Integrated Medical, Behavioral Health, and Social Services

Care in the Community

Better Data and Analytics

Value-Based Care

THE CHART INVESTMENT PROGRAM:

COMMUNITY HOSPITAL ACCELERATION, REVITALIZATION, AND TRANSFORMATION

PHASE 2 EVALUATION REPORT

SEPTEMBER 2020

MASSACHUSETTS
HEALTH POLICY COMMISSION

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EXECUTIVE SUMMARY

INTRODUCTION

In Chapter 224 of the Acts of 2012, "An Act Improving the Quality of Health Care and Reducing Costs through Increased Transparency, Efficiency and Innovation," the Massachusetts legislature dedicated funds for investments in community hospitals in recognition of the unique and important role of community hospitals in the Massachusetts health care system. Utilizing these funds, the Massachusetts Health Policy Commission (HPC) created the Community Hospital Acceleration, Revitalization, and Transformation (CHART) Program, which was implemented in Massachusetts community hospitals over two distinct phases. With technical assistance from the HPC, CHART hospitals designed and implemented new care models for target populations with complex medical, social, and/or behavioral health needs in order to provide the most appropriate care at the right time, in the right place.

Community hospitals are vital providers of lower cost, high quality care in their communities, often serving patients with a variety of medical, behavioral health, and social needs. However, the increasing migration of patients away from community hospitals and a general decline in the use of inpatient care statewide has reduced revenue and left many community hospitals with fewer resources to meaningfully invest in people, processes, and technology. To enhance their ability to meet current and future community needs, between 2014 and 2018, the CHART Program invested approximately $70 million in Massachusetts community hospitals to make improvements that have the potential to both enhance patient care and reduce overall health costs for the Commonwealth.

This Report focuses on Phase 2 of the CHART Program and explores the degree to which the hospitals (1) effectively *implemented* the CHART Program, (2) achieved the intended *impacts* on the goals of Phase 2, and (3) *sustained* elements of the CHART Program after the performance period, without ongoing investment by the HPC.

SECTION ONE: PROGRAM DESIGN AND IMPLEMENTATION

The HPC made up to $60 million available to eligible Massachusetts community hospitals to participate in the CHART Phase 2 Investment Program. Phase 2 was designed to fund two-year initiatives to transform traditional hospital care models, build community hospital capabilities, align services with the needs of the local population, and ultimately prepare CHART hospitals to participate and succeed in value-based payment models. Following a competitive selection process, the HPC Board approved 20 individual hospital awards and 5 joint hospital awards. Because some hospitals chose to implement two distinct CHART programs, 29 CHART programs are included in this evaluation report.

Prior to formally launching their CHART programs, hospitals participated in a rigorous, year-long Implementation Planning Period (IPP). During IPP, hospitals used locally-derived data to conduct baseline data analyses to identify target populations, define aim statements, and refine program goals. Consistent with HPC research, analyses of local data revealed that patients with behavioral health conditions and/or a history of frequent hospitalization represented a significant proportion of acute care utilization. To deepen their understanding of the drivers of utilization, hospitals also conducted interviews with a sample of patients. These interviews provided additional insight into how a complex and nuanced set of factors, including behavioral health and/or social needs, could lead to patients' use of acute care services. Recognizing opportunities to improve care and reduce unnecessary utilization, nearly all hospitals defined their target populations either by a history of high utilization or by behavioral health diagnosis. Hospitals then proposed acute care utilization reduction targets for eligible patients and developed care models to identify gaps in care and address underlying causes of unnecessary utilization.

During IPP, the following more refined goals for community hospitals in CHART Phase 2 emerged:

1. **Integrate care across medical, behavioral health, and social needs,**
2. **Shift care from the hospital to the community as appropriate,**
3. **Use data and analytics to better serve patients, and**
4. **Orient organizations toward value-based care.**

Exhibit 1: The CHART Phase 2 goals encompassed change at both the hospital and patient-level

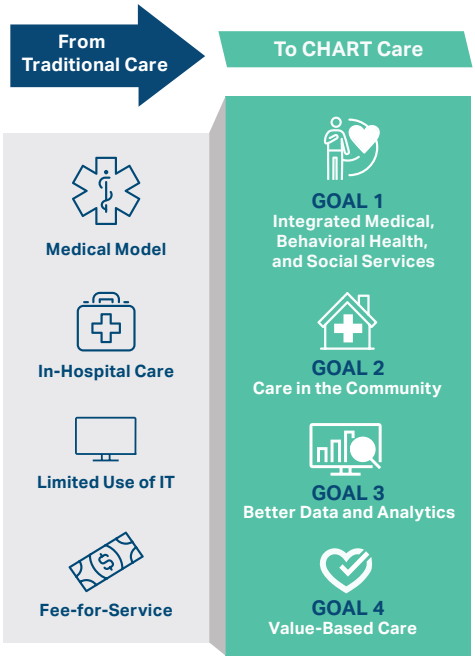

CHART programs launched between September 2015 and February 2016, with a 24-month performance period beginning at the time of each program's launch. Between CHART funding and in-kind contributions from the hospitals, the total CHART Phase 2 Program budget amounted to approximately $76.8 million. This funding was used to:

- **Hire and train multidisciplinary teams,** funding over 400 full and part-time positions including pharmacists, nurses, social workers, community health workers, and patient navigators, as well as operational roles such as Program Managers and data analysts.
- **Develop strategies for identifying and engaging with eligible patients** in the emergency department (ED) or inpatient settings. CHART teams deployed new systems for screening patients for behavioral health and social needs and many created real-time alerts when an eligible patient presented in the hospital.
- **Enhance post-discharge services,** including engaging patients via phone call or follow-up visit within 48 hours of discharge. These 48-hour follow-up connections came to be one of the most consistently adopted components of the program and were critical to addressing patients' needs and concerns after hospital discharge.
- **Extend care beyond the walls of the hospital** by meeting with patients in the community. Visits in the home or in public or outdoor spaces were often more convenient and comfortable for patients and supported the development of trusting, longer-lasting therapeutic relationships. These visits often enabled CHART teams to support their most vulnerable patients and deepened team members' understanding of the circumstances that affected their patients' health and acute care utilization.
- **Build or expand partnerships with local medical and non-medical organizations** to better meet patients' needs and connect patients to community-based resources as they transition out of the acute care setting. CHART funds were used to formalize relationships with 34 partner organizations. Many hospitals also formed non-financial partnerships to strengthen referral processes and channels of communication.
- **Build capacity for data collection** to monitor programmatic performance and inform data-driven decision-making. With advice from the HPC, teams developed dashboards to display relevant data and established protocols for staff (including frontline staff) to regularly review data.

