large geographic areas that prevent unnecessary hospital readmissions for up to 90 days.
- » Enhancing care coordination at the local level, including timely follow-up with providers, access to health care services, and closure of social determinants of health care gaps, is a key driver of readmission reduction.
- » Overcoming language barriers, access to proxy decision-making documents, and call preparation time often require the addition of team members focused on specific populations or tasks.

The Challenge

Transitional care in the United States was born from a clear imperative: in 2004, nearly one in three Medicare¹ patients discharged from acute care institutions were readmitted within 30 days. Since then, several well-studied readmission reduction programs (e.g., Care Transitions,² Project RED,³ and GRACE⁴), when implemented in their entirety, have proven that high-quality transitional care can reduce readmissions and costs⁵ and improve outcomes and patient satisfaction.⁶

Effective transitional care can prevent adverse outcomes, including gaps connected with various social determinants of health (SDOHs), that often occur as patients move between care settings. Examples include a lack of transportation, leading to inadequate follow-up with primary care providers (PCPs) and specialists; a lack of means to access and adhere to medication; and failure to access recommended home-based services. As defined by the National Transitions of Care Coalition,⁷ the seven components of an effective transitional program are as follows:

- Transition planning
- Information transfer
- Patient and family engagement
- Follow-up care
- Medication management
- Health care provider engagement
- Shared accountability across providers and organizations

Unfortunately, hospitals and health care systems struggle to implement, scale, and sustain traditional, face-to-face transitional care programs, which are often forced to shut down because of a lack of cost-effectiveness⁸ or because of poor outcomes.⁹

The Goal

Signify Health provides software, analytics, provider networks, and care redesign services to hospital systems and physician practice groups participating in Medicare's Bundled Payments for Care Innovation Advanced (BPCI-A) program. Our goal was to implement and rapidly scale a multistate, evidence-based, virtual-first, 90-day transitional care program for BPCI-A and ACO clients nationwide. We called the program Transition to Home (TTH). Since rehospitalizations are both a marker of overall quality in health care and a significant driver of overall episodic cost, Signify Health sought to give better odds to Medicare patients who thought going home meant staying home. Signify's fees are paid from our clients' shared savings on the basis of achievement of quality measures and reduction in overall costs.

The Team

In the summer of 2020, Signify Health convened a team of 20 employees to develop the TTH program and workflows. The team included social workers, care coordinators, product and technology specialists, data and financial analysts, pharmacists, client success executives, implementation teams, senior nurse practitioners, and the chief medical officer. The program went live with its first two clients, health systems with multiple hospital locations, on February 1, 2021. Over the next 12 months, the TTH program was scaled to 10 clients. It now enrolls patients discharged from 68 hospitals in 15 states and is adding approximately 750 new patients each month.

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The Execution

The TTH program has several key design principles:

- Risk stratification of the population to match higher-intensity clinical services with high-complexity, higher-risk patients
- A virtual-first (telephonic) approach, which eliminated patient travel time, reduced cost, hastened implementation, and improved safety during the coronavirus pandemic
- Use of evidence-based transitional care assessment tools, interventions, and workflows

- Transparent quality assurance, audit, and readmission review processes to reduce variation and ensure adherence to best practice

TTH patients are stratified twice: first by episode (bundle) on the basis of each hospital's historic rehospitalization rates and second at the patient level using the LACE¹⁰ index score, an evidence-based tool for assessing readmission risk. Patients are thus triaged into one of two care pathways (Figure 1):

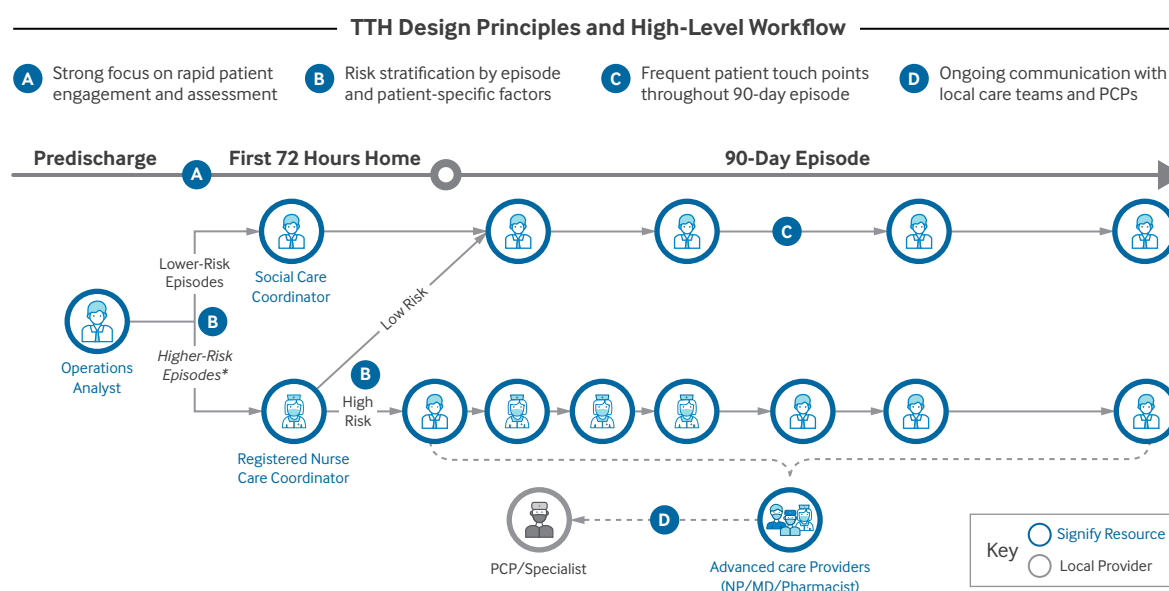
- Tier 1 (high risk), which emphasizes early clinical engagement by a registered nurse care coordinator focused on care plan and medication regimen review, symptom assessment, and self-monitoring for acute changes in condition; or
- Tier 2 (low risk), which emphasizes early social care coordinator engagement focused on motivational interviewing, access to medical resources (medications, postacute services, PCP follow-up), and community services to close SDOH gaps.

TTH services begin at the point of hospital or post-acute facility discharge, when patients are transitioning home with or without support from a home health agency. Patients discharged to skilled nursing facilities (SNFs) and inpatient rehabilitation facilities (IRFs) are monitored closely for discharge orders, and TTH is activated once they reach their home or assisted living facility.

FIGURE 1

Transition to Home Design Principles and Risk Stratification Overview

By focusing on episodes and patients with the highest risk of rehospitalization, the Transition to Home (TTH) program is optimized for patient recovery.



NP = nurse practitioner, PCP = primary care provider.

Source: Signify Health

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

TTH is provided solely telephonically by licensed professionals and seeks to augment local care coordination by communicating directly with local resources and providers on behalf of patients. TTH does not use any automated telephonic triage or symptom assessment systems. PCPs are notified of our engagement with their patients at the beginning and the end of the program and as needed for urgent issues. Signify advanced practitioners (physicians, nurse practitioners, and pharmacists) conduct ongoing case reviews of all high-risk patients and engage in peer-to-peer discussions with local providers when necessary.

The Methods

Study Population

The study population consisted of Medicare beneficiaries admitted to hospitals who triggered episodes under the BPCI-A model. Beneficiaries were excluded from the BPCI-A model if they (1) were eligible for Medicare on the basis of end-stage renal disease, (2) did not have Medicare as their primary payer, (3) died during the anchor admission or procedure, (4) were covered under managed care plans or the United Mine Workers, or (5) had received a diagnosis of Covid-19 on or after February 2020 during the anchor admission or procedure or during the 90-day postanchor time period.

Among TTH-engaged patients, the most common acute care diagnoses were sepsis, congestive heart failure, cardiac arrhythmia, renal failure, and urinary tract infection, which together accounted for nearly 50% of all patients enrolled in TTH (Figure 2).

Treatment Group

The treatment group consisted of any eligible patient who (1) received a phone call from a TTH coordinator and (2) accepted TTH services. These individuals were designated as “TTH-engaged” beneficiaries.

Comparison Group

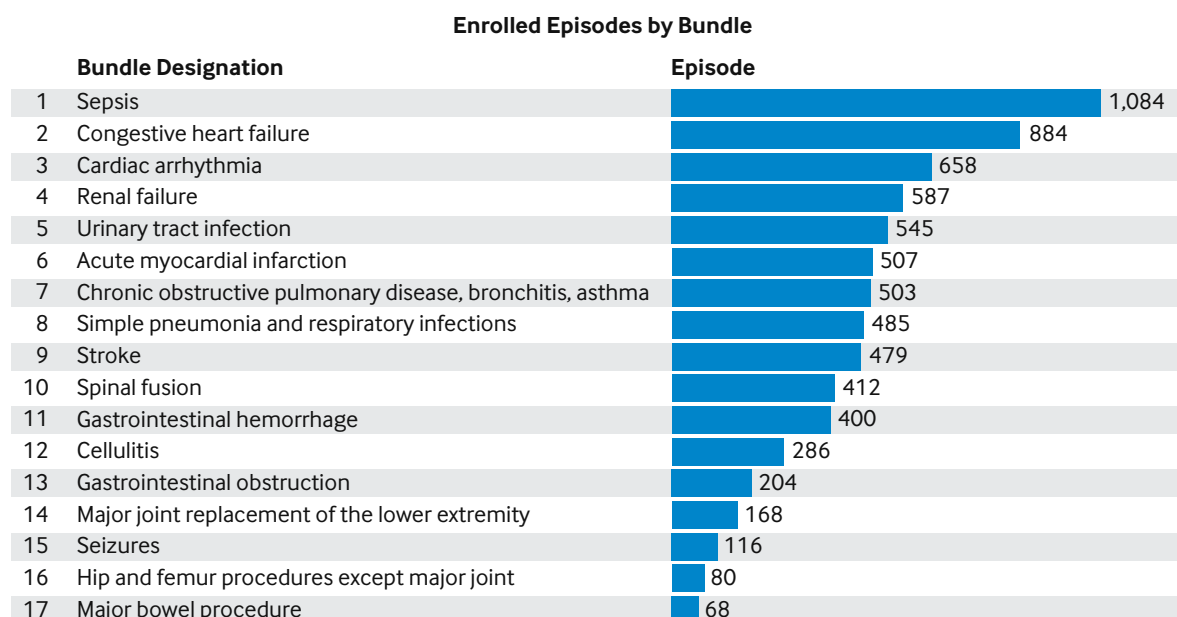
The comparison group consisted of eligible patients who (1) did not receive a phone call from a TTH coordinator, (2) received a phone call from a TTH coordinator but did not pick up or did not respond, or (3) picked up the phone call and declined services. These are designated as “non-TTH” beneficiaries.

“

TTH is provided solely telephonically by licensed professionals and seeks to augment local care coordination by communicating directly with local resources and providers on behalf of patients.”

FIGURE 2

Transition to Home—Engaged Patients by Major Hospital Discharge Diagnoses, February 1, 2021 to January 31, 2022



Source: Signify Health

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

Data Sources

The TTH program uses two primary data sources for execution and evaluation. Direct HL7 data feeds from health systems participating in BPCI-A identify eligible Medicare beneficiaries, determine underlying conditions or diagnostic related groups (DRGs), establish a discharge disposition for the episode, and provide the patients' contact information. Our proprietary documentation and operations platform (Signify Community) uses these data in the workflows for patient outreach, tiering, and care coordination by the interdisciplinary team. Medicare claims files, provided directly from the U.S. Centers for Medicare & Medicaid Services (CMS) through the BPCI-A model, are used to validate episode status, calculate the program's 30- and 90-day risk adjusted readmission rates, and evaluate other outcomes.

Statistical Analysis and Risk Adjustment

The primary outcome of interest was the relative reduction in 30- and 90-day readmission rates compared with risk-adjusted historical benchmarks for both TTH-engaged and non-TTH populations. TTH program performance was evaluated by conducting a simple difference-in-difference comparison of relative readmission reduction between the TTH-engaged and non-TTH populations at 30 and 90 days after episode initiation, followed by a simple two-sided

t-test comparing beneficiary-level readmission rates with the expected historical risk-adjusted benchmark for that beneficiary.

Because of the long follow-up period required and the programmatic lag in BPCI-A claims, statistical analyses were conducted for BPCI-A-eligible patients admitted to acute care hospitals between February 1 and August 31, 2021, using data made available in March 2022.

The risk adjustment methodology utilized to calculate the historical comparative benchmark reflects the patient case mix adjustment (PCMA) methodology used in the BPCI-A model.¹¹ The PCMA is a standardized risk adjustment model calculated by CMS in which patient characteristics (e.g., enrollment in Medicaid, eligibility for Medicare through disability), utilization in the 90 days before admission (e.g., previous admission, long-term care, etc.), hierarchical condition codes identified in the 90 days before admission, and the complexity of the beneficiary's DRG are combined to evaluate a patient's relative complexity. The weighting of specific adjustment factors is calculated on the basis of multiple regression analysis of a CMS national data set across the BPCI-A baseline period for the model year being measured. These adjustment factors are in turn applied to each beneficiary as an individualized PCMA score provided through the monthly claims data set shared by CMS to BPCI-A participants. The PCMA, in turn, is used to calculate the 90-day readmission rate historical benchmark by

- Aggregating historical baseline performance data at the hospital and DRG level on the basis of the current model year's baseline data set,
- Calculating an estimated linear slope of performance on the basis of PCMA, and
- Applying the calculated slope to performance period episodes on the basis of the episode's actual CMS Certification Number, DRG, and calculated PCMA as provided by CMS.

The primary statistical analyses are based on comparisons between current populations' relative readmission rates and their historical risk-adjusted benchmarks. This is how BPCI-A evaluates overall performance.

“*The goal of TTH is to augment care coordination with local providers including hospital care transitions programs, home health agencies, community-based social services organizations, durable medical equipment companies, primary care physicians and specialists, and the patient and family themselves.*”

Hurdles

We encountered several hurdles, which varied somewhat by location and population served.

Language Barriers

In several geographic areas, we had difficulty engaging and assisting patients whose primary language was not English. Access to telephonic medical interpreter services was inconsistent, and feedback from both staff and documentation review suggested that the experience of both provider and patient was subpar. To improve patient experience and reduce the utilization of translation services, we recruited additional care coordination staff with fluency in Arabic or Spanish, which has led to increased patient enrollment and satisfaction.

Documentation for Proxy Decision-Making

Given the overall frailty of the hospitalized Medicare population¹² and the high proportion of BPCI-A patients who are likely in the last stages of life (approximately 10%, according to our internal observations), TTH care coordinators frequently found themselves communicating with proxy decision-makers. But in scaling TTH across multiple hospitals, we discovered wide variation in how advanced care planning and proxy decision-maker documents were collected, digitized, and transmitted after discharge. In many cases, we had to locate, validate, and secure the necessary documentation ourselves before we were able to effectively serve the patient or had to break off our engagement. We therefore implemented a reporting capability to immediately flag and notify our hospital partners in an attempt to address the issue systematically.