Throughout the performance period, the HPC worked closely with CHART teams to apply principles of continuous quality improvement to adapt their models as they gained experience working with their target populations.

SECTION TWO: PROGRAM IMPACT

Over the CHART Phase 2 performance period, approximately 137,000 hospital encounters were targeted for intervention across 29 CHART programs. Each encounter represented an opportunity to intervene and influence the trajectory of a patient's care by taking a patient-centered approach to deliver integrated care across medical, behavioral, and social needs. The HPC analyzed the performance of the 29 CHART programs across five impact domains: operational use of data, provision of integrated whole-person care, partnerships, acute care utilization, and patient experience.

28 of 29 programs made notable progress in operational use of data. Robust data and analytics can have a powerful impact on care improvement efforts. CHART funding enabled community hospitals to improve their ability to collect and use data to redesign care processes to improve patient experience and outcomes.

27 of 29 programs made notable progress towards integrating whole-person care. CHART hospitals applied innovative, whole-person care models to provide integrated care across medical, behavioral health, and social needs. These approaches aimed to support patients with complex needs not often addressed by the traditional medical model. Adopting these integrated care approaches spurred innovations in hospital staffing models, as well as new partnerships with other community providers and social services.

28 of 29 programs made notable progress in partnerships. CHART funding allowed hospitals to invest in community partners providing a broad range of services, including behavioral health services, primary care, and home health care and related services for older adults. Enhanced partnerships frequently included co-location service models, embedded staff, and case conferencing for shared patients.

24 of 29 programs reported reductions in hospital utilization for their eligible patient populations, with 16 programs reporting a 15% or greater reduction. The care models implemented by CHART hospitals were designed to help patients avoid having to use costly acute care settings. CHART hospitals helped patients find care in the appropriate setting by forming trusting relationships with them and their families, addressing the medical, behavioral health, and social needs that the patients prioritized, and coordinating existing and new services to support patients' stability in the community.

Patients valued the holistic relationship-based care models. Patients reported that the individualized, comprehensive, and relationship-based CHART care models positively influenced their care experience. Patients also reported that CHART changed their patterns of health care service use and specifically reduced hospitalizations and ED use.

SECTION THREE: SUSTAINABLE ORGANIZATIONAL CHANGE

The CHART Phase 2 Investment was designed to create lasting transformation beyond the performance period and to prepare community hospitals to succeed in a value-based care environment. In addition to adoption of a more data-informed approach to care redesign as discussed in Section Two, many hospitals reported positive organizational culture changes from the Phase 2 intervention. Changes included adoption of a holistic approach to population health and recognition among staff of both the value of extending care beyond the hospital and of integrating non-clinical staff into the care team. Hospitals also reported a greater appreciation for the ways in which the stigma associated with certain diagnoses can influence how care is delivered. Overall, leadership and staff expressed support for the Phase 2 model. In particular, providers felt better equipped with the tools to meet patients' needs and reported that streamlined workflows reduced administrative burden.

Despite operating in a challenging health care market that was slower to move to value-based payment than anticipated, most CHART hospitals found ways to sustain their programs in whole or in part, which underscores CHART's value in supporting ongoing transformation. Overall, 23 CHART programs were sustained to some degree beyond the period of grant funding. Among hospitals that sustained all or parts of their CHART programs, the majority cited their existing or anticipated participation in Accountable Care Organizations (ACOs) – particularly MassHealth ACOs – as a key factor that influenced their decision to continue CHART roles and activities.

CONCLUSION

The CHART Program supported sustainable care delivery transformation through innovative investments in Massachusetts community hospitals to prepare them to participate fully in a health care marketplace increasingly oriented towards value-based care models. With CHART Phase 2 funding and technical assistance from the HPC, hospitals made significant strides in re-aligning people, programs, and processes and, in so doing, delivered meaningful value to thousands of patients – many of them facing complex illnesses and challenging social conditions. By leveraging their CHART investments, more Massachusetts community hospitals are better equipped today to serve their patients and succeed in a value-based health care environment. While there is still much more to be done to ensure the vitality of community hospitals, the achievements of these critical institutions through CHART show their dedication and ability to innovate as they continue to provide high-quality, cost-effective health care to the Commonwealth's residents.

INTRODUCTION

ABOUT THE MASSACHUSETTS HEALTH POLICY COMMISSION

The Massachusetts Health Policy Commission (HPC), established in 2012, is an independent state agency that develops policy to reduce health care cost growth and improve the quality of patient care. The HPC's mission is to advance a more transparent, accountable, and equitable health care system through its independent policy leadership and innovative investment programs. The HPC's goal is better health and better care – at a lower cost – for all residents across the Commonwealth.

The agency's main responsibilities are led by HPC staff and overseen by an 11-member Board of Commissioners. Key activities include setting the health care cost growth benchmark; setting and monitoring provider and payer performance relative to the health care cost growth benchmark; creating standards for care delivery systems that advance an equitable health care system and are accountable to better meet patients' medical, behavioral, and social needs; analyzing the impact of health care market transactions on cost, quality, equity, and access; investing in community health care delivery and innovations; and safeguarding the rights of health insurance consumers and patients regarding coverage and care decisions by health plans and certain provider organizations.

ESTABLISHMENT OF THE CHART INVESTMENT PROGRAM

The Community Hospital Acceleration, Revitalization, and Transformation (CHART) Investment Program was designed to support the Commonwealth's aim of delivery system transformation by enhancing the ability of eligible community hospitals to meet current and future community needs. The framework for CHART was included in Chapter 224, "An Act Improving the Quality of Health Care and Reducing Costs through Increased Transparency, Efficiency and Innovation," establishing the Distressed Hospital Trust Fund. Funded through a one-time assessment on major providers (27 percent)[i] and surcharge payers (73 percent) in Massachusetts, the Distressed Hospital Trust Fund provided dedicated funding to support community hospital transformation. Hospitals eligible to receive funding under the Trust Fund must be non-profit, non-teaching, community hospitals with low relative price compared to other hospitals in the state.