Precall Preparation Time

Early on, clinicians were spending an average of 7 minutes per patient reviewing discharge summaries and medication lists before their first outreach call attempt. Because not all patients answer the phone or consent to participate in TTH, much of this effort was wasted. Clinicians were also performing other non-value-added tasks, such as routing inbound calls, performing manual risk stratification, and scheduling PCP appointments. We created a new role — the care coordination assistant (CCA) — to help prepare charts and perform rote subclinical tasks. We hired four CCAs who each work with all of our TTH client institutions. Using an assistant reduced the average call preparation time from 7 minutes to 3 minutes and kept clinicians focused on assessments and care plans for patients who were successfully enrolled in the program.

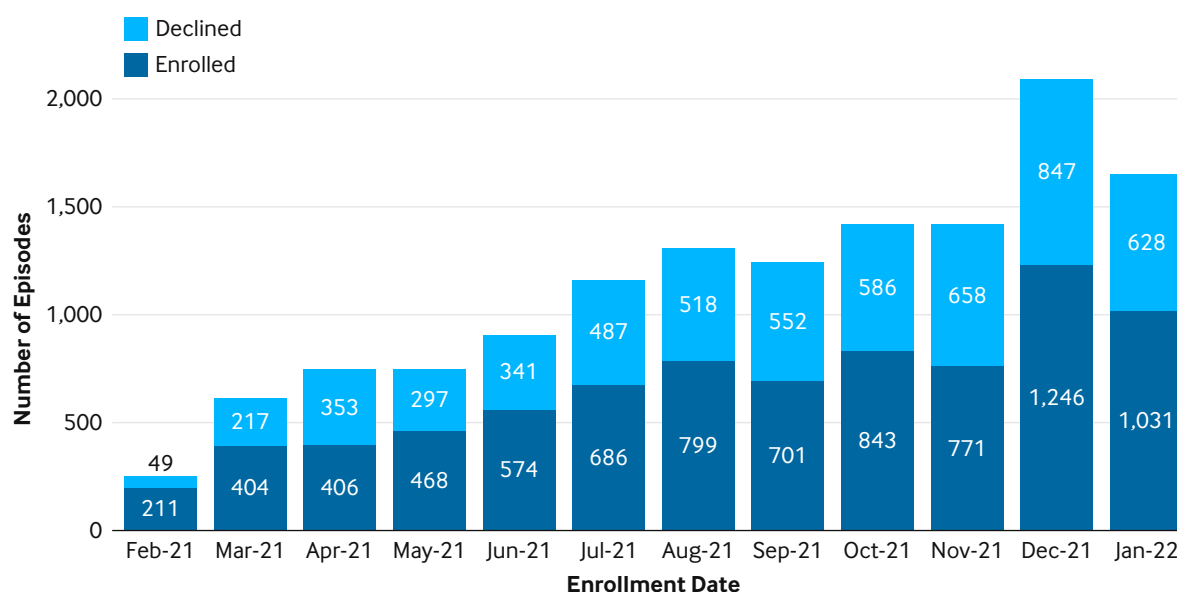
Metrics

Enrollment Trends and Patient Population

Initial efforts were focused on outreach and enrollment because only patients enrolled in the program can potentially benefit from the evidence-based transitional care services that TTH offers. TTH care coordinators began calling patients on February 1, 2021, on behalf of the first two clients (12 hospitals), and additional clients were activated on the first day of subsequent months. Within the first 90 days, our care coordination teams were enrolling nearly 100 patients per week, which has steadily increased over the subsequent 9 months (Figure 3).

FIGURE 3

Transition to Home—Engaged Enrolled Episodes by Bundle Designation, February 1, 2021 to January 31, 2022



Source: Signify Health

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Characteristics of the TTH-engaged and eligible non-TTH participants included in readmission reduction analyses are shown in Table 1.

The numbers of episodes for Tiers 1 and 2 were nearly equal, as shown in Table 2. Tables subsequent to Table 2 show the results of Tiers 1 and 2 combined.

Care Coordination and SDOH Needs Addressed

The goal of TTH is to augment care coordination with local providers, including hospital care transitions programs, home health agencies, community-based social services organizations,

Table 1. Characteristics of TTH-Engaged and Non-TTH Populations Hospitalized, February 1 to August 31, 2021*

Population Composition	TTH Engaged (n= 2,124)	Non-TTH (n = 6,938)
Average Age, yr	76.09	77.19
Female Sex, %	57.60	56.10
Dual Eligible, %	15.60	20.00
With Medicare Through Disability, %	21.50	20.30
Average PCMA	1	1.05

*TTH = Transition to Home, PCMA = patient case mix adjustment. Source: Signify Health

Table 2. Characteristics of Tier 1 and Tier 2 TTH-Engaged and Non-TTH Populations Hospitalized Between February 1 and August 31, 2021*

Characteristic	Tier 1	Tier 2	Combined Results
TTH Engaged			
No. of episodes	1,018	1,096	2,114
Readmission rate, %	28.70	20.90	24.60
Risk-adjusted historical benchmark, %	30.50	25.80	28.10
Relative rate reduction at 90 d, %	−5.90	−18.99	−12.46
Non-TTH			
No. of episodes	3,591	3,347	6,938
Readmission rate, %	31.70	27.70	29.70
Risk-adjusted historical benchmark, %	31.70	27.60	29.70
Relative rate reduction at 90 d, %	0.00	0.36	0.00

*TTH = Transition to Home. Source: Signify Health

durable medical equipment companies, and primary care physicians and specialists, and the patient and family themselves. In the first 12 months of the program, more than 3,000 SDOH gaps were identified and 34% were successfully addressed. The most common gap was health care, which includes follow-up appointments with practitioners and access to medications. As a result, more than 1,400 follow-up appointments were scheduled with PCPs and specialists. Table 3 illustrates the number and type of contacts made on behalf of patients in the first 12 months of the program to address health care needs for TTH-engaged patients.

After health care, there were substantial needs identified for assistance with transportation (approximately 21%), food and housing insecurity (approximately 21%), and other social care issues. The broad geographic spread of the TTH SDOH interventions is shown in Figure 4.

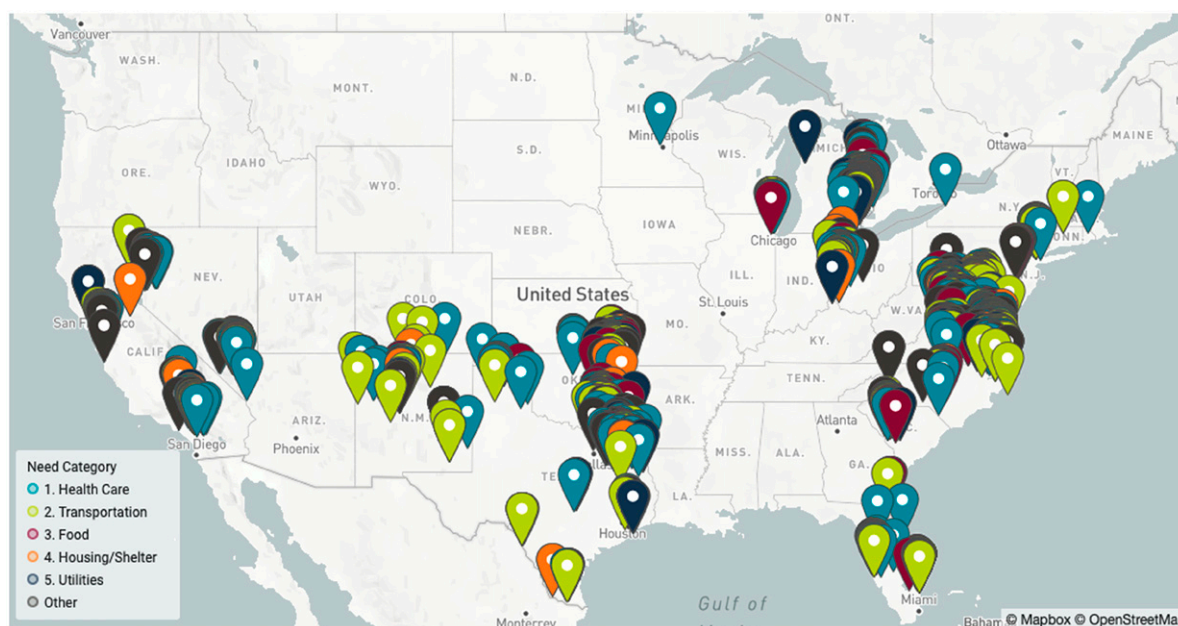
Table 3. Type of Care Coordination Calls Made on Behalf of Transition to Home–Engaged Patients, February 1, 2021 to January 31, 2022

Contact Type	No. of Successful Calls
Community-Based Organization	892
Primary Care provider	777
Specialty Provider	713
Home Health Agency	558
Pharmacy	204
Other	149
Related Contact	67
Durable Medical Equipment Vendor	55
Total	3,415

Source: Signify Health

FIGURE 4

Identified Social Needs by Patient Home Location, February 1, 2021 to January 31, 2022



Source: Signify Health

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Rehospitalization Reduction

Compared with the risk-adjusted historical benchmarks for both groups, differences were seen at 30 days between the TTH-engaged and the non-TTH populations enrolled in BPCI-A between February 1 and August 31, 2021. For example, the number of readmissions to acute care declined 14% for TTH-engaged patients compared with an increase of 6.83% for non-TTH patients. This rate was also durable at 90 days, with a 12.69% reduction for the TTH-engaged group versus 0% for the non-TTH group (Table 4).

Our results also suggest that the TTH intervention was effective for all populations regardless of initial discharge disposition after acute care. This was most apparent when comparing the relative

Table 4. TTH Comparative 30- and 90-Day RRs, All Clients between February 1 and August 31, 2021*

Population	No. of Patients	30-d Readmission, %			90-d Readmission, %		
		Actual RR	Risk-Adjusted RR Benchmark	Relative Performance	Actual RR	Risk-Adjusted RR Benchmark	Relative Performance**
TTH Engaged	2,124	12.90	15.00	−14.00	24.60	28.10	−12.69
Non-TTH	6,938	17.20	16.10	6.83	29.70	29.70	0.00

*TTH = Transition to Home, RR = readmission rate. **p<0.05. Source: Signify Health

performance of patients discharged with home health (19.86% reduction vs. 4.62% increase) and IRF (12.26% reduction vs. 8.96% increase) services at 90 days for the TTH-engaged and non-TTH groups. In our study, rehospitalizations among patients who had utilized SNF services increased in both groups but to a lesser degree among those receiving TTH (Table 5).

Costs and ROI

Ultimately, the viability of the TTH program relies on generating shared savings above and beyond the operational costs of the program itself, which initial data suggest it will do. For proprietary reasons, we are unable to provide detailed ROI analyses at this time. Initial claims data for the first 7 months of the program suggest that several hundred unnecessary hospitalizations have been prevented among the current client base and that month-over-month savings continue to rise. When a full year of claims-based data are available and the program has reached steady state, we intend to perform and report a more detailed financial analysis.

Next Steps

Ultimately, the clinical and financial impact of the TTH program is dependent on our ability to contact individual Medicare beneficiaries and their willingness to receive services. This likely introduces some degree of selection bias. In addition, our current measure of program efficacy is limited to a simple difference-in-differences approach rather than a multiple logistic regression analysis. We acknowledge these limitations but are encouraged by the fact that the relative reductions in both 30- and 90-day rehospitalizations were observed consistently over several staggered program implementations, across multiple health systems in geographically diverse parts of the nation, and for various post-acute care utilization patterns.

Table 5. TTH 90-Day Readmission Rates by Post-Acute Care Utilization, February 1 to August 31, 2021*

Population	No. of Patients	90-d Readmission, %		
		Actual RR	Risk-Adjusted RR Benchmark	Relative Performance
TTH Engaged	2,124	24.60	28.10	−12.46
Total Non-TTH	6,938	29.70	29.70	0.00
Received Home Health				
TTH engaged	487	22.60	28.20	−19.86
Total non-TTH	1,249	31.70	30.30	4.62
Received Skilled Nursing				
TTH engaged	315	32.70	29.70	10.10
Total non-TTH	1,452	36.30	31.50	15.24
Received Inpatient Rehabilitation				
TTH engaged	70	22.90	26.10	−12.26
Total non-TTH	280	30.40	27.90	8.96

*TTH = Transition to Home, RR = readmission rate. Source: Signify Health

We plan to follow up this case study with more comprehensive statistical and financial analyses when additional data become available for the BPCI-A and ACO populations served over a longer time period.

Unfortunately, the BPCI-A program has not traditionally provided race and ethnicity data, so we cannot meaningfully address issues related to individual populations specifically. We did attempt to address different settings by comparing patients' home address zip codes with rural-urban commuting area codes,¹³ but we discovered that the populations of our clients were predominantly urban. The sample size of patients residing in rural environments was too small from which to draw any definitive conclusions.

Despite coordinating care for a significant portion of TTH-engaged patients, only 34% of the identified SDOH needs were documented as addressed or met in our medical record. We do believe that some of this is related to documentation challenges. But we also believe that there are opportunities for care redesign to ensure that a majority of SDOH needs are fully addressed at the time of service, and that this work will improve the effectiveness of the TTH intervention.

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Disclosures: Marc Rothman, Theresa Bretz, Angela Farinella, Justin Rock, John Kliewer, Lisa Brian, and Brenda Tsai Meu Chong are employees of and potential equity holders in Signify Health.

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CASE STUDY

How an Interdisciplinary Care Team Reduces Prolonged Admissions Among Older Patients with Complex Needs

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A subset of patients cared for by the San Francisco Veterans Affairs Health Care System (SFVAHCS) are older and have complex medical, psychological, and social needs. To improve coordination and care for these patients, SFVAHCS created the Transitions Referral and Coordination team, which holds a once-weekly interdisciplinary meeting for managing geriatric complexity. Over 6 months, SFVAHCS saw an almost 40% reduction in inpatients with prolonged hospitalizations (defined as a length of stay longer than 30 days), from an average of 18 persons per week to 11 in their facility with 93 medical-surgical beds. Surveys of meeting participants highlight the value of the interdisciplinary approach. SFVAHCS is now expanding this conceptual framework to improve care for outpatients with similar needs. The authors hope their approach and findings can help other institutions similarly challenged with providing high-quality, integrated care for an increasingly common patient population.

KEY TAKEAWAYS

- » In the Transitions Referral and Coordination (TRAC) framework, after medical stability is achieved, prolonged admissions are driven by uncertainty or inconsistency about what constitutes a safe and appropriate discharge destination, a capable and willing decision-maker, and an accessible funding source.
- » A weekly interdisciplinary meeting with representation from inpatient and outpatient services and a medical-legal partnership can help brainstorm solutions to discharge older patients with prolonged admission and complex needs.

- » This meeting breaks down siloes, facilitating ongoing care after discharge and more integrated care for outpatients at risk of a social admission.
- » The active participation of attorneys with expertise in elder law helps navigate legal issues involving housing, long-term care, capacity, benefits, and Medicaid eligibility.
- » A framework-driven approach using the TRAC framework helps identify patterns in discharge barriers, reducing the need to “reinvent the wheel” when similar problems emerge.