The impetus for CHART as the vehicle for disbursement of monies from the Trust Fund was recognition by the HPC, other policy makers, and market participants of the importance of community hospitals to the Massachusetts health care system. As highlighted in the HPC's 2016 report, Community Hospitals at a Crossroads,[1] community hospitals are an important source of lower cost, high quality inpatient, outpatient, and emergency care in the local communities where patients live. However, the increasing migration of patients away from community hospitals to higher cost academic medical centers (AMCs) and teaching hospitals for routine care, along with a general decline in the use of inpatient care statewide, has left many community hospitals financially vulnerable. As community hospitals see fewer patients, they experience both declining overall revenue and lower payment rates as a result of reduced bargaining leverage with commercial insurers. As a result of these forces, community hospitals generally have had fewer resources to meaningfully invest in people, processes, and technology to remain competitive with the state's higher cost AMCs and teaching hospitals.

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i Hospitals within the Partners HealthCare system, Boston Children's Hospital, and CareGroup (consisting of Beth Israel Deaconess Medical Center, Mount Auburn Hospital and New England Baptist Hospital) were required to pay stratified amounts based upon operating surplus. Boston Children's Hospital, Beth Israel Deaconess Medical Center, Mount Auburn Hospital, New England Baptist Hospital and Martha's Vineyard Hospital all received 50 percent mitigation of their assessment by the Commission. See "958 CMR 2.00. One Time Assessment on Certain Qualifying Hospitals and Qualifying Surcharge Payors," pursuant to Chapter 224 of the Acts of 2012, Section 241. 958 CMR 2.00: One Time Assessment on Certain Qualifying Hospitals and Qualifying Surcharge Payors, Mass. St. c. 224 § 241 (2013).

In early summer 2013, following enactment of Chapter 224, the HPC began a public process to develop the regulatory framework for disbursement of the Distressed Hospital Trust Fund through the CHART Investment Program. Through that process, the HPC further defined the Investment Program's mission as supporting community hospitals in charting a course for the right care at the right time in the right place. This included community hospital readiness for participation in value-based care models including accountable care organizations. The HPC identified key priorities for investment, including maximizing appropriate use of hospitals; enhancing behavioral health care; improving hospital processes to reduce waste; and harnessing enabling technologies, use of locally-derived data,[ii] community partnerships, and strategic planning as tools to support transformation.

PHASE 1 OF THE CHART INVESTMENT PROGRAM

The CHART Investment Program evolved over two complementary Phases designed to support the Commonwealth's aim of delivery system transformation. In Phase 1, the HPC awarded approximately $10 million to 28 community hospitals to support initial capacity-building efforts. Over the roughly seven months of Phase 1, hospitals focused on a range of such efforts including change management (particularly at the executive level) and infrastructure investments to enable care delivery transformation. Many hospitals used Phase 1 investments for technology, such as electronic medical record analytic tools and care management platforms. Others used the funds to provide staff training in quality improvement or to support strategic planning. A small number implemented pilot programs to enhance care. For more information about CHART Phase 1, please see the HPC's CHART Phase 1 Report.[2]

Exhibit 2: The CHART Investment Program was implemented over two complementary Phases between 2014 and 2018

PHASE 2 OF THE CHART INVESTMENT PROGRAM

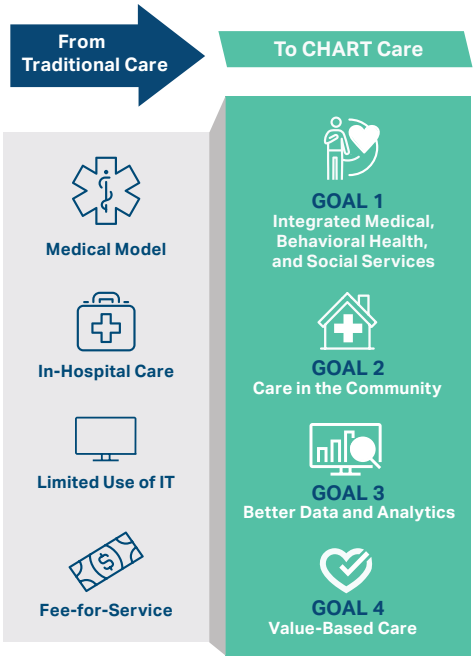
In June 2014, the HPC made up to $60 million available to eligible community hospitals to participate in CHART Phase 2. Following a competitive procurement process, funds were awarded to 27 hospitals in October 2014. While Phase 1 offered hospitals the opportunity to make foundational investments over a relatively short investment period, Phase 2 was designed to test innovative models of delivery system transformation, emphasizing care coordination, care transitions, and behavioral health care over a two-year performance period. In Phase 2, hospitals took a data-informed approach to define their target populations, establish measurable program aims, and design interventions and care models. Technical assistance provided by the HPC supported the hospitals in further refining their data analyses, applying principles of continuous quality improvement, and integrating insights and best practices from national and local sources.

ii Locally-derived data, which includes qualitative and quantitative data, refers to information that hospitals can collect about practices and trends at their own institution. This data can provide timely and specific information to inform the design and implementation of interventions. Examples of locally-derived data include hospital administrative data, medical records, patient and provider interviews, and publicly available demographic information.

Locally-derived data combined with emerging cost-related data at the national and state level influenced the goals and design of CHART Phase 2 (see **Call Out Box: Trends at the State and National Level**). From this intentionally iterative process emerged four overarching goals of the Phase 2 Program:

1. **Integrate care across medical, behavioral health, and social needs,**
2. **Shift care from the hospital to the community as appropriate,**
3. **Use data and analytics to better serve patients, and**
4. **Orient organizations toward value-based care.**

Exhibit 3: The CHART Phase 2 goals encompassed change at both the hospital and patient-level



CALL OUT BOX: TRENDS AT THE STATE AND NATIONAL LEVEL

The HPC's development of the CHART Phase 2 Investment Program drew on emerging trends and evidence at both the state and national level:

- HPC research identified high rates of avoidable health care spending in the Commonwealth, including $700 million in preventable acute hospital readmissions and $550 million in emergency department (ED) visits that could have been avoided with timely and effective primary care.[iii, 3, 4]
- HPC analysis of high-cost patients showed ED spending was highly concentrated, with less than 1 percent of the commercial population accounting for 8 percent of commercial ED spending and less than 1 percent of the Medicare population accounting for 5 percent of commercial ED spending.[5]
- HPC research also identified behavioral health (BH), including mental health and substance use disorders, as an important driver of acute care utilization. In Massachusetts, the number of ED visits related to BH grew by 23.7 percent between 2010 and 2014, while the number of other visits fell by 1.8 percent.[iv, 4, 5] A key driver of this increase was the devastating impact of the national opioid epidemic in Massachusetts. Across all individuals in the Commonwealth, the rate of opioid-related hospital discharges increased by more than 50 percent between 2012 and 2017.[6]
- Trends at the national level, including regulatory initiatives to reduce hospital readmissions[7] and the formation of accountable care organizations (ACOs) and other alternative payment models in the Affordable Care Act (ACA), signaled a changing health care payment environment.
- A growing body of evidence supported the development of high-touch care models to reduce readmissions for high-risk populations, generally stressing improved discharge planning, timely post-discharge follow-up, and coordination of ongoing care and services.[8-15]

iii As reported in the HPC's 2014 Cost Trends Report, Massachusetts residents used the ED 12 percent more than the U.S. average in 2012. In 2012, avoidable outpatient ED visits accounted for almost half (48%) of total ED visits. In addition, in federal fiscal year 2015, the Centers for Medicare and Medicaid Services penalized 55 Massachusetts hospitals for higher-than-expected Medicare readmission rates for certain conditions.

iv As reported in the HPC's 2014 Cost Trends Report, costs for patients with comorbid medical and BH conditions are among the highest, often reflecting acute care utilization driven both by the BH condition itself and by the impact of uncontrolled BH symptoms on the management of other serious medical conditions.

EVALUATION OF THE CHART PHASE 2 INVESTMENT PROGRAM

The CHART Phase 2 Evaluation Report explores the degree to which, on a cohort-level, the hospitals (1) effectively *implemented* the CHART Program, (2) achieved the intended *impacts* on the goals of Phase 2, and (3) *sustained* elements of the CHART Program after the performance period, without ongoing investment by the HPC.

While CHART funds were awarded to 27 community hospitals, some hospitals participated as part of a joint award, while others implemented more than one program at their hospital. Twenty-nine CHART programs are included in the evaluation. Since Phase 2 was designed to incorporate core elements across all hospitals, findings are reported at the cohort-level, in aggregate. The evaluation was conducted using a qualitative and quantitative mixed methods framework and includes data from interviews, surveys, hospital discharge case-mix data, and hospital-reported data. The HPC contracted with the Boston University School of Public Health (BUSPH) to inform and support the evaluation of CHART Phase 2.

Section One of the Evaluation Report, *Program Design and Implementation*, traces the development of the CHART Phase 2 Investment Program from the initial legislative framework to the implementation and operationalization of care models. Section Two, *Impact*, describes how the CHART Phase 2 intervention made progress toward the four Phase 2 goals. To measure achievement on the Phase 2 goals, the HPC tracked CHART programs' performance across five impact domains: operational use of data, provision of integrated whole-person care, partnerships, acute care utilization, and patient experience (for more information, see **Appendix: Methods**). Section Three, *Sustainable Organizational Change*, describes organizational culture change tied to CHART Phase 2 and examines hospital commitment to sustaining CHART roles and activities. Together, these Phase 2 evaluation findings grow the evidence base about community hospital transformation initiatives designed to move hospitals toward accountable, integrated care delivery.

SECTION ONE:

PROGRAM DESIGN AND IMPLEMENTATION

1.1 STRUCTURE AND PROCUREMENT OF CHART PHASE 2

>>>> KEY TAKEAWAYS <<<<

- CHART Phase 2 was designed to fund two-year initiatives focused on **transforming** traditional hospital care, **building** community hospital capabilities, and **aligning** services with the needs of the local populations each serves.
- In June 2014, the HPC made up to **$60 million** available to eligible community hospitals; after a competitive selection process, the HPC Board approved **20 individual hospital awards** and **4 joint hospital awards**.
- Unique elements of award design included: 1) **Strategic Planning Payments** and 2) **Outcome-based Achievement Payments**.

The initial design of CHART Phase 2 was guided by the framework established by the Massachusetts legislature in Chapter 224, the Commonwealth's landmark cost containment legislation.[v] In Chapter 224, the legislature identified several priorities for expenditure of the Distressed Hospital Trust Fund: improving and enhancing the ability of community hospitals to serve populations efficiently and effectively, adopting health information technology to facilitate interoperability, and supporting the infrastructure necessary for community hospitals to transition to alternative payment methodologies. In addition, the HPC drew on findings from CHART Phase 1 (see **Call Out Box: Lessons from Phase 1**) and the HPC's prior research to inform the development of the Phase 2 Investment Program. The HPC designed Phase 2 to fund two-year initiatives focused on transforming traditional hospital care, building community hospital capabilities, and aligning services with the needs of the local populations each serves.

In June 2014, the HPC made up to $60 million available to eligible community hospitals[vi] through the CHART Phase 2 Program. In response to the HPC's Request for Proposals, CHART eligible hospitals submitted applications which included a quantified description of hospital and community need, a description of the proposed initiative, expected impact, and a detailed budget. Building on emerging trends at the national level, HPC research, and lessons from CHART Phase 1 (see **Call Out Box: Lessons from Phase 1**), the HPC strongly encouraged CHART hospitals to propose community partnerships with a broad array of local

v The regulatory framework for CHART was established in Section 2GGGG in Chapter 29 of the Massachusetts General Laws by Chapter 224, "An Act Improving the Quality of Health Care and Reducing Costs through Increased Transparency, Efficiency and Innovation," and the HPC's implementing regulation 958 CMR 5,00.

vi CHART eligibility was established through criteria specified in Chapter 224, as well as by regulation. Hospitals that received CHART funds included non-profit, non-teaching community hospitals with relatively low prices.

health and human services organizations. In addition, hospitals were asked to propose appropriate use of enabling technology resources, such as electronic case management tools or data analysts, to support implementation of their initiatives. Finally, hospitals were required to include a plan to identify strategies to sustain successful CHART Phase 2 funded initiatives beyond the grant period. All hospitals were required to participate in HPC-led activities, including technical assistance, performance measurement, and collaborative learning.

The maximum Phase 2 award amount was $6 million per hospital over a two-year performance period. To maximize the potential for large-scale change, the HPC encouraged Joint Hospital Proposals in which two or more eligible hospitals partnered to achieve the same primary aims through execution of an aligned set of initiatives. Each hospital could receive up to two awards, one hospital-specific award and one joint award, and no more than $6 million total.