The Challenge

Older adults are more likely to have multiple chronic illnesses,¹ take multiple medications,² experience deteriorating cognitive and physical ability,^{3,4} need assistance with basic activities like eating and housekeeping,⁵ struggle with bowel and bladder incontinence,⁶ and encounter poverty and social isolation.⁷⁻⁹ Many have combinations of the above circumstances, adding complexity to care delivery. For example, moderate heart failure requires daily treatment with oral diuretics and is considerably more difficult to manage in an impoverished and socially isolated older person with dementia, falls, and bladder incontinence whose housing is unstable and threatened because of escalating care needs. Without treatment, this person may become breathless within days and require admission, yet setting up a home environment where they take medications consistently can be difficult.

At the San Francisco Veterans Affairs Health Care System (SFVAHCS), we found that caring for patients with multiple complex care issues sometimes created conflicting goals among different teams. This was true even though the SFVAHCS is an integrated and academic-affiliated health care system able to provide care to local veterans across settings, including home, clinic, hospital, and long-term care. Outpatient teams saw how day-to-day complex needs could exceed what could be safely or realistically managed in a clinic, at home, or in a nursing home and viewed the hospital as a gateway to expertise, solutions, and more supportive services. Inpatient teams and EDs tasked with decreasing excess utilization saw how these social admissions — those without acute medical needs or with quickly resolving medical needs — restricted patients’ freedom and led to deconditioning, understimulation, and adverse events without clear benefits to the patient and at the cost of expensive acute care resources.¹⁰⁻¹³

These patients often had prolonged inpatient admissions and, if discharged, frequent readmissions.^{14,15} Making decisions was morally distressing for both inpatient and outpatient teams: with these teams operating in siloes, it was difficult to know what could be done without knowing what others could do, and without full knowledge of what was possible, no existing team could determine what was best for the increasing number of long-stay patients.^{16,17}

Several initiatives had been started to try to improve care for this patient population. In the outpatient setting, these individuals were sometimes followed by an intensive case management service that could provide 3 to 6 months of interdisciplinary home-based care, including a physician, nurse, and psychologist. However, few providers knew this service existed, what the service provided, or which patients were well suited for the service. Moreover, there was little continuity of care around

discharge and readmission. When admitted to our hospital, the San Francisco VA Medical Center (SFVAMC), complex patients were discussed at daily multidisciplinary rounds and were sometimes selected for further discussion at monthly meetings convened by executive nursing leadership. Daily multidisciplinary rounds were attended by the hospitalist, social worker, and charge nurse assigned to the patient and consisted primarily of brief 5-minute updates on medical status and ongoing barriers to discharge. The monthly meetings were attended by representatives from inpatient social work, geriatrics leadership, our hospitalist service, geriatric social work and our VA nursing home. They emphasized discharge but often lacked a complete understanding of the intricate issues facing long-stay patients with very complex barriers to discharge. There was a lack of collective expertise about outpatient resources, care facilities, and medical-legal aspects of care and no systematic method of learning from prior efforts caring for similar patients. To address these challenges,¹⁸ we created the Transitions Referral and Coordination (TRAC) team.

The Goal

Our goal was to meet as an interdisciplinary team for 1 hour weekly to discuss and coordinate care for the most complex patients in the SFVAHCS. We sought to address the medical and social circumstances of these patients with a framework-driven approach to identify patterns and to continuously learn from strategies used in previous cases.

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Making decisions was morally distressing for both inpatient and outpatient teams: with these teams operating in siloes, it was difficult to know what could be done without knowing what others could do, and without full knowledge of what was possible, no existing team could determine what was best for the increasing number of long-stay patients.

Our initial aim was to reduce the number of admitted patients with a length of stay (LOS) greater than 30 days. Prolonged inpatient stays were a particular concern for hospital leadership; on average, during quarter 3 (Q3) 2019, 18 out of 93 medical-surgical beds at the SFVAMC were occupied by patients with an LOS of more than 30 days, many of whom were medically cleared for discharge. Among these long-stay patients, the average LOS was 136 days, with an averaged median LOS of 103 days. At \$3,947 per hospital-day, these 18 patients cost the medical center \$6.4 million dollars in Q3 2019.¹⁹

The Team

We formalized the TRAC team in September 2019. An earlier committee examined transitions of care and identified gaps in care coordination in the SFVAHCS. This work informed initial membership for TRAC. We included medical directors from inpatient and outpatient services, nursing and social work leadership, occupational therapists, psychologists, and medical-legal partnership lawyers with elder law expertise (Table 1).

Table 1. Transitions Referral and Coordination (TRAC) Team Members

Hospital Medicine	Associate Chief, Hospital Medicine Chief Physician Utilization Management Advisor
Geriatric Medicine	Associate Chief of Staff, Geriatrics and Palliative Care Medical Director, Acute Care of the Elderly Service Medical Director, Community Living Center (VA Nursing Homes) Medical Director, Intensive Management Patient Aligned Care Teams (IMPACT — VA outpatient complex care consulting team)*
Ethics	Ethics Consult Coordinator
Social Work	Inpatient Social Work Supervisor* Outpatient Social Work Supervisor Geriatrics Social Work Supervisor
Nursing	Patient Flow Nurse Manager
Behavioral Health	Inpatient Behavioral Support Team Occupational Therapist
Medical-Legal Partnership for Seniors	Managing Attorney, Medical-Legal Partnership for Seniors-VA Project Policy Director, Medical-Legal Partnership for Seniors Medical Director, Medical-Legal Partnership for Seniors
Quality Improvement Lead	VA Quality Scholars Fellow (clinically also a geriatrician)
Hospital Leadership	Associate Chief of Staff for Quality, Value and Safety (clinically also a hospitalist)

VA = Veterans Affairs. *Designated as TRAC Leads, who were responsible for screening referrals, approving the agenda, organizing the meetings, and returning recommendations to referring teams. Note: There are 14 team members in total; some team members hold multiple titles. Source: The authors.

Importantly, the lawyers' role was to represent patients' interests (rather than those of the SFVAHCS) during meetings. Although many medical-legal partnerships receive funding from the health care partner, the lawyers in our team were not funded by the SFVAHCS. Team members participated without specific compensation. Referring clinicians and members of the patients' care teams were invited ad hoc to participate in discussions.

The Execution

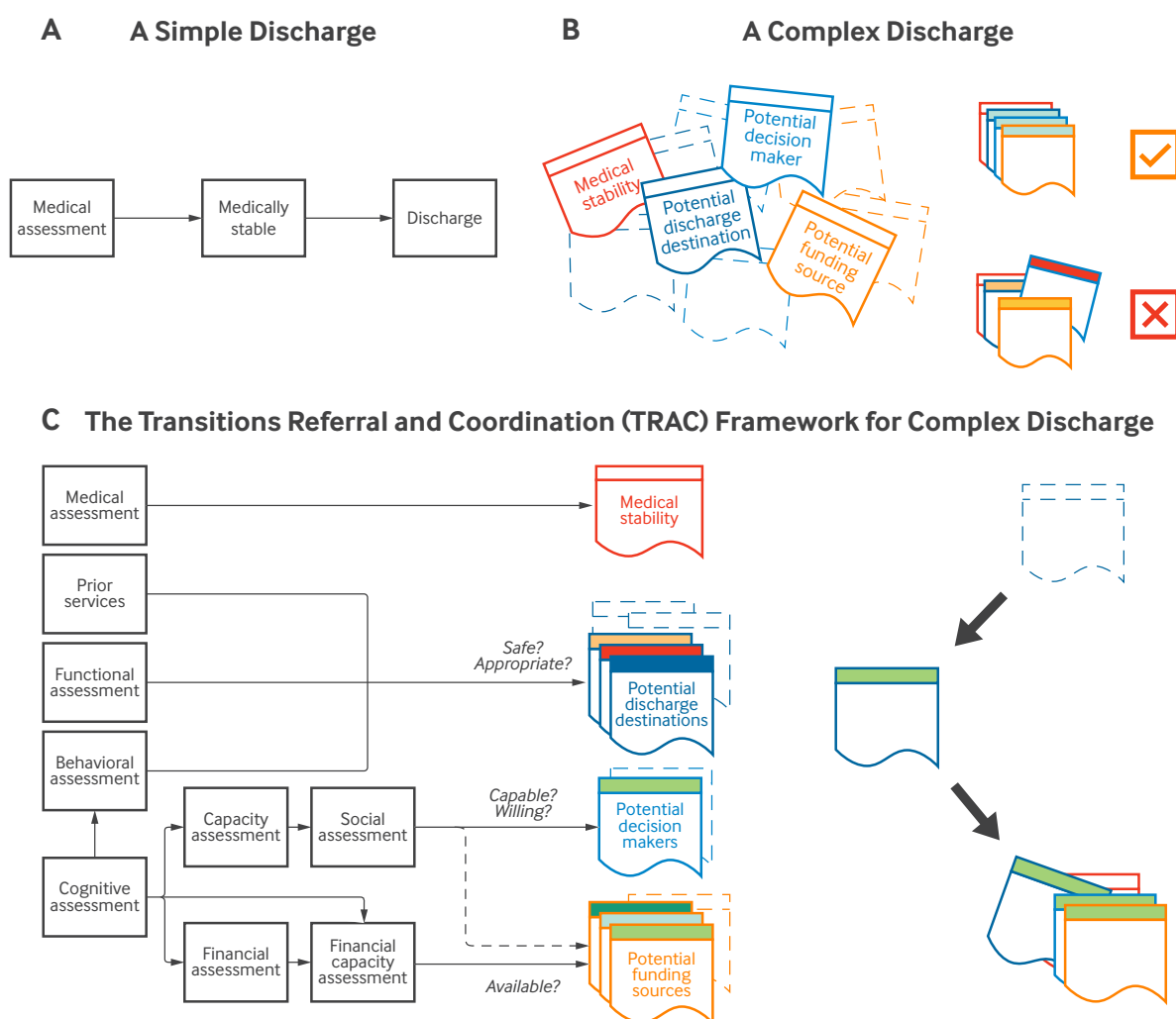
Our early meetings focused on inpatients with prolonged hospital admissions. We explicitly sought to function in an advisory role to referring teams by facilitating connections and offering recommendations rather than taking on active management responsibilities or giving directives on what should happen. In December 2019, we reviewed minutes from our first 3 months to identify common problems; we then formulated a conceptual framework to systematically assess and address the issues that hindered discharge (Figure 1).

We recognized that in addition to medical stability, three other factors were required to proceed with discharge: a discharge destination, a decision-maker, and a funding source. Discharge was often hindered by uncertainty or inconsistency about what constituted: (1) a safe and appropriate discharge destination (e.g., home, home with supports, homeless shelter, assisted living facility, rehab, or nursing home); (2) a capable and willing decision-maker with legal authority to participate in decision-making (e.g., the individual, a family member, or a legal guardian); and (3) an available funding source (e.g., private funds, Medicare, Medicaid, or local programs to cover supportive services). This conceptualization of a complex discharge became the framework to inform referral to TRAC and data collection for ongoing improvement. For example, if nursing home-level care

FIGURE 1

How the Transitions Referral and Coordination (TRAC) Team Uses the TRAC Framework for Complex Discharge

(A) In a simple discharge, medical stability is the only factor to consider. (B) Discharges become complex when we can no longer take for granted three additional factors: teams must also identify a discharge destination, a decision-maker, and a funding source. Medical stability is always required (indicated by the uncolored tab), but alignment must be achieved among the other factors for discharge to proceed (indicated by all having the same-colored tab, forming a “set”). (C) TRAC works by using an interdisciplinary team and a standardized framework to support referring care teams in systematically evaluating whether each component of the discharge plan is viable. Systematic assessments identify which discharge destinations are safe and appropriate, which decision-makers are capable and willing to participate, and which funding sources are available. Expertise is built up over time, allowing TRAC to help referring teams reveal undiscovered options (indicated by the dotted lines) and anticipate which options will or will not align.



Source: The authors

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was deemed necessary, we knew we also needed a payer for that nursing home and a decision-maker to agree to that destination.

We felt proactive and simultaneous consideration of these other factors expedited discharge. For example, by systematically reviewing each case that came to us, we found that, at our institution, assessments for Medicaid eligibility were sometimes delayed while social workers searched for a nursing home placement. Medicaid funding is required to finance most long-term care, but assessing Medicaid eligibility can take months in a cognitively impaired person, requiring assessment of financial capacity, appointment of a legal representative, searching for assets, navigating any legal complexities, and then finally applying for Medicaid. When ambiguity existed regarding the location to which a veteran should be discharged (e.g., could they go to an assisted living facility instead of a skilled nursing facility?), efforts would be redirected to finding other placement options rather than sustaining momentum in applying for Medicaid. Starting this process earlier, pooling our collective expertise, and offering guidance to referring teams that were encountering roadblocks meant funds were more likely to be available as soon as an appropriate nursing home placement came up. We began to standardize assessment of these three factors through our referral form to clarify the discharge process ([Appendix](#), Document 1).

“ *We recognized that in addition to medical stability, three other factors were required to proceed with discharge: a discharge destination, a decision-maker, and a funding source.* ”

We believed the experience gained in reviewing complex discharges with this framework helped us understand why some discharges were delayed and others were not. During meetings, we sometimes identified unexplored financial resources (e.g., Medicaid programs, community resources, or previously unknown patient assets) to pay for supports. In others, we identified assisted living facilities receptive to clients with behavioral issues. We also helped teams understand the legal standards of financial capacity, which was crucial in minimizing delays for discharge; clinicians often underestimated patients’ legal capacity to appoint decision-makers and spent time unnecessarily pursuing guardianship.

Over time, we realized some referrals had solutions that did not require convening the entire team to discuss. Consequently, we designated two team members (a physician and a social worker) as TRAC Team Leads to screen referrals, provide recommendations on simpler cases, and ask the team to find more information when warranted. We also integrated routine data collection into our meeting process (Figure 2).

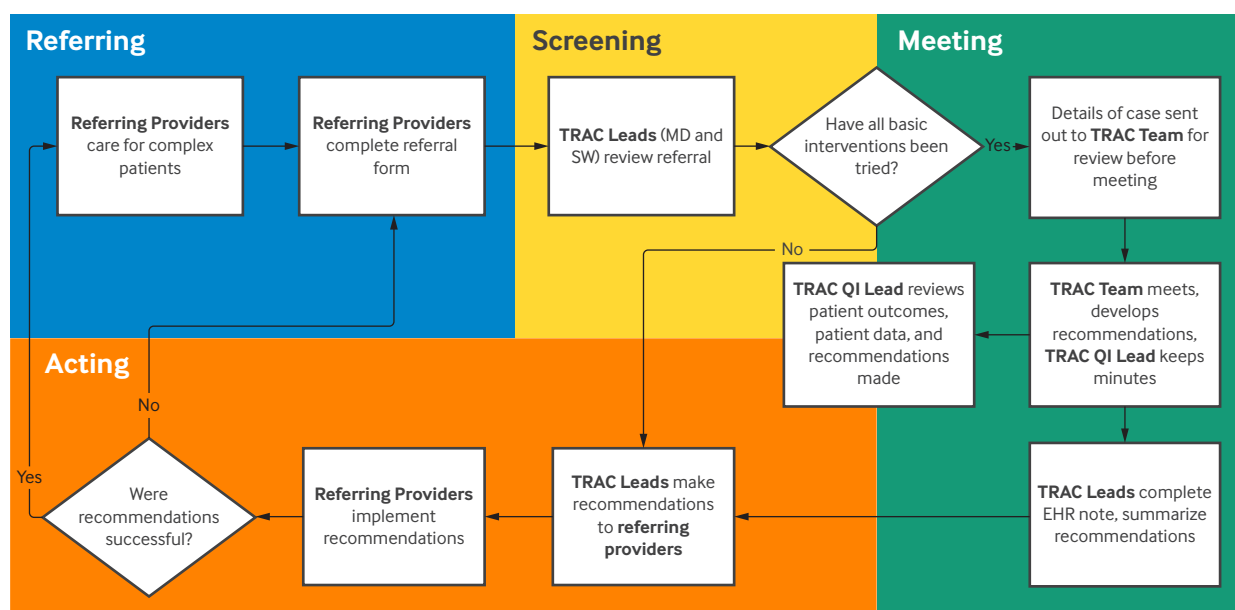
Metrics

Minutes are recorded for every meeting, and the Quality Improvement Lead was responsible for abstracting details about each case into an Excel spreadsheet. Using these minutes, information in the referral form, and data from the electronic health record, we documented the veteran’s age,

FIGURE 2

Process Flow Diagram for the Transitions Referral and Coordination (TRAC) Team Meeting

Our interdisciplinary meeting depends on two TRAC Leads screening referrals to ensure the full TRAC team convenes only to discuss very complex cases not easily solved by experienced team members. The team then meets to brainstorm potential solutions sometimes made possible only through the collaboration of several services. Recommendations are returned to providers to equip others to manage similar patients. After meetings, data about the case and our recommendations are collected to ensure continuous learning and development of strategies to address similar patients. EHR = electronic health record, MD = Doctor of Medicine, QI = quality improvement, SW = social worker.



Source: The authors

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sex, race, LOS at time of TRAC meeting, and contributing reasons for prolonged hospitalization according to our conceptual framework. To determine whether we were reducing the number of long-stay patients, we used daily hospital census figures to calculate the weekly average number of medical-surgical patients with an LOS of more than 30 days.

Between September 2019 and June 2020, the TRAC team reviewed 25 inpatients (Table 2). Patients were older male veterans with multiple problems; many had simultaneous cognitive impairment, behavioral issues, and self-neglect, leading to behaviors — such as aggression, illicit substance use indoors, and incontinence — that threatened their ability to remain adequately housed or to access placements in supportive housing options.

Our framework-driven approach helped us recognize and clarify which patient issues were commonly prolonging admission. Cognitive impairment and self-neglect were major contributors.

Table 2. Characteristics of Hospitalized Patients Reviewed by the Transitions Referral and Coordination (TRAC) Team

Characteristic	
Overall	25
Age, mean (SD)	80 (7.2)
Male sex	25 (100)
Race	
White	16 (64)
Black	5 (20)
Hispanic	1 (4)
Other	3 (12)
Length of stay at time of TRAC meeting, days, mean (SD)	122 (126)
Contributing reasons for prolonged hospitalization	
Cognitive impairment	22 (88)
Behavioral issues (e.g., aggression, wandering)	20 (80)
Self-neglect (e.g., hoarding, uncleanliness prompting eviction warnings)	16 (64)
Falls	12 (48)
Homelessness	8 (32)
Unrepresented (e.g., no willing family or friends)	6 (24)
Discharge status in June 2020	
Still admitted	8 (64)
Readmitted	1 (4)
Discharged home	2 (8)
Discharged to residential care facility	6 (12)
Discharged to skilled nursing facility	3 (6)
Discharged to shelter	3 (6)

SD = standard deviation. Data are No. (%) unless otherwise indicated. Source: The authors.

We therefore standardized pathways to address common issues. One pathway involved greater use of the inpatient geriatrics service in assessing capacity around complex discharge decisions and assessing the safety of the outpatient living environment. Another pathway promoted the involvement of our medical-legal partnership. The attorneys were available to see patients in the hospital to help assess capacity for decision-making (such as appointing a financial power of attorney) in addition to providing counsel to veterans or their legal representatives around housing rights, health care benefits, taxes, and elder abuse.

“

For example, if nursing home-level care was deemed necessary, we knew we also needed a payer for that nursing home and a decision-maker to agree to that destination.

We previously assumed prolonged admissions were heavily driven by homeless or unrepresented patients (e.g., without decision-making capacity and no advance directive or surrogate), but our data showed that these issues comprised a minority of our referrals. This has since helped us anecdotally recognize that being represented can sometimes stall discharge when there are disagreements with or between family members. For example, in some cases, we identified and found funding for an appropriate nursing home bed, but the designated decision-maker took months to respond to requests to complete the remaining paperwork to authorize transfer. As a result, TRAC members have worked closely with hospital leadership to develop an administrative discharge process in which discharge is executed with the written support of hospital administration, for use only when a decision-maker actively delays discharge to a safe and affordable destination.

To quantitatively evaluate our work, we examined the weekly average of patients with an LOS greater than 30 days between June 2019 and June 2020 using a c-chart, fixing control limits on the basis of the trend 3 months prior to the start of TRAC (Figure 3). C-charts were generated using QI Macros following Montgomery's rules for special cause variation.

We observed a sustained shift with seven fewer long-stay patients per day since we started meeting in September 2019 compared with our baseline number of long-stay patients in Q3 2019 ([Appendix, Figure A1](#)). Further reductions were seen after March 2020 because of the Covid-19 pandemic, but we did not include these in our estimated effect as it is difficult to attribute reductions in long-stay patients after March 2020 to the efforts of the TRAC team; in April 2020, San Francisco opened several shelter-in-place hotels, producing discharge destinations not previously available. Furthermore, the SFVAMC actively cleared beds in anticipation of a surge of Covid-19 admissions. Nonetheless, the median LOS has shown a sustained decrease since the pandemic started, suggesting that very long stays have not recurred ([Appendix, Figure A2](#)).

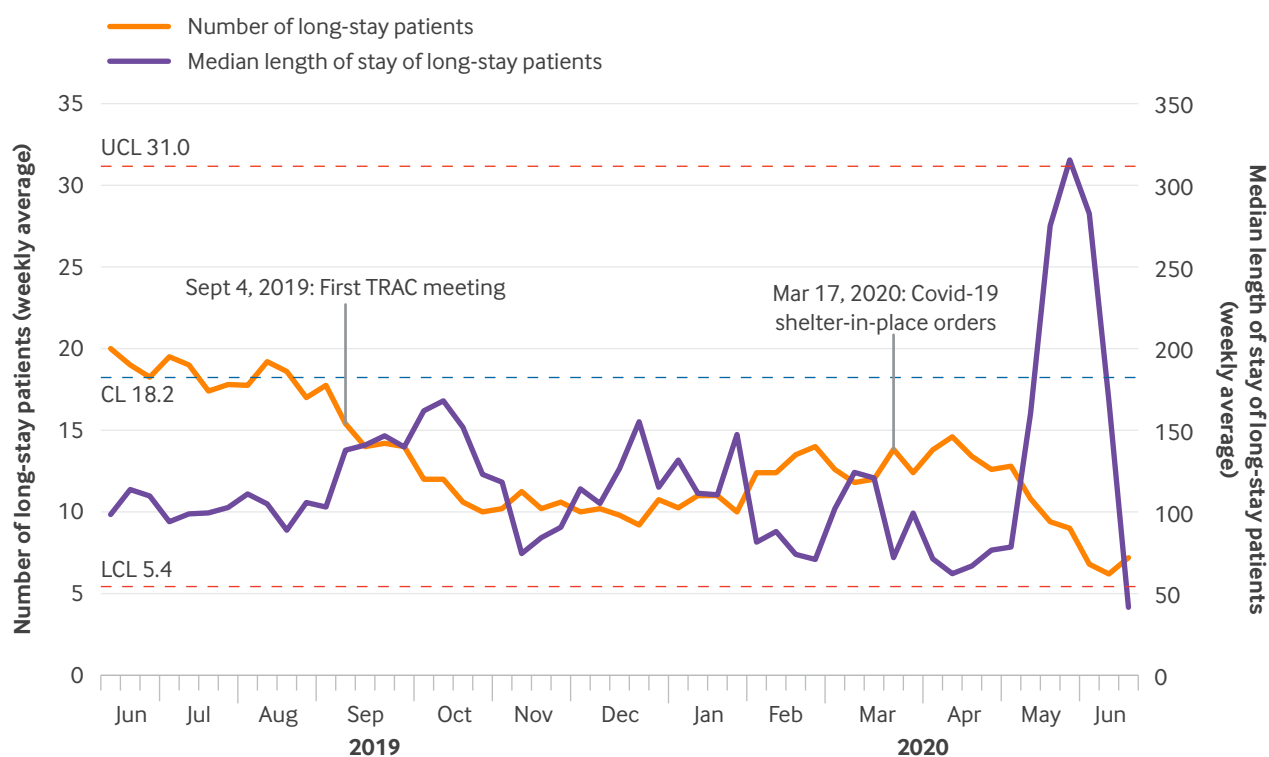
C-charts can identify significant changes from baseline but cannot demonstrate causality. We continued to meet, but to justify our meetings, we needed to understand if the change in LOS was attributable to our work or whether something else happened in September 2019 to reduce the number of long-stay patients. We therefore surveyed team members and referring providers to ask if they thought TRAC was useful, to identify what parts of TRAC were most useful, and to solicit recommendations for improvements ([Appendix, Document 2](#)). The survey was conducted between March and September 2020 and used REDCap to gather responses. Eight of 14 TRAC team members and 18 of 44 nonmember participants responded, with approximately equal representation from physicians and social workers. Likert results were summarized using averages, and qualitative responses were analyzed using framework analysis.

In responses, TRAC was seen as a “venue to brainstorm solutions to barriers to discharge” and “solve cases that required creative thinking and input from multiple people/disciplines,” often “helping reveal what options there may be that were not yet explored/considered.” Team members and participants agreed that their participation in TRAC left them with a better understanding of interprofessionalism and that it was a useful forum for learning how to care for complex patients themselves ([Appendix, Table A3](#)). All respondents could think of patients who would benefit from the TRAC team's involvement. The most common constructive feedback we received was that it

FIGURE 3

C-chart of Long-Stay Patients (Length of Stay [LOS] Longer than 30 Days) at the San Francisco VA Medical Center

In a c-chart, shifts, trends, and outliers denote significant changes from a previously stable baseline. Using a baseline of from June to September 2019, we observe a sustained shift (defined as 8 points above or below the center line) following the start of our Transitions Referral and Coordination (TRAC) meetings. Further reductions occur after the start of the Covid-19 pandemic but are not easily attributable to TRAC. Some veterans had been admitted to the San Francisco VA Medical Center for more than 1 year; the rise and fall in median LOS at the end of the figure is explained by these veterans remaining and then finally being discharged in June 2020. CL = central line (fixed using a baseline of quarter 3 2019), LCL = lower control limit, UCL = upper control limit. Solid yellow line is number of long-stay patients; solid purple line is median LOS of long-stay patients.



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would help to have more active involvement from hospital leadership in complex discharge and that we should communicate more often with referring teams so that they know how to refer more patients to us and join our meetings. This feedback has been critical to us understanding that TRAC as an interprofessional weekly meeting is the intervention. More than the processes that we have developed, feedback suggests that coming together to discuss the most difficult cases has been the most helpful.

Hurdles

Several challenges remain. First, meetings are time intensive, involving approximately 10 leaders in our health care system spending 1 hour of their time weekly. While all participants were salaried, this implicit expenditure was initially justified by reduced long-stay admissions; reducing long-stay admissions by seven patients per day translates to more than \$100,000 per week in recovered inpatient expenditures. However, we may be able to achieve similar results with fewer core members present, and we are developing criteria to revisit how we define quorum for meetings (e.g., at least three senior members are available to meet).

“

Another pathway promoted the involvement of our medical-legal partnership. The attorneys were available to see patients in the hospital to help assess capacity for decision-making (such as appointing a financial power of attorney) in addition to providing counsel to veterans or their legal representatives around housing rights, health care benefits, taxes, and elder abuse.

Second, our process for following up on previously discussed patients is currently ad hoc. We encourage rereferral when problems arise, but this can delay decision-making in tough cases. Regular review would help sustain momentum toward discharge, and follow-up after discharge would allow us to critically appraise whether our recommendations were helpful beyond the discharge itself. We are therefore planning ways to periodically conduct chart review on referred patients and discuss them every 2 to 3 months.

Third, strict screening may diminish the benefits of the TRAC team. Screening reduces the number of cases we review and may be efficient but removes the opportunity for non-team members to join discussions and learn from the debate. We are therefore favoring a permissive referral strategy, informed in part by our survey results (participants value the TRAC team as an educational venue) and our value in equipping others to manage complex patient cases themselves.

Fourth, we continue to see the most challenging complex cases in the SFVAHCS. We have expanded to receive referrals from outpatient teams and clinicians at our attached Veterans Affairs (VA) nursing home, working to see if we can intervene earlier to ensure that patients have a safe and appropriate place to live or transition to if things get worse. However, with an aging population and the societal changes wrought by Covid-19, it is hard to know if we are making improvements. Nevertheless, our standardized and comprehensive framework presents opportunities for us to better categorize the problems we are seeing and to pursue a more data-driven approach to the problems we encounter. For example, we have come to recognize that persons with severe behavioral issues simply have no discharge destination because of local shortages in options, even if they have a legal decision-maker and a payer. Our framework has also helped us to ask other VA settings how they may be addressing similar problems.

Where to Start

For institutions interested in improving care for similar patients, start by convening clinical leaders from both inpatient and outpatient services to identify shared challenges and gaps in care for patients with complex needs. Next, we recommend other institutions seek lawyer collaborators with elder law expertise because our medical-legal partnership has been invaluable. A number of barriers to optimal care, such as housing and guardianship, are rooted in legal and policy factors, and our attorney colleagues have been better equipped to provide expert consultation. The medical-legal partnership model exists in about 400 health care settings nationally, but, to our knowledge, only four are focused on older complex patients.²⁰ A federal statute funding legal services for homeless and vulnerably housed veterans, which could provide mechanisms to fund medical-legal partnerships at other VA sites, became law in January 2021.²¹ Funding, ethics, and other implementation issues surrounding medical-legal partnerships have been described elsewhere and are beyond the scope of this article, but worthy of attention prior to implementation.²² Next, start meeting. As you do so, we encourage using data to identify trends and monitor outcomes. Objective metrics informed our team processes, let us observe success and failure, and helped facilitate buy-in from hospital leadership and other stakeholders.

We have categorized our lessons learned into five themes and offer the following for consideration as guiding principles for this work. Acknowledging complexity recognizes we should comprehensively assess all intersecting issues in our cases and also approach them humbly. Interprofessional collaboration recognizes solutions are unlikely to come from any one profession and that difficult decisions are often better decided by consensus than alone. Follow-up and tracking recognize that feedback is important to objectively and systematically improve care for these patients. Continuous learning recognizes that data need synthesis to build frameworks and standardized approaches for patients with similar issues. Education recognizes that equipping others to care for these patients is more important than isolating expertise within our group. Taken together, our approach created an effective forum for collaborative and systematic problem solving in complex cases that were otherwise overwhelming and, in reducing the daily census of long-stay patients, has produced demonstrable results .