All proposals were evaluated in a competitive selection process by a review committee comprised of HPC staff and one HPC Commissioner, the HPC's technical advisors for the CHART Phase 2 Program, and staff from other Commonwealth agencies including the Massachusetts Department of Public Health (MDPH) and the state Medicaid program, MassHealth. Proposals were evaluated and scored based on projected impact of the proposal, community need and engagement, and the hospital's financial status, operational capacity, and budget proposal. Award amounts recommended by the Review Committee varied based on scope, projected impact, and hospital and community need. The HPC Board approved 20 individual hospital awards and 5 joint hospital awards, across 27 community hospitals:[vii]

Exhibit 4: CHART Phase 2 awardees and award amounts

HOSPITAL AWARDEE	AWARD AMOUNT
Addison Gilbert Hospital	$1,269,057
Anna Jaques Hospital	$1,200,000
Baystate Franklin Medical Center	$1,800,000
Baystate Noble Hospital	$1,200,000
Baystate Wing Hospital	$1,000,000
Berkshire Medical Center	$3,000,000
Beth Israel Deaconess Medical Center-Milton	$2,000,000
Beth Israel Deaconess Medical Center-Plymouth	$3,700,000
Beverly Hospital	$2,500,000
Emerson Hospital	$1,200,000
Harrington Memorial Hospital	$3,500,000
HealthAlliance Hospital	$3,800,000
Holyoke Medical Center	$3,900,000
Lawrence General Hospital	$1,482,654
Lowell General Hospital	$1,000,000
Mercy Medical Center	$1,300,000
Milford Regional Medical Center	$1,300,000
Signature Healthcare Brockton Hospital	$3,500,000
Winchester Hospital	$1,000,000
UMass Marlborough Hospital	$1,200,000

JOINT HOSPITAL AWARDEES	AWARD AMOUNT
Addison, Beverly, Winchester, and Lowell General Hospitals (Lahey –Lowell Joint Award)	$4,800,000
Athol Memorial Hospital and Heywood Hospital	$2,900,000
Baystate Franklin Medical Center, Baystate Noble Hospital, and Baystate Wing Hospital	$900,000
Hallmark Health System	$2,500,000
Southcoast Hospitals Group	$8,000,000

vii This table shows the amounts awarded by the HPC Board. For Harrington Hospital and Holyoke Medical Center, the total award amount includes additional funds for capital improvement projects. The table also includes the joint award received by Baystate Franklin Medical Center, Baystate Noble Hospital and Baystate Wing Hospital, which was utilized to offer specialty telemedicine consults. However, due to the distinct focus of these awards, the two capital awards and the joint Baystate award were not included in the CHART Phase 2 evaluation analysis. See Call Out Box: Additional CHART Award Spending for more details.

Consistent with the orientation of the CHART Phase 2 Program toward transformation to value-based care models, the award design incorporated two unique features. First, Strategic Planning Payments – up to $50,000 per hospital – were available to fund consultants, additional data analyses, structured program review, and program evaluation for hospitals to consider how to sustain CHART models and/or otherwise engage in a value-based payment environment after the performance period ended. Second, the awards included a final, Outcome-based Achievement Payment, placing a portion of investment funds at risk based on achievement of outcomes. This was intended to motivate continuous improvement and mirror the incentive structures in value-based contracts. The final risk-based Achievement Payment consisted of up to fifteen percent (15%) of the award amount[viii] and was structured to recognize both capacity building and reductions in utilization.

CALL OUT BOX: LESSONS FROM CHART PHASE 1 THAT INFORMED CHART PHASE 2 DESIGN

The CHART Investment Program was designed by the HPC as a phased investment across eligible Massachusetts community hospitals to enhance the delivery of efficient, effective care. From February to September 2014, CHART Phase 1 supported $10 million in initial capacity building efforts across 28 community hospitals. Findings from the CHART Phase 1 Program can be found in the CHART Phase 1: Foundational Investments for Transformation report.[2] The HPC drew on lessons from Phase 1 to inform the HPC's design of Phase 2. Key takeaways from Phase 1 included the importance of dedicated project management, collaboration with local providers and resources, capacity for data analytics, and close engagement and technical advisement with the HPC. These findings were incorporated into the design of the Phase 2 programs.

Exhibit 5: Lessons from CHART Phase 1 informed Phase 2

LESSON FROM CHART PHASE 1	RESPONSE IN CHART PHASE 2 DESIGN
Having a dedicated Program Manager and building a team with the right mix of expertise and skills were foundational to project success.	In Phase 2, the HPC required hospitals to designate both a dedicated Program Manager and a Clinical and Operational Investment Director and to carefully assess the skills required to support the project before assembling teams.
CHART Phase 1 hospitals recognized the importance of leveraging existing organizations providing health and human services in the community.	In Phase 2, the HPC strongly encouraged CHART hospitals to include community partnerships in their proposals with community-based clinicians and medical service providers, government agencies and public services, and human services organizations.
Notwithstanding some challenges in accessing and analyzing data in Phase 1, hospitals' abilities to use locally-derived data to measure individual and cohort-wide hospital performance was an important driver of program improvements.	In Phase 2, the HPC required hospitals to collect and analyze locally-derived data to define target populations, test their assumptions about patient needs, and monitor on-going progress to inform continuous process improvement.
The HPC contributed to the success of CHART Phase 1 hospitals by providing expert support on clinical operations and technology implementation, access to data, reports on project progress and learning from other CHART hospitals, and opportunities for data-driven conversations among hospital leadership.	In Phase 2, the HPC committed to continuing close engagement with hospitals from project planning through implementation.

viii Net of Enabling Technologies and Strategic Planning Payments.

1.2 IMPLEMENTATION PLANNING PERIOD

SECTION ONE

>>>> KEY TAKEAWAYS <<<<

- Prior to formally launching their CHART programs, hospitals participated in a rigorous, year-long **Implementation Planning Period** (IPP).
- During IPP, hospitals used locally-derived data to conduct baseline data analysis to **identify** target populations, **define** aim statements, and **refine** program goals.
- Hospitals conducted brief interviews with a sample of patients to **better understand** their care preferences and **rationale** for coming to the hospital rather than seeking care in a lower acuity setting.
- Hospitals observed how a **complex** and **nuanced** set of factors could drive patients' acute care utilization, requiring integration of care across **medical**, **behavioral**, and **social needs**.
- Nearly all hospitals defined their **target populations** either by a history of high utilization or by behavioral health diagnosis; hospitals then proposed acute care utilization **reduction targets** for eligible target population patients.
- Through this data-driven process, the four goals of the CHART Program evolved: 1) **integrate** care across medical, behavioral health, and social needs, 2) **shift care** from the hospital to the community as appropriate, 3) use **data and analytics** to better serve patients, and 4) orient organizations toward **value-based care**.
- Hospitals then developed preliminary **care models**, defined **operational measures**, and established **budgets**.

An Implementation Planning Period (IPP) followed the announcement of awards.[ix] A key feature of the Phase 2 Program was its focus on continuous quality improvement and iterative design informed by data analysis. The HPC and hospitals utilized learning from IPP to further refine CHART Phase 2 design and program goals. In close collaboration with the HPC and technical advisors, hospitals used baseline findings to develop inclusion criteria for their target populations, set clear and measurable program aims, and design their interventions and care models before program launch (see **Exhibit 6**).

Exhibit 6: Implementation Planning Period (IPP) milestones

Baseline Data
Hospitals performed local data analysis to identify target populations and utilization reduction targets.

Intervention Development
Hospitals developed care models, identified local partners and enabling technology needs, defined measures, and created budgets.

Finalize Plan
Hospitals finalized their care models, developed Memorandums of Understanding (MOUs) with local partners, and enumerated deliverables.

HPC Approval and Contracting
Hospitals and the HPC coordinated to finalize contracting.

ix IPP was initially anticipated for a three-month period from November 2014 to January 2015. However, the work required to refine scope and budget and to prepare for program launch was greater than expected, and IPP extended to later in 2015. To compensate hospitals for the additional time required for IPP, in March 2015 the HPC Board authorized an Implementation Planning Payment of $100,000 for each hospital.

BASELINE ANALYSIS TO INFORM TARGET POPULATION, PRIMARY AIMS, AND PROGRAM GOALS

During IPP, the HPC required CHART teams to collect and analyze locally-derived hospital data to define target populations and to test their assumptions about patient needs. Teams were also required to use locally-derived data to monitor on-going progress and to implement continuous process improvement of their initiatives. The HPC worked closely with CHART teams and provided technical assistance (TA) (including clinical expertise) to refine and modify their proposals. These modifications were informed both by CHART teams' analysis of their own data and by HPC analysis of statewide trends.

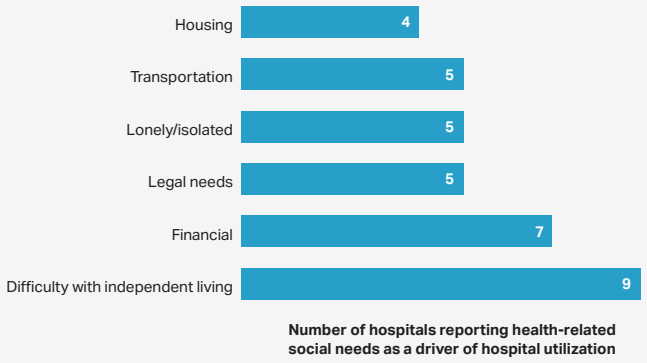
BASELINE UTILIZATION DATA AND PATIENT INTERVIEWS

Previous research by the HPC identified high rates of preventable acute hospital readmissions and emergency department (ED) visits as sources of avoidable spending and as symptoms of gaps in the Massachusetts health care system. Analyses of ED utilization further revealed that a small number of patients with patterns of frequent utilization accounted for a disproportionate share of visits and cost. In addition, there had been significant growth in the number of ED visits related to behavioral health (BH) conditions in recent years, driven in part by the devastating impacts of the opioid epidemic and the increase in opioid-related hospital discharges.[x, xi, 5, 6] To understand if and how these trends played out in their hospital, hospitals collected and analyzed their own baseline data to identify population-level utilization patterns and patient needs. Through this work, hospitals sought to develop a better understanding of the patterns of avoidable hospital utilization and to improve their ability to analyze their own data.

CHART hospitals identified the top 10 discharge diagnoses leading to readmission or 30-day ED revisits at their hospitals and then segmented those discharges and readmissions/revisits by discharge destination, presence of a BH diagnosis, and history of frequent hospitalization. Consistent with previous HPC research findings regarding statewide trends, the hospitals' baseline analyses of their data showed that patients with BH conditions represented a significant proportion of acute care utilization. Hospitals also found that a small number of patients with a history of frequent hospitalization disproportionately contributed to the hospitals' rates of ED and inpatient utilization. Furthermore, there was significant overlap among patients with BH conditions and patients with patterns of high utilization.

To deepen their understanding of the drivers of utilization at their own institutions, hospitals also conducted brief interviews with a sample of patients with inpatient readmissions or who frequently used the ED.[xii] Hospitals asked patients about their care preferences and rationale for coming to the hospital rather than seeking care in a lower acuity setting. Patients often reported that they "feel safe" in the hospital, that it is more convenient, and that the care is better. Interviews commonly revealed how health-related social needs, such as struggles with independent living and financial challenges, could lead to hospitalizations (see **Exhibit 7**). Housing instability and involvement with police or legal processes were more commonly noted at hospitals that focused interviews on patients with BH diagnoses. Many patients identified practical barriers to accessing services, such as lack of transportation. Patients also identified loneliness and isolation as drivers of acute care utilization.

Exhibit 7: Health-related social needs were commonly identified in patient-reported reasons for seeking acute care



x See Call Out Box: Trends at the State and National Level.

xi As reported in the HPC's 2015 Cost Trends Report, while growth in visits for most categories of ED use remained relatively flat between 2010 and 2012, visits for BH conditions (including both mental health and substance use disorders) grew sharply, at about 5 percent a year, totaling about 6 percent of all ED visits in 2012. Additionally, patients with at least five visits in 2014 (7 percent of patients) accounted for one-third of ED visits in that year and those with between two and four visits accounted for another one-third. BH conditions were more prevalent among frequent ED users (5+ visits) than other users, 11 percent versus 5 percent.

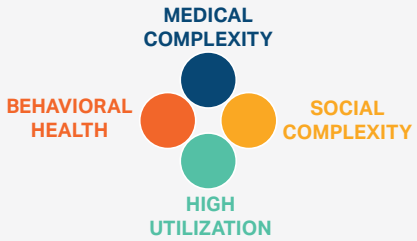
xii Each hospital was required to identify 5-8 patients (or family members of patients), including at least three patients enrolled in Medicaid who were readmitted to inpatient care or had frequent visits to the ED. Hospitals that focused on developing programs specifically for patients with a BH diagnosis sought out those patients for interviews.