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Appendix

[Appendix to Reducing Prolonged Admissions Among Older Patients with Complex Needs: An Interdisciplinary and Framework-Driven Approach](#)

Disclosures: We note that the TRAC research is not associated with a separate VA program related to the Coordinated-Transitional Care Program Toolkit.²³ Kenneth Lam is supported by the VA Quality Scholars Program funded through the VA Office of Academic Affiliations (Grant AF-3Q-09-2019-C), Department of Veterans Affairs, Veterans Health Administration. Sarah Hooper receives funding

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ARTICLE

QualityImpact: A Data-Driven Quality Improvement Model That Improves Clinical Care and Reduces Cost

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The Consortium for Southeast Healthcare Quality (COSEHQ) created QualityImpact, a data-driven clinician performance improvement initiative for managing cardiovascular conditions, and scaled it across the Southeast United States between 2016 and 2019. Under the U.S. Centers for Medicare & Medicaid Services Transforming Clinical Practice Initiative, COSEHQ implemented the model in 735 clinical practices and engaged 4,692 clinicians. The initiative, which was intended to prepare clinicians for value-based alternative payment models, encompassed data transparency, professional education, evidence-based best practices, and peer-to-peer best collaborative learning. Clinicians received assistance with workflow optimization, care management, patient engagement, risk stratification, and revenue enhancement. At completion, 157,215 patients diagnosed with hypertension, diabetes, and other cardiovascular conditions showed clinical improvement. QualityImpact also led to reductions in the number of all-cause hospital and ED visits and achieved estimated cost savings of almost \$200 million.

Heart disease is the leading cause of death in the United States,^{1,2} and the risk varies by region. The Southeastern United States has higher rates of chronic cardiovascular and renal diseases, including ischemic heart disease, stroke, heart failure (HF), and chronic kidney disease, than other parts of the United States.²⁻⁴ Hypertension, a known preventable and modifiable risk factor for these diseases and many others, is more prevalent and severe in the southeast region of the United States,^{3,4} as are obesity, smoking, uncontrolled cholesterol levels, and type 2 diabetes.⁵⁻⁹

Established in 1994, the Consortium for Southeast Healthcare Quality (COSEHQ) specializes in research, professional education, and health care quality advancement with a specific focus on cardiovascular health improvement. This article describes a COSEHQ initiative called QualityImpact, a quality improvement model aligned with the Institute for Healthcare Improvement Quadruple Aim that focuses on optimized clinical care, improved health outcomes, and lower health care costs.

In 2015, COSEHQ was awarded a cooperative agreement under the U.S. Centers for Medicare & Medicaid Services (CMS) Transforming Clinical Practices Initiative (TCPI) to serve as a Practice Transformation Network (PTN). PTNs engaged clinicians to achieve health care transformation, prepare for value-based payment arrangements, and improve the quality of care. COSEHQ collaborated with The Kinetix Group, a care delivery consultancy, to implement QualityImpact across 735 diverse outpatient practice sites between 2016 and 2019, engaging 4,692 clinicians and impacting a patient population from these practices of approximately 2.1 million (Figure 1). COSEHQ leveraged CMS's TCPI change theory framework, consisting of 3 primary drivers and 15 secondary drivers as the basis for assessing a practice's transformation progress once QualityImpact was implemented (Figure 2). We found the TCPI framework to be adaptable to all practice types, especially those seeking success under value-based reimbursement.

Implementing QualityImpact

QualityImpact was implemented to improve clinicians' performance in the clinical management of cardiovascular-related conditions, including hypertension, HF, and type 2 diabetes. A secondary aim was to improve the practice's appropriate utilization of health care resources overall and prepare interested practices for value-based reimbursement models.

Onboarding included having each practice identify a minimum of three staff members, called "champions," to lead the practice's implementation internally and to liaise with our PTN team. The practice-assigned champions typically included a lead physician, a quality improvement lead, and an administrator. A COSEHQ-employed quality improvement advisor (QIA) provided direct technical assistance and collaborated with the broader PTN team to deploy resources based on assessed practice-specific care gaps. QIAs typically worked with more than one practice, with a ratio of 4:1.

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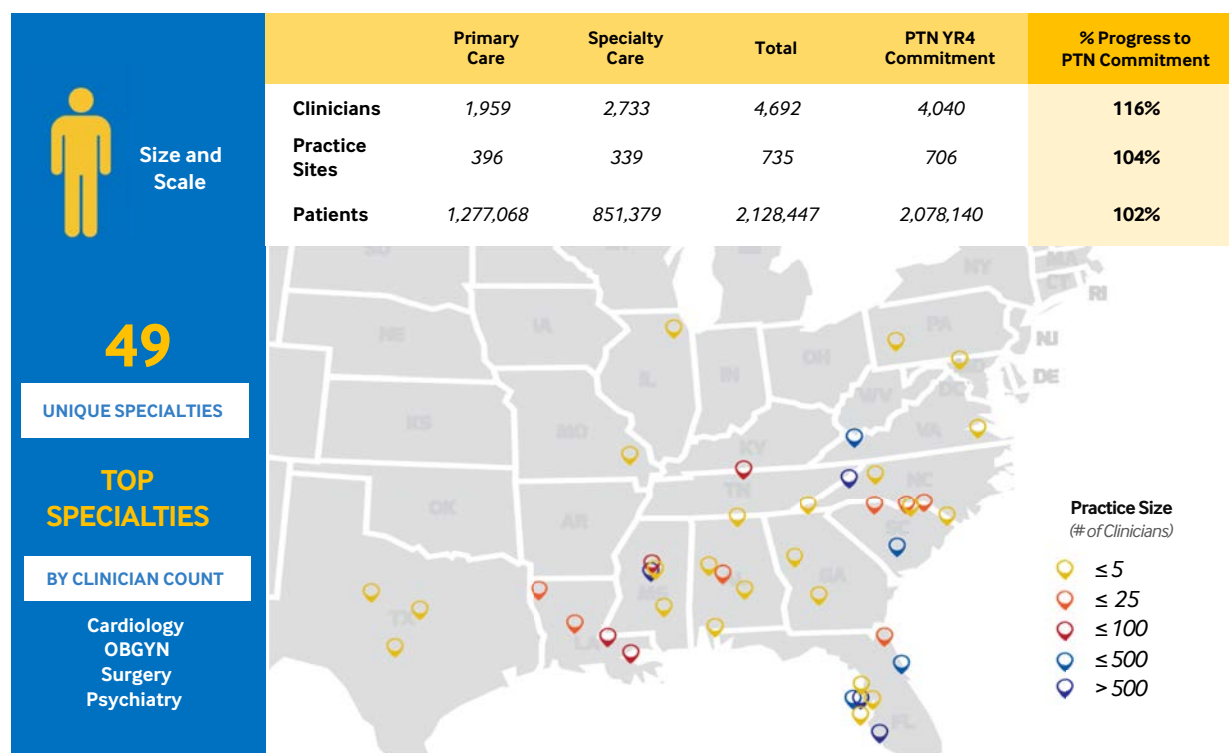
COSEHQ leveraged CMS's TCPI change theory framework, consisting of 3 primary drivers and 15 secondary drivers as the basis for assessing a practice's transformation progress.

Because managing a busy office leaves little time for physicians and staff to learn skills and integrate new processes, QualityImpact needed to be adaptable and easily incorporated with minimal disruption to the normal workflow. Practice sizes ranged from independent clinicians to multispecialty groups, and we tailored the model to each practice.

FIGURE 1

The Consortium for Southeast Healthcare Quality (COSEHQ) Practice Transformation Network (PTN) Enrolled Over 4,600 Clinicians and 700 Practice Sites

COSEHQ exceeded its original projected clinician enrollment goal by 16%, enrolled practices by 4%, and patient reach by 2%. Enrolled practices varied by size, ranging from independent clinicians and practices with fewer than five clinicians to large integrated networks. OBGYN = obstetrics and gynecology.



Source: Consortium for Southeast Healthcare Quality
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A practice assessment helped the QIA understand a practice's capabilities in areas including the following:

- use of evidence-based guidelines;
- patient access (including appointment availability, use of patient portals, and availability of after-hour clinics and telehealth);
- population management;
- coordinated care, referral processes, and patient follow-up;

- health IT;
- workflows and standardized process protocols; and
- existing data-driven quality improvement strategies.

FIGURE 2

Change Theory Framework

Centers for Medicare & Medicaid Services change theory framework primary and secondary drivers.
HIT = health IT.

Primary Drivers	Secondary Drivers
Patient/Family Care Design	<ul style="list-style-type: none">• Patient/family engagement• Team-based relationships• Population management• Community partnerships• Coordinated care delivery• Enhanced access
Continuous Data-Driven Quality Improvement	<ul style="list-style-type: none">• Engaged and committed leadership• Quality improvement strategy supporting a culture of quality and safety• Transparent measurement and monitoring• Optimal use of HIT• Organized evidence-based care
Sustainable Business Operations	<ul style="list-style-type: none">• Strategic use of practice revenue• Staff vitality and joy of work• Capability to analyze and document value• Efficiency of operations

Source: Centers for Medicare & Medicaid Services
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Data transparency and goal-oriented gap closure, important under value-based care, were promoted across the PTN. Azara Healthcare (formerly a part of SPH Analytics Inc.) was contracted to deploy its population health platform to each practice. Our focus was on improving cardiovascular measures; however, the platform provided a practice access to real-time reports detailing individual patients’ clinical status, care gaps, and risk level on multiple health care conditions (Figure 3). The platform also aggregated the clinical values of a physician’s total population and illustrated both clinical measure control rates and a clinician’s progress toward achieving those. This information could also be presented at the practice level, illustrating all physicians’ performance in aggregate. The cardiovascular clinical information enabled the PTN team to codevelop a goal-oriented action plan with each practice to address the practice’s care gaps.

FIGURE 3

Sample Patient-Focused Dashboard

Patient dashboard from the Azara Healthcare Population Health Platform, alerting clinicians to patient-specific care gaps and historical visit data care opportunities to close care gaps.



ACEI = angiotensin-converting enzyme inhibitor, ALT = alanine aminotransferase, ARB = angiotensin receptor blocker, AST = aspartate aminotransferase, BMI = body mass index, CHF = congestive heart failure, CRCS = colorectal cancer screening, DM = diabetes mellitus, EF = ejection fraction, eGFR = estimated glomerular filtration rate, GFR = glomerular filtration rate, HTN = hypertension, LVSD = left ventricular systolic dysfunction, PW = postmenopausal woman.

Source: Azara Healthcare and Symphony Performance Health Inc.

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Technical assistance was tailored to each individual practice, consisting of a variety of PTN strategies and resources to improve clinical performance and, where needed, reduce variation to enhance care delivery processes (Table 1).

Practice groups set attainable short-term clinical improvement goals based on population-based clinical gaps identified through the Azara Healthcare platform. Performance improvement was promoted using a “tight-loose-tight” methodology. Our PTN leadership established key quality measures and achievable expectations for practices (tight). The QIAs gave practices autonomy to implement creative solutions to meet their quality and utilization improvement goals, but they remained available to assist in monitoring progress and providing needs-based support (loose) to

Table 1. Select Quality/Impact Resources

Resource	Aim
Getting started guidelines	To assist practices in the design of processes, such as risk stratification or a care management program
Boot camp	Intense consultation by subject matter experts for practice cohorts with similar care gaps
Guidelines	Education and simplified algorithmic translations of evidence-based therapies
Best practices	How to scale proven therapeutic interventions
Patient engagement processes	Tools to engage patients and establish joint clinician/patient decision-making
Billing and coding enhancement	Severity of illness capture and new/evolving reimbursement codes
Increase revenue flow	How to establish processes for annual wellness examination, proper coding, care management, etc.
Workflow streams	How to enhance processes to ensure efficiencies
Team roles/responsibilities	How to empower each clinician to operate at the highest level allowed by their license and clearly delineate matrix responsibilities
Actionable data	Educating practices in the interpretation and effective use of their data

Source: Consortium for Southeast Healthcare Quality.

ensure practices' accountability. PTN leadership monitored practices' attainment of goals and intervened as necessary to ensure targeted goals would be met (tight).

The selection and implementation of a specific strategy was driven by the initial and recurring practice assessments, a practice's progress on its action plan, and the ongoing evaluation of clinical performance analyzed via the Azara Healthcare platform. For example, many clinicians were insufficiently using Hierarchical Condition Category coding to risk-stratify their patients. Our certified coding physician expert provided live lectures and designed on-demand modules that improved compliance in these practices, which often led to better reimbursement to the practice. If blood pressure control rates were below evidence-based target goals, our subject matter experts provided education through live collaborative meetings, webinars, and/or tools/resources distributed to the entire network. Our experts also provided one-on-one consultation to the practice champions or facilitated group discussions with the practice care team. Many clinicians needed assistance with translating new or evolving evidence-based research into their everyday practice.

Each practice received a quarterly performance report benchmarking it against established target goals. The QIAs reviewed this report with the practices during monthly calls. If a practice was not making progress, the PTN team increased its interaction, reviewing and revising the action plan where needed. Our physician subject matter experts engaged the clinicians through onsite visits and peer-peer consultation, which often brought the practices back on track. Rapid-cycle PDSA (Plan, Do, Study, Act) "performance sprints" propelled practices toward goal achievement. A practice would implement one or more interventions, over a 3-month or 6-month period as appropriate, to improve an identified care gap or a delay in meeting their goals. If performance improved by the end of the period, the practice adopted the intervention.

If it did not, other strategies were considered. Sprints led to sustainable performance improvements.

“ *Because managing a busy office leaves little time for physicians and staff to learn skills and integrate new processes, QualityImpact needed to be adaptable and easily incorporated with minimal disruption to the normal workflow.* ”

The PTN team offered additional training opportunities to ensure that practices had the knowledge needed to implement the strategies and to further hone their skills in managing their patient populations. We offered on-demand learning activities on diverse topics, including clinical guidelines, telehealth, patient decision-making, and team-based care. We hosted live webinar-based collaborative meetings where practice “champions” from all of the enrolled PTN sites participated and discussed best practices, solved problems, and led learning sessions. Many of the educational offerings provided physicians with continuing medical education credits.

The PTN team fostered peer-to-peer modeling, a significant quality improvement factor. Performance data dashboards showed individual providers’ relative clinical management proficiency. These comparative measures were shared with lower-performing providers to encourage them to emulate their higher-performing peers. Where practices did not have a high-performing physician, we found role models for them among other practices that were performing well.

Results

To analyze performance change, we compared clinical data with baseline data abstracted by Azara Healthcare looking back 1 year prior to introducing the QualityImpact model. We also acquired context around the successes, challenges, and lessons learned in the “touchpoint calls” between the QIAs and the champions. The insights gleaned from these communications were shared with the full network through peer-to-peer briefings and educational forums highlighting best practices.

Because practices were enrolled on a rolling basis, there were insufficient network-wide data to aggregate and analyze baseline population-based clinical control rates until January 2017. Over that 3-year period (2017–2019), clinicians in networked practices showed population-based clinical improvement in the prevention and management of cardiovascular disease. Clinical improvement was defined as a positive change in patients’ clinical values and evidence-based therapeutic drug management for cardiovascular conditions such as congestive HF. For the purposes of this article, we focused on blood pressure and glucose measures. We used clinical targets from the National Quality Forum: an increase in the percentage of patients with controlled hypertension (blood pressure lower than 140/90 mmHg), an increase in the percentage of patients with diabetes with glycated hemoglobin (HbA_{1c}) levels lower than 8%

(indicating good control), and a decrease in the percentage of patients with HbA_{1c} levels greater than 9% (indicating poor control).