Data collected during IPP informed how the hospitals and the HPC further refined the goals of each initiative and the overall CHART Program. In particular, hospitals identified sub-populations of patients with BH conditions and/or a history of frequent hospital utilization, which disproportionately contributed to the hospitals' rates of ED and inpatient utilization. Among these sub-populations, the hospitals and the HPC recognized opportunities to improve patient care and reduce unnecessary spending by shifting care from the hospital to the community as appropriate. Hospitals also observed how a complex and nuanced set of factors could drive patients' acute care utilization, requiring integration of care across medical, behavioral, and social needs. Finally, hospitals gained experience using locally-derived data to inform their understanding of their patient populations and what services would be needed to improve care and influence acute care utilization.

SELECTION OF TARGET POPULATIONS

After reviewing insights gleaned from analyses of their baseline data and patient interviews, each hospital collaborated with the HPC to identify a specific target population for its program. In accordance with HPC statewide findings and local data about avoidable utilization, nearly all hospitals defined their target populations either by a history of high utilization (generally >4 inpatient admissions or >10 ED visits in the past year) or by BH diagnosis. Because unmet BH needs were found to be common drivers of frequent hospital utilization, these two criteria have substantial overlap.[16] **Exhibit 8** provides a summary of the hospitals' identified target populations (see **Appendix** for details of each hospital's target population and aim(s)).

Exhibit 8: Hospitals selected target populations that included patients with behavioral health conditions, high utilization, social complexity, and/or medical complexity



- Addison Gilbert Hospital
- Anna Jaques Hospital
- Athol Memorial Hospital/Heywood Hospital joint award
- Baystate Franklin Medical Center
- Baystate Noble Hospital
- Baystate Wing Hospital
- Berkshire Medical Center
- Beth Israel Deaconess Medical Center - Milton
- Beth Israel Deaconess Medical Center - Plymouth
- Beverly Hospital
- Emerson Hospital
- Harrington Memorial Hospital
- HealthAlliance Hospital
- Holyoke Medical Center
- Lahey Health/Lowell Hospital joint award
- Lawrence General Hospital
- Lowell General Hospital
- Mercy Medical Center
- Milford Regional Medical Center
- Signature Healthcare Brockton Hospital
- Southcoast Hospitals Group joint award
- UMass Marlborough Hospital

Though BH diagnoses and utilization history were the common threads across the cohort, specific inclusion criteria varied. For hospitals that focused on target populations with BH diagnoses, some hospitals included only patients with a primary BH diagnosis, while others included any BH diagnosis. Many hospitals also used social or medical complexity to define their target populations. Social complexity criteria included dual eligibility for Medicaid and Medicare, Medicaid status, and housing instability. While none of the hospitals focused on patients with one specific condition, such as coronary artery disease or pneumonia, several used medical criteria, such as discharges to post-acute care, as markers of medical complexity. With the exception of one program that focused on patients who are dually-eligible for Medicaid and Medicare, all of the CHART programs were payer-agnostic, meaning that patients were eligible for participation in CHART regardless of their insurance coverage. This was an important feature of the CHART program, with the goal of focusing providers and systems on patient needs rather than insurance coverage. Other variations included a program that targeted elderly patients discharged to post-acute care settings and one that elected to serve all discharged patients residing in a specific geographic area. Despite the substantial variation in eligibility criteria, CHART hospitals were consistent in serving patients affected by multiple medical, behavioral, and social factors and patients with histories of frequent acute care utilization.

SELECTION OF AIMS

After defining their target populations, the hospitals collected baseline data for patients meeting eligibility criteria. Hospitals used their baseline data to estimate the number of patients they expected to enroll and quantified the impact they hoped to have on the target population by the end of the performance period. Recognizing that frequent acute care utilization is a driver of high health care costs and can be a marker of unmet care needs, hospitals worked with the HPC to develop primary and secondary aim statements to quantify acute care utilization reduction targets (e.g. readmissions, ED revisits, and length of stay). In the absence of established benchmarks for utilization reduction targets, teams were encouraged to set aggressive targets to catalyze their focus on improving care and reducing unnecessary utilization. Typically, teams whose primary aim focused on inpatient readmissions or ED revisits targeted a 20% decrease.

Seven hospitals chose to focus their primary aim on reducing readmissions, seven on ED visits or revisits, four on any-bed returns (a broader measure encompassing both readmissions and ED revisits), and one on ED length of stay. Five hospitals chose two primary aim statements to reflect their decision to implement two distinct programs during the performance period (e.g., one ED-focused program and one inpatient-focused program). The primary aim drove the design of the CHART care models and teams, as the aim determined where programs would identify and enroll patients. For example, staff of a CHART program focused on ED revisits would approach patients during an ED visit to enroll them in the program, whereas a program focused on reducing inpatient readmissions would meet patients during an inpatient hospital stay to enroll them in the program. Hospitals with more than one primary aim operated distinct CHART teams within the hospital, bringing the total number of CHART programs to 29.[xiii]

Exhibit 9: Hospitals selected their primary aims based on data analysis conducted during IPP

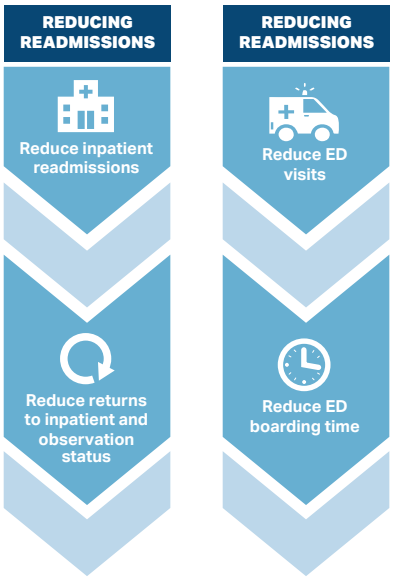


Exhibit 10: The goals and design of CHART Phase 2 were informed by a data-driven, iterative process

REFINING CHART PHASE 2 GOALS

A key feature of CHART was the focus on continuous quality improvement and iterative design informed by data analysis. As the hospitals collected data and performed baseline analyses during IPP, the HPC worked closely with them and with the HPC's technical advisor, Collaborative Healthcare Strategies, to continue to adapt the design and goals of CHART Phase 2 (see **Exhibit 10**).