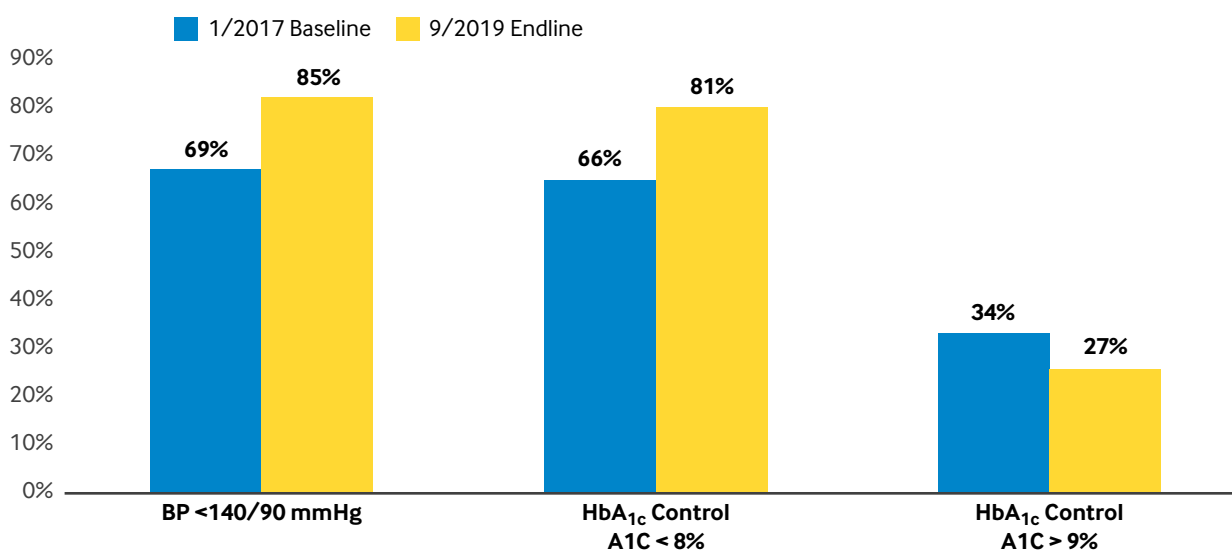
Cumulatively, by the end of the initiative, 157,215 patients showed improvement in at least one of the clinical metrics. Changes from baseline to endline for the three clinical measures, as demonstrated by population-based control levels, show overall improvement (Figure 4).

We observed a reduction in the utilization of ED visits and all-cause hospitalizations. Due to the unavailability of CMS data specific to the initiative, we were not able to measure utilization improvements specific to cardiovascular measures. We did have access to utilization data for the period of June 2018–2019 from a large regional commercial payer that had multiple practices enrolled in our PTN. ED visits and all-cause hospital admission data showed reduced utilization during QualityImpact implementation (Figure 5). Our estimated savings from these reductions were calculated by using the data from these clinics and applying publicly available cost averages for hospital admissions and ED visits.^{10,11} These calculated savings were extrapolated across the PTN for a total estimated network savings of \$192,266,889.

FIGURE 4

Improvements in Clinical Metrics: Control Rates

National Quality Forum (NQF) inclusion/exclusion criteria were used to define outcome measures. For blood pressure (BP) control (NQF 0018), 360,607 of 524,221 patients had controlled BP at baseline compared with 446,386 patients with controlled BP at the end of the Transforming Clinical Practice Initiative (endline). For diabetes control (NQF 0575), 46,907 of 71,071 patients had an A1C lower than 8% at baseline compared with 57,798 patients at endline. For diabetes control (NQF 0059), 3,753 of 11,038 patients had an A1C higher than 9% at baseline compared with 2,980 patients at endline. HbA_{1c} = glycated hemoglobin.

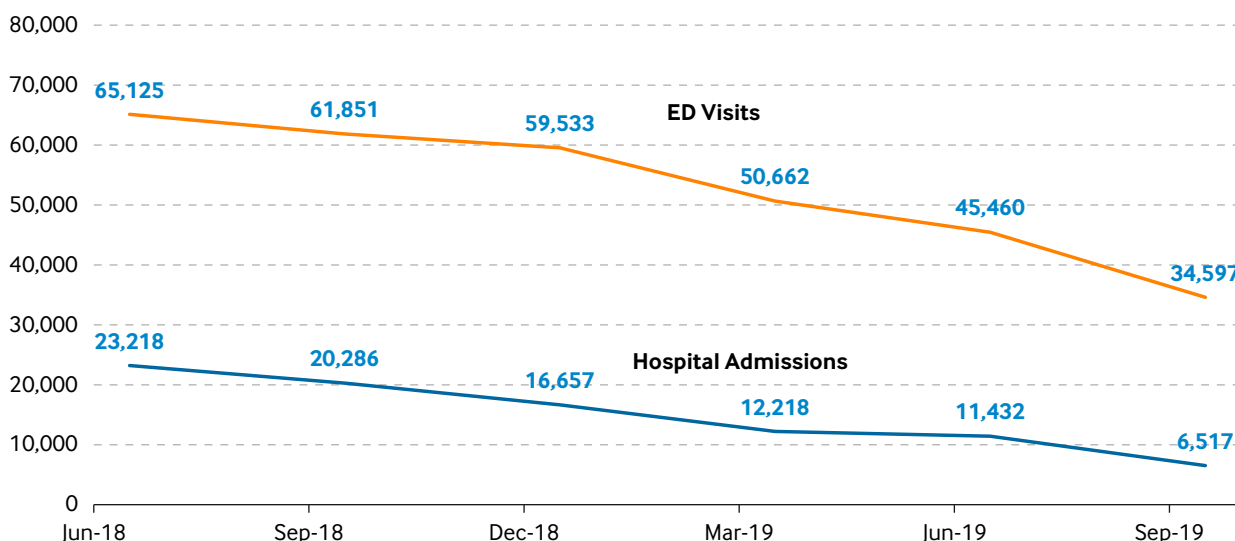


Source: Consortium for Southeast Healthcare Quality
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FIGURE 5

Number of ED Visits and Hospital Admissions

Reductions measured during the last 15 months of the initiative when utilization reports from the commercial payer were available. Each data point represents the previous 3-month period of usage. The larger decreases shown in the last quarter (September 2019) reflect the summer months, when historically, utilization of services tends to decrease.



Source: Consortium for Southeast Healthcare Quality

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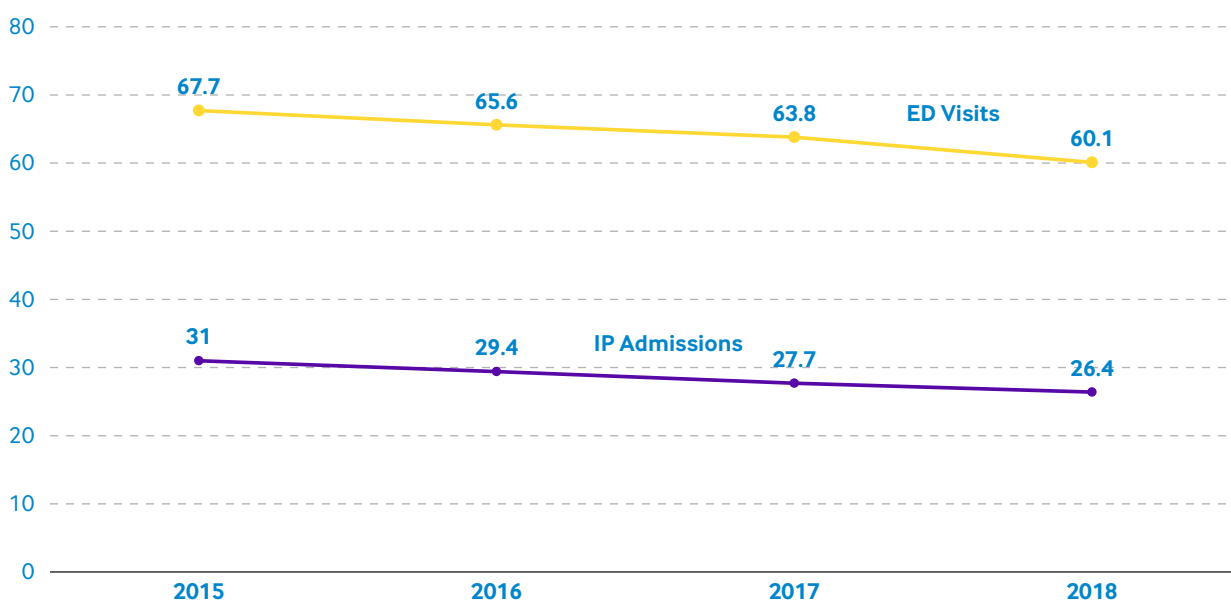
To confirm QualityImpact's influence on reduced health care costs, we contracted with an independent firm (Avalere Health LLC, a health care-focused data consultancy firm) to conduct a post-TCPI assessment of Medicare fee-for-service (FFS) costs and utilization for beneficiaries attributed to COSEHQ PTN enrolled providers. Under a research-focused data user agreement with CMS, Avalere Health through its parent, Inovalon, Inc. receives Medicare FFS claims data including a 100% sample of Medicare Parts A, B, and D. Avalere used attribution and statistical benchmarking models from other CMS/Center for Medicare & Medicaid Innovation programs and demonstrations to analyze patterns of care among a defined comparison population of all Medicare FFS beneficiaries not attributed to COSEHQ PTN practices. Avalere evaluated COSEHQ PTN performance on two utilization metrics (inpatient admissions and ED visits) and two cost metrics (average per beneficiary per month, Parts A and B [2015–2018] and Parts A, B, and D [2015–2017]) and compared those results against the benchmark population (patients in the same geographic region not participating in the program) stratified by year to account for underlying trends in outcomes among the comparison population over time.

The analysis estimated that total costs associated with only Medicare FFS patients treated by clinicians in participating practices using the QualityImpact model were \$54 million lower over a

FIGURE 6

Inpatient Admissions and ED Visits per 100 Medicare Fee-for-Service (FFS) Beneficiaries: Preparticipation versus QualityImpact Participation Years

Avalere analysis based on a 100% sample of FFS Medicare patient data from participating practices. Preparticipation is for 2015. QualityImpact years 1–3 are for 2016–2018. IP = inpatient.



Source: Avalere

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3-year period (2016–2018) compared with patients treated by clinicians in practices not enrolled in TCPI and thus not using this model. This analysis, which focused on a smaller segment of our patient population than the ED and hospital utilization analysis mentioned earlier and differed in its methodology, did show lower costs following the implementation of the QualityImpact model (Figure 6, Figure 7).

Limitations

CMS Medicare claims data were not provided for this project, as the primary aim was quality improvement, and analyzing claims data was beyond the scope of the initiative. The majority of our enrolled patients, 60%, were insured by commercial plans, 35% by Medicare, and 5% by Medicaid. We therefore considered it reasonable to compare our practices with others using the commercial data to which we had access.

FIGURE 7

Cost-Reduction Insights

Per-ED visit program expenditures (including physician visits during visit) from a Medicare Payment Advisory Commission (MedPAC) analysis of 2019 hospital outpatient and physician claims, adjusted to 2015–2018 with Outpatient Prospective Payment System (OPPS) annual update factors (http://medpac.gov/docs/default-source/reports/jun19_medpac_reporttocongress_sec.pdf). COSEHQ = Consortium for Southeast Healthcare Quality.

Summary of Measures: Takeaways

Insights & Takeaways

Over Time, COSEHQ Practices Succeeded in Slowing Cost Increases / COSEHQ was able to slow the growth of total cost of care, relative to the patient population absent program participation, which saw a notable increase over the performance period.

Largest Improvements in Care Efficiency Realized Amongst 4 Top States / The four states with the largest number of beneficiaries—South Carolina, Louisiana, Florida, and Virginia—experienced reductions in ED visits and inpatient admissions.

Avalere Findings Suggest That COSEHQ Succeeded on Cost and Utilization Improvement / Generally speaking, utilization for COSEHQ practices trended downward, and Medicare spending increased but at a lower rate than practices not participating in the COSEHQ initiative. Avalere estimates that savings totaled **\$54 million** over the performance period.

Source: Avalere

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“*Data transparency and goal-oriented gap closure, important under value-based care, were promoted across the PTN.*”

The PTN estimated cost savings of \$192,266,889 was based on the 15 months of available commercial payer utilization data and may not represent the entire project period. However, because of the rolling enrollment during the first 2 years in which utilization trends did not include the entire network, we feel this estimate is representative.

We did not track the implementation cost for each practice, as that calculation was outside of the scope of the initiative, and practices varied in size, resource needs, and number of clinicians. Based on the total funding received, an average cost per enrolled practice was about \$20,000.

Certain practice electronic health records (EHRs) had limitations to aggregate patient data into a population health analytics platform. Azara Healthcare provided a network-wide EHR agnostic platform for retrieving clinical data from practices and was vital to normalizing and identifying overall care gaps across providers and sites of care.

This initiative was implemented only in the United States, primarily in the southeast region, at the request of CMS. Although the principles of the model have been replicated successfully in other subsequent initiatives, the complete architecture has not been applied broadly in other geographic regions or countries.

Patient satisfaction was not a measure we evaluated in this initiative, as our focus was on improving clinician and practice performance. However, after implementing QualityImpact patient engagement resources, many practices executed their own patient satisfaction surveys.

Lessons Learned

- **Recruitment capacity.** With an initiative this large, we expected to encounter a range of problems. Surprisingly, one of the biggest hurdles we met was having a higher-than-expected enrollment. This stretched the COSEHQ resources initially but motivated us to build remote capabilities to scale the model, including mentoring and peer-to-peer learning sessions, archived on-demand clinical training modules, and an inventory of self-teaching tools that made it possible to reach a broad group of clinicians.
- **Scaling recruitment.** Ideally, onsite visits to recruit clinicians were imperative to gaining buy-in. However, due to constraints on the PTN staff's travel availability and a practice's available nonpatient time, we consolidated some of our recruitment efforts by presenting at professional society meetings and conferences and visiting each practice that expressed interest.
- **Reducing practice burden.** The user-friendly population health platform allowed users to conduct quick reviews of patient care gaps and clinician performance on their own, when convenient.
- **Actionable, concise reporting.** Clinicians do not have the time or interest to review lengthy reports. Making data actionable through brief two-page "at a glance" reports with recommendations for improvement kept clinicians informed and engaged without overburdening them.
- **Leadership buy-in.** Getting buy-in from leadership made engagement of clinicians easier, improving both participation levels and outcomes, especially from clinicians who were reluctant to participate. Leadership was especially interested if the practice engaged in pay-for-value contracts.

- Practice alignment with the initiative. A data-driven practice-specific action plan with identified target goals and timelines ensured that practices stayed on course and achieved goals.
- Regular communication and accountability. We used monthly accountability calls to cultivate trust, discuss and revise strategies for practices that were lagging in their progress, and encourage those who were on track.
- Transparency and feedback. Quarterly dashboard reports, distributed to practices throughout the initiative, illustrated their progress toward target goals. Pauses in progress triggered updates to the practice's action plan.
- Peer-driven improvement. Peer-to-peer learning, promoted throughout the 4-year project period among physicians across the PTN, revealed best practices and improved individual physicians' clinical performance.
- Enrolled physicians expressed the value of having our PTN physician experts, who understand the life and knowledge of physicians, engage them as peers.
- Operational alignment. Standardizing operational processes where appropriate to eliminate variation led to improved efficiency and effectiveness and reduced costs for both the patient and practice staff.

QualityImpact was a catalyst for continued improvement. All 735 participating practice sites showed evidence of improved clinical performance. Of these practices, 456 were recognized by CMS as exemplary practice sites. Additionally, 79% (583 of our enrolled practice sites) successfully transitioned to value-based payment models, meeting another goal of the CMS TCPI.

Although the final CMS evaluation of the TCPI program is still underway, CMS recognizes COSEHQ as a top-performing PTN, with 90% of practices enrolled demonstrating clear and consistent progress toward target goals. Achieving target goals validated that a practice had implemented the QualityImpact clinical improvement and transformation tools and resources and had internally built the business acumen to succeed. Behavior even changed among clinicians and patients who are typically difficult to engage. COSEHQ continues to build on its QualityImpact success and is working with practices considering or already engaged in value-based payment models.

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COMMENTARY

Measuring Health Disparities in a Commercially Insured Population: The First Step to Incorporate Equity into Value Transformation

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Improving the value of the health care system cannot occur unless we improve the quality of care for all, not just for a subset of the population. Unfortunately, evidence is accumulating that value-based payment initiatives for Medicare patients may exacerbate health disparities by preferentially excluding sicker populations with lower sociodemographic status and greater social vulnerabilities. In alignment with explicit priorities articulated by the U.S. Centers for Medicare & Medicaid Services, Blue Cross Blue Shield of North Carolina has committed to addressing prevailing health disparities as a core component of its statewide transition to value-based payments. The authors detail Blue Cross' methodology for quantifying health equity in its commercially insured population, report the results of the insurer's disparities analysis, and describe a plan to incorporate health equity into current and future value programs.

The last decade of value-based payment reform has largely focused on innovative reimbursement mechanisms that reward providers for improving the health of populations and lowering costs. Thus far, stakeholders have defined success solely based on quality and cost metrics, ignoring persistent problems of health equity. Indeed, current value-based models may exacerbate inequities in access, quality, and affordability.¹

To address these inequities, multiple parties — including state and federal public health programs, commercial payers, and agencies and organizations concerned with measuring care quality — have added health equity as a core function of value transformation.^{2,3} In its 2021 strategy refresh,

the Center for Medicare and Medicaid Innovation (CMMI) at the U.S. Centers for Medicare & Medicaid Services (CMS) made health equity a primary objective, with the specific aim to “embed health equity in **every aspect** of CMS Innovation Center models on underserved populations” (emphasis added by authors).⁴ CMMI has incorporated health equity into the newly announced Accountable Care Organization Realizing Equity, Access, and Community Health (ACO REACH) program.⁵ The National Council for Quality Assurance (NCQA) has introduced a Health Equity Accreditation Program.⁶

Collecting accurate and complete data on individuals’ sociodemographic characteristics remains a formidable obstacle.⁷ Additionally, it is not clear which variables (income, employment, education, age, disability, family structure, race/ethnicity, language, housing, transportation, etc.) are most salient for measuring equity. Organizations including the NCQA support leveraging “indirect” methods, such as the Area Deprivation Index and the Social Vulnerability Index, in the absence of member-level data.⁶ Even when this granular data is available, health care stakeholders have yet to figure out a uniformly acceptable, systematic method for defining, quantifying, and creating accountability for reducing health disparities within a population.⁸

Over the past 3 years, Blue Cross Blue Shield of North Carolina (Blue Cross NC) has shifted away from fee-for-service reimbursement toward value-based models. We have more recently accelerated and codified our commitment to advancing health equity through a few mechanisms: (1) increasing the completeness and accuracy of race, ethnicity, and language (REL) data reported by members; (2) investing in nonmedical drivers of health for all North Carolinians;⁹ and (3) applying quantitative and contractual mechanisms to address equity via value transformation work.

In this article, we focus on the third mechanism. We describe our current approach to defining and quantifying health disparities in the context of our value programs, and discuss specific steps we are taking to incorporate health equity into value programs.

Methodology

Blue Cross NC partnered with Ursa Health, a health care analytics and professional services company, to generate robust cost and quality insights about our member population, with a specific focus on our value programs and health equity.

Ursa Health analyzed Blue Cross NC claims data, from January 1, 2019, to June 30, 2021, for both commercial (excluding the State Health Plan) and Medicare Advantage lines of business. We defined four member cohorts: (1) the entire Blue Cross NC membership; (2) members attributed to Blue Premier, Blue Cross NC’s flagship statewide accountable care organization network¹⁰; (3) members eligible for the existing Advanced Kidney Care¹¹ value-based payment model; and (4) members who would qualify for a planned maternity value-based payment model. Attribution to Blue Premier is based on receiving the plurality of primary care services by a provider affiliated with a participating accountable care organization. All members with a clinical diagnosis of chronic kidney disease (stage IV or V) or end-stage renal disease qualify for attribution to the Advanced Kidney Care model, with select business exclusions. All members with commercial coverage with

a qualifying delivery event were included in the cohort eligible for the maternity value-based payment model for the purposes of this disparity analysis.

“*Current value-based models may exacerbate inequities in access, quality, and affordability.*”

We evaluated relevant cost, utilization, and quality (custom and standard) outcomes, many of which our value-based partners are accountable for in the value-based payment models. The Blue Premier program launched in January 2019 with steadily increasing membership. Given the time frame of the available data, we expect Blue Premier to have a small causal effect on cost, quality, or utilization outcomes. Therefore, the observed differences between Blue Premier attributed and non-attributed populations reflect baseline characteristics of our membership as new care model deployment and subsequent impacts on outcomes take time to manifest.

Given the lack of accurate self-reported REL data at the member level, we used an “indirect” method to impute a measure of member-level socioeconomic disadvantage. Outcomes were stratified by the University of Wisconsin’s Area Deprivation Index (ADI) into quintiles, where higher ADI scores correspond to a greater degree of deprivation. The ADI uses American Community Survey’s 5-year estimates of income, education, employment, and housing quality domains. Members were assigned the ADI score of their U.S. Census block group “neighborhood” according to their nine-digit zip code.^{12,13}

We characterize socioeconomic disparities by focusing on patients within the most and least deprived neighborhoods (those within the fifth and first ADI quintiles, respectively). Comparing the extreme quintiles typically gives the largest contrast of a general trend.

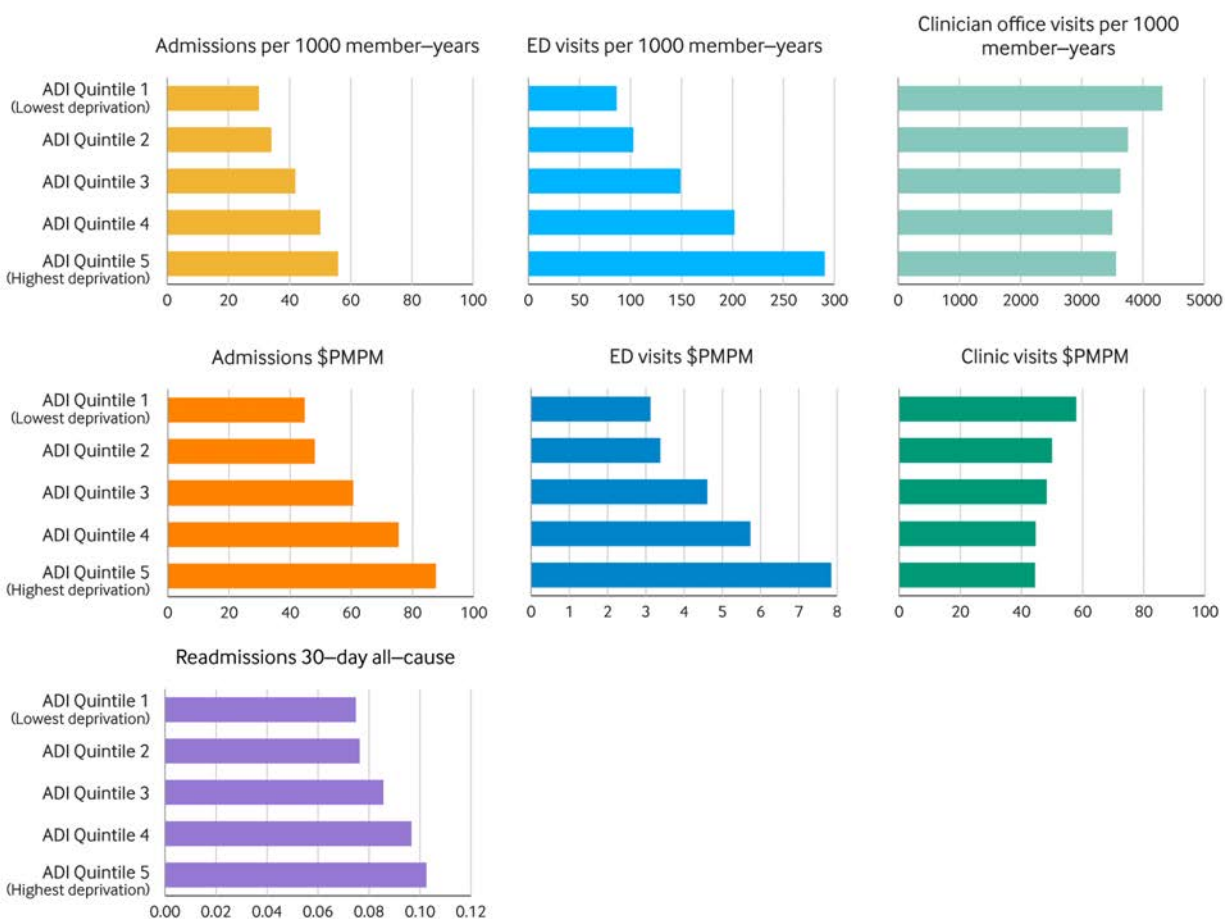
In addition to comparing outcomes across groups, we are also interested in how these differences evolve with time. Specifically, we use a linear probability model to test whether disparities in Blue Premier membership change over time.¹⁴ (See [Appendix](#) for more information on our methods and supplemental data.)

Results

We analyzed claims data for 5.85 million patients, with a combined 89.8 million member-months between January 1, 2019, and June 30, 2021 (Figure 1 ; 98.4% of patients (97.7% of member-months) were in the commercial line of business and 1.6% of patients (2.3% of member-months) were in Medicare Advantage. ADI data was available for virtually all patients. About 9.4% of members were in the first ADI quintile, 13% were in the fifth quintile, and the remaining members were relatively evenly distributed (approximately 25%) across the middle three quintiles (see [Appendix](#)). Members living in the most deprived neighborhoods had higher admission rates (55.8 vs. 30.0 admissions per 1,000 member-years), higher 30-day all-cause readmission rates (10.3% vs. 7.5%); and much more frequent emergency department (ED) visits (290.4 vs. 86.4 visits per 1,000 member-year) compared with members in the least deprived neighborhoods. Compared with the least deprived

quintile, members in the most deprived quintile were admitted 86.0% more frequently and readmitted 37.3% more frequently, and they visited the ED more than three times as frequently. This disparity translates into significantly higher plan paid per-member per-month (PMPM) amounts for inpatient care (\$87.70 vs. \$44.70) and ED care (\$7.80 vs. \$3.10). Conversely, members in the most highly deprived areas access outpatient clinician visits less frequently (3.6 vs. 4.3 visits per member-year) and had lower outpatient clinician visit PMPM costs (\$44.4 vs. \$57.9) than those members living in the least deprived areas (see [Appendix](#)).

FIGURE 1
Inequities Across The Entire Blue Cross NC Membership



Source: Blue Cross Blue Shield of North Carolina

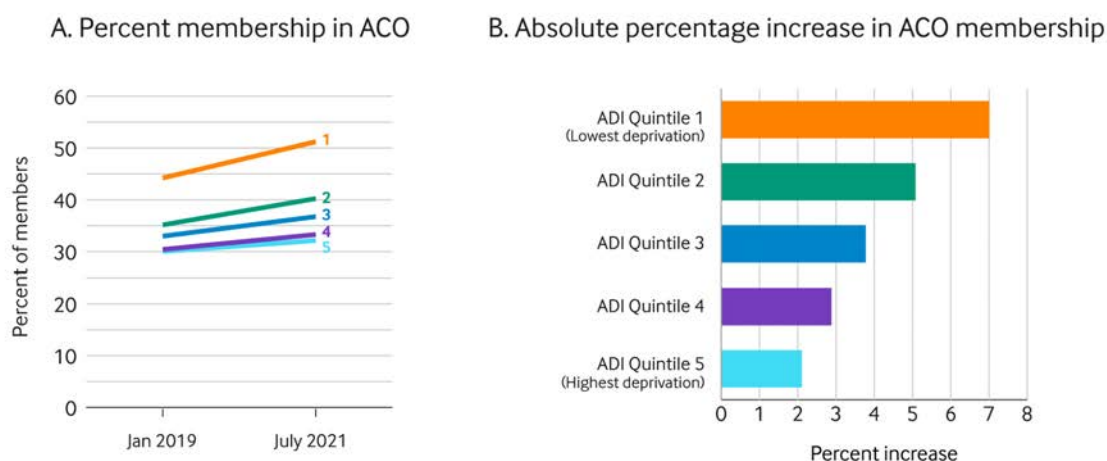
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“Collecting accurate and complete data on individuals’ sociodemographic characteristics remains a formidable obstacle.”

Attribution to Blue Premier ensures that members have a primary care provider or health care organization that is accountable for quality and total cost of care, laying the foundational incentives

for population-based care redesign to achieve value goals. We analyzed the probability of Blue Premier attribution according to ADI quintile over time (Figure 2). Since its launch in early 2019, the Blue Premier disproportionately reached the least deprived areas; 44.2% of members living in the least deprived quintile were attributed to Blue Premier, compared with only 30% of members in the most deprived quintile. By July 2021, 51.2% of members living in the least deprived quintile were attributed to Blue Premier, compared with only 32.1% of members in the most deprived quintile. Thus, at the initiation of the program, members living in the least deprived areas were 47.3% more likely (14.2% absolute difference); 30 months into the program, they were 59.5% more likely (19.1% absolute difference) to be attributed to Blue Premier than members in the most deprived areas. This represented a significant increase in the Blue Premier membership disparity over time (see [Appendix](#)).

FIGURE 2
Disparities in Access to Commercial Accountable Care Organization

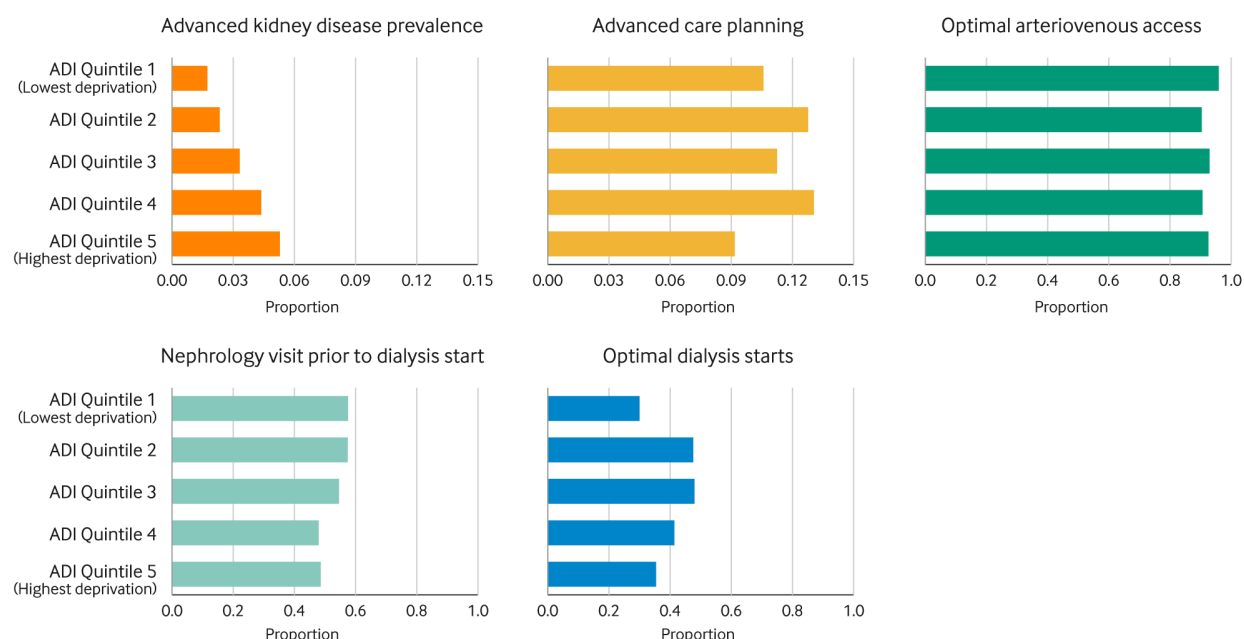


Source: Blue Cross Blue Shield of North Carolina

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The 101,760 members that meet clinical criteria for our population-level value-based care model for advanced kidney disease (AKD), defined by a diagnosis of chronic kidney disease stage 4 or 5 or end-stage kidney disease, disproportionately live in more deprived areas (Figure 3). In the most-deprived ADI quintile, 5.0% of members qualified for this value-based care model based on a diagnosis of AKD compared with 1.7% of members in the least-deprived ADI quintile. Encouragingly, cost and quality metrics, including advanced care planning, appropriate arteriovenous access within 90 days of starting dialysis, access to a nephrologist prior to starting dialysis, and optimal dialysis starts, were comparable across ADI quintiles (see [Appendix](#)).

FIGURE 3
Disparities in Chronic Kidney Disease and End Stage Kidney Disease

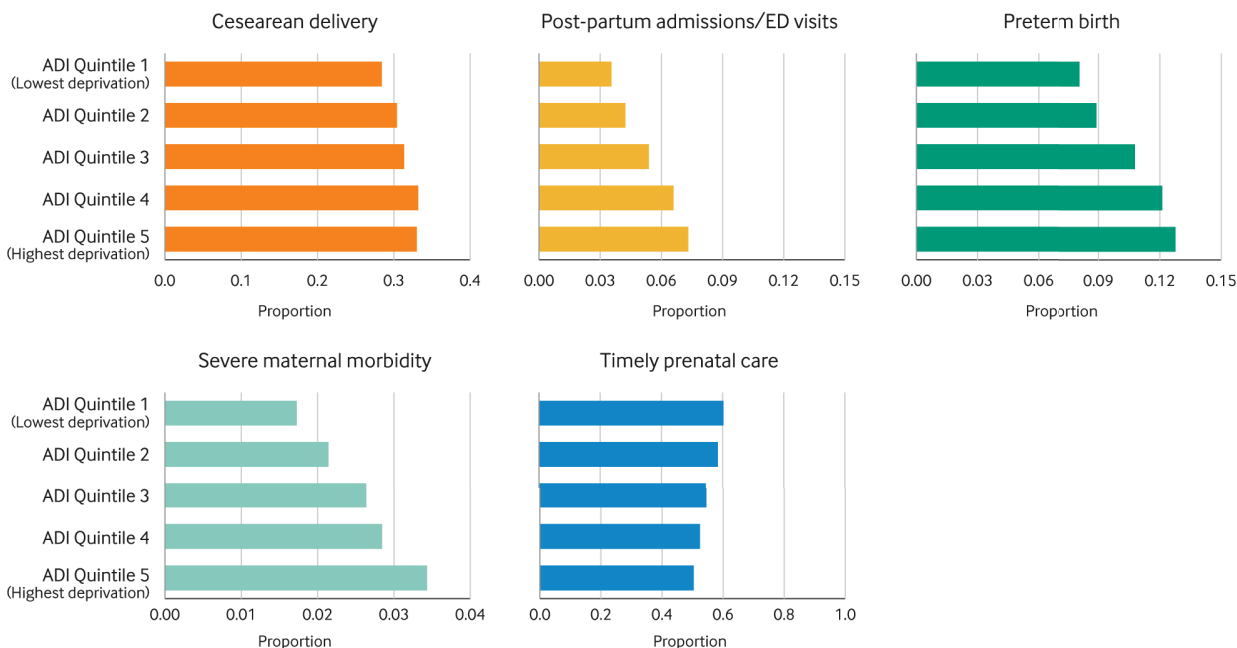


Source: Blue Cross Blue Shield of North Carolina

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We analyzed 57,314 maternity episodes that resulted in a newborn delivery during the 30-month analysis period (Figure 4). While not statistically significant, plan-paid amount trended higher for members in the most-deprived ADI quintile compared to those in the least deprived quintile. This difference was driven by higher rates of preterm birth (12.8% vs. 8.1%), cesarean delivery (33.0% vs. 28.4%), postpartum admission or ED visit (7.3% vs. 3.6%), and severe maternal morbidity (3.4% vs. 1.7%), while newborn encounter length of stay was comparable across ADI quintiles. Conversely, expectant mothers in the most deprived areas had fewer prenatal office visits and lower rates of timely prenatal care compared with those in the least deprived areas (50.4% vs. 60.3%) (see [Appendix](#)).

FIGURE 4
Disparities in Maternal and Perinatal Health



Source: Blue Cross Blue Shield of North Carolina

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Discussion

As we improve the completeness of our self-reported REL data at the member level, we demonstrate how a validated measure of socioeconomic disadvantage can be applied to cost, quality, and utilization metrics to quantify and articulate existing health disparities within a commercial insurance population. Specifically, we evaluated the existing disparities in the context of existing value programs, including a network of primary care-centric accountable care organizations (ACOs), a population-based chronic condition model for AKD, and an episode-based payment model for maternity and perinatal care. Identifying and quantifying these disparities are fundamental capabilities required to activate a value-based payment strategy that explicitly and intentionally creates accountability for measurably reducing health disparities.

First, we found evidence in our general population that members living in more deprived areas are hospitalized and utilize the ED more frequently, yet receive fewer outpatient services, than members living in less deprived areas. While not causal, our data suggests that socially vulnerable members may face greater systematic barriers to obtaining effective upstream disease prevention and health optimization services, even if commercially insured. These members disproportionately rely on costlier sites of service, including the ED and inpatient facilities, and likely arrive at these facilities with more acute and complicated illnesses. These findings indicate the imperative for value programs, which create accountability for improving population health, to reach these members. In theory, programs that increase access to outpatient primary care and invest in social

drivers of health for these historically disadvantaged members offer the greatest opportunity to improve quality of care, enhance experience for the patient, and reduce overall costs to the health care system.

“ *Our analysis of the variation in the socioeconomic status of members attributed to Blue Cross NC’s foundational network of accountable care organizations revealed evidence of unequal access to a systematic infrastructure intended to improve quality, affordability, and member experience.*”

Second, our analysis of the variation in the socioeconomic status of members attributed to Blue Cross NC’s foundational network of accountable care organizations revealed evidence of unequal access to a systematic infrastructure intended to improve quality, affordability, and member experience. Though these socially vulnerable populations should be our top priority based on need and opportunity, they are, in fact, disproportionately underrepresented in our flagship value transformation program. This finding supports previously reported evidence that if alternative payment models are not explicitly and intentionally designed to promote health equity, they may worsen disparities for racial and ethnic minorities and socioeconomically vulnerable individuals.^{1,15} Our results confirm prior reports showing that physicians who practice in areas with higher percentages of individuals who are Black, impoverished, uninsured, or disabled, or have less than a high school education, are less likely to participate in commercial and Medicare ACOs.¹⁶

Additionally, patients who are Black, dually enrolled in Medicare and Medicaid, and living in a more impoverished zip code are less likely to be attributed to a Medicare ACO.¹⁷ Similar disparities have been found in Medicare’s mandatory joint replacement bundled payment model.¹⁸ Perhaps even more concerning, we found that disparity in Blue Premier attribution is increasing over time, potentially perpetuating inequities. This analysis illuminates the immediate imperative for all stakeholders to explicitly and intentionally incorporate health equity as a fundamental component of value transformation.¹⁹ Blue Cross NC is actively redesigning our core value programs to make them more feasible for provider groups that disproportionately serve vulnerable populations, incorporating measurement and accountability of population-level equity metrics, diversifying member outreach efforts, and enhancing community partnerships.²⁰

Finally, we quantified disparities in our privately insured population in two specialty care areas, advanced kidney disease and perinatal care, that have well-established health equity problems nationally. Deeper analysis of these two clinical service lines raises different points of interest.

We confirmed previously published reports that advanced kidney disease disproportionately afflicts members living in the most vulnerable areas.²¹ Somewhat reassuringly, we found that within the diagnosed population, cost, quality, and utilization of services are relatively consistent across socioeconomic status, with the exception of kidney transplant rate, which we were not able to evaluate in this analysis. While small numbers of events limit the ability to detect statistical significance, we can still identify areas for improvement, including access to a nephrologist prior

to starting dialysis (nearly 10% lower rates of nephrology visit prior to dialysis for members living in the most deprived areas compared with the least deprived). Abiding by the commitment to intentionally tackle health inequities through value-based programs, policy makers and leaders of health plans and care delivery organizations must factor this baseline disparity into account when prioritizing initiatives. Despite the relatively small numbers of individuals with advanced kidney disease, it has an outsized impact on vulnerable populations, making it an essential area of focus. Our findings from this analysis also provide support for designing programs that focus on prevention of chronic illnesses that lead to AKD. We must address drivers of health that contribute to the higher prevalence of AKD in disadvantaged populations by creating true accountability for prevention and management of risk factors such as diabetes, heart disease, high blood pressure, and obesity.

Disparities in maternal and perinatal health in the United States are appalling, and are a national disgrace. Nonwhite infants are up to 2.4 times more likely to die in the first year of life,²² and Black mothers are 3 to 4 times more likely to die at childbirth.²³ Vice President Kamala Harris recently announced a call to action to reduce maternity mortality and morbidity.²⁴ Infants born in North Carolina have the 11th-highest mortality rate in the United States, and maternal morbidity and mortality rates continue to rise. Blue Cross NC is investing \$2 million into evidence-based initiatives for the most vulnerable individuals, with a goal of reducing disparities in maternal and infant health outcomes by 50% in 5 years. The results of the present analysis can help inform decisions around allocating finite resources to help communities in greatest need of social assistance. Additionally, we must take these findings into account as we design value-based payment models for maternal and infant health: selecting partnerships and care models that explicitly address social drivers of health, prioritizing deployment of high-value care models to the most socioeconomically disadvantaged areas, and including the reduction health disparities as a quantitative, accountable metric tied to reimbursement.^{2,3}

This analysis illustrates the potential for being misled by aggregate cost measures and the importance of being able to drill down into the differential cost drivers within a perinatal episode. While average episode cost is not drastically different across ADI groups, the data indicate that mothers in more socioeconomically fortunate areas receive more of their care in the outpatient setting, while facility-based hospital costs are higher for socially vulnerable members, driven by significantly worse outcomes.

This study is limited by several factors.

First, without access to the complete, self-reported, member-level socioeconomic and demographic data, we relied on an indirect, imputed method for assigning members a composite score of neighborhood-level area deprivation.²⁵ In alignment with the approach taken by other health plans²⁶ and rationale laid out by the National Council for Quality Assurance's proposal to stratify quality measure by race and ethnicity,²⁷ we believe that while this indirect approach may not be currently suitable for patient-level accountability and interventions, it does provide an immediately useful path toward transparency on health disparities, and it identifies high-impact opportunities to invest in population-level and community-based health equity strategies. Furthermore, this indirect method likely underestimates the true impact of socioeconomic factors on health outcomes.

Second, this approach can only identify associations with cost and quality outcomes but cannot establish a direct causal link between specific social drivers of health and health care outcomes. While alternative approaches to stratifying populations, such as the U.S. Centers for Disease Control and Prevention's Social Vulnerability Index, may have more granular independent variable domains (such as socioeconomic status, household composition and disability, race/ethnicity and language, and housing type and transportation), conclusions are still limited to associations.

“ *Measuring and reporting existing disparities in our commercially insured population is but the first step to activating a strategy to materially reduce inequities in health care.* ”

Finally, we cannot make any definite conclusions about the direct impact of value programs on reducing disparities, which would require analysis over several years. This current analysis is intended to establish a baseline snapshot of existing disparities and a starting point to intentionally create accountability for improving health equity.

Measuring and reporting existing disparities in our commercially insured population is but the first step to activating a strategy to materially reduce inequities in health care. Inspired to align with the ACO REACH program's requirement that “all model participants develop and implement a robust health equity plan to identify underserved communities and implement initiatives to measurably reduce health disparities within their beneficiary populations,”⁵ Blue Cross NC is actively formalizing a health equity strategy to step up to this call to action. This road map will define the concrete steps and identify necessary resources to:

- Create a data infrastructure to measure, quantify, and report disparities
- Stratify cost, quality, access, and patient experience measures by subpopulation
- Establish the methodology for benchmarking and measuring reductions in disparities
- Define the path to financial accountability for performance on health equity metrics with our value partners

We believe that specifically addressing equity through these steps is not only aligned with our mission statement, “To improve the health and well-being of our customers and communities — we won't stop until healthcare is better for all,” but that this also makes us more effective in our accomplishing the goals of value transformation — to make health care better and more affordable. This is a unique opportunity to meet both our social and community obligations and our financial mandates.

Our first explicit application of these methods will occur in the context of a new alternative payment model, scheduled to go live in January 2023, that attributes members with high behavioral health needs to an accountable provider. This accountable provider is incentivized to deliver coordinated, high-quality, cost-effective care to attributed members through a shared-savings

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Appendix**Statistical Methods and Supplementary Data**

Disclosures: David Johnson was Medical Director for Value Transformation at Blue Cross Blue Shield of North Carolina in Durham, North Carolina, while the article was written. Ish Bhalla and Nora Dennis are employees of Blue Cross Blue Shield of North Carolina. Colin Beam is an employee of Ursa Health. Blue Cross Blue Shield of North Carolina contracted with Ursa Health to complete the data and analytics necessary for this study.

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