From the beginning, the CHART Phase 2 program was designed to transform care delivery so that patients received the right care at the right time in the right place. As the CHART hospitals developed their Phase 2 interventions, it became clear that operationalizing

xiii One readmissions-focused CHART team applied their program to two distinct target populations. Performance on 30-day readmissions was measured separately for each target population.

this concept would require them to shift the typical paradigm of care from medical, hospital-based services to patient-centered services coordinated across the care continuum. As a result, the four cohort-wide goals of the CHART Phase 2 Program evolved to be: 1) integrate care across medical, behavioral health, and social needs, 2) shift care from the hospital to the community as appropriate, 3) use data and analytics to better serve patients, and 4) orient organizations toward value-based care.

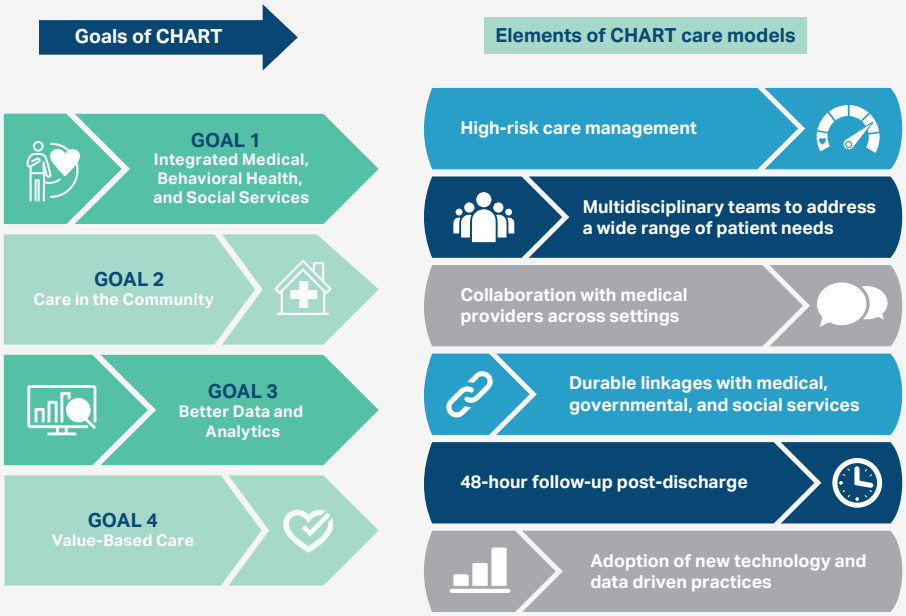
These four goals encompass transformations at both the hospital and patient-level and are mutually reinforcing. For example, expanding capacity to use data and analytics not only enables community hospitals to better serve their patients, but also builds infrastructure that positions community hospitals to participate in value-based care models. Similarly, by integrating care for medical, social, and BH needs through partnerships with local organizations, hospitals can reduce unnecessary acute care utilization and ensure that patients receive care in the most appropriate community setting.

Exhibit 11: The CHART Phase 2 goals encompassed change at both the hospital and patient-level

INTERVENTION DEVELOPMENT

Informed by baseline analyses and guided by the four goals of CHART Phase 2, the hospitals proceeded to develop their care models. Care models were tailored to utilize the hospital and community's resources to meet target population patient needs and achieve the team's primary aim(s). While each CHART team's care model had unique features, teams shared consistent features across the cohort, supporting progress toward the CHART Phase 2 Program goals. These features include:

Exhibit 12: CHART care models shared common features to support progress toward the Phase 2 goals



SECTION ONE

» **High-risk care management:** CHART teams employed high-risk care management as a key strategy to improve quality of care and reduce unnecessary acute care utilization. To coordinate care for patients with complex medical, behavioral, and social needs, enhanced care planning was used to connect patients with the resources they needed in the most appropriate community setting.

» **Multidisciplinary teams to address a wide range of patient needs:** CHART programs hired and trained multidisciplinary staff to adopt new practices that addressed a broad array of patient needs, including social and behavioral health needs, in the hospital and community. Care models typically involved a CHART case manager, patient navigator, social worker, or community health worker (CHW) who would approach the patient in the acute care setting to establish a relationship.

» **Collaboration with medical providers across hospital departments and outside the hospital:** CHART team members worked with clinical providers in and outside of the hospital to ensure continuity of care across settings and that patients accessed care in the most appropriate setting.

» **Durable linkages with medical, governmental, and social services:** CHART teams developed networks of resources, sometimes through formalized partnerships, that leveraged expertise and resources outside of the hospital to support patients after discharge and to prevent future unnecessary hospital utilization.

» **48-hour follow-up post-discharge:** Building on findings that readmissions peak within the two days following discharge,[xiv, 17] hospitals were required to follow-up with eligible patients within 48-72 hours of discharge. Teams connected with patients by phone or met patients in their home or in a public setting to make sure that patients understood their discharge instructions and to connect them with resources to reduce readmissions or revisits.

» **Adoption of new technology and data driven practices:** Through the use of technology and/or data analyst personnel, CHART teams adopted new practices to enable teams to connect with patients and track services and performance. A key feature of many care models was a commitment to identifying and engaging target population patients rapidly upon presentation in the acute care setting.

Exhibit 13: Care model example: Reducing readmissions for high-risk patients

TARGET POPULATION
Adult patients with ≥4 inpatient hospitalizations, social complexity (Medicaid/Medicare status, housing status), substance use disorder diagnosis, or recent 30-day readmissions

PRIMARY AIM
Reduce 30-day readmissions

STAFFING MODEL
Program Manager, 2 Registered Pharmacists, 2 Nurse Practitioners (NP), 2 Social Workers (SW), 2 Pharmacy Technicians, Consulting Physician

TYPICAL PATIENT PATHWAY

INPATIENT

A patient is admitted to the hospital and meets the target population criteria. During a daily review of census admissions, the patient is flagged and enrolled in the program. The patient is assigned a SW and a Registered Pharmacist.

The SW approaches the patient at the bedside to understand why the patient has been (re)admitted, assesses gaps in care and social service needs, and determines the patient's eligibility for a palliative care consultation. A pharmacy technician collects a list of the patient's medications, and the pharmacist provides medication management and medication counseling. For the duration of the inpatient stay, the CHART care team attends rounds to review the patient's care plan. Before discharge, a primary care appointment is scheduled, and assistance is provided to help the patient navigate additional medical or behavioral health appointments.

POST DISCHARGE

After the patient is discharged, the SW monitors the patient's care and confirms that the patient is attending their follow-up appointments. The SW connects the patient to community-based resources and calls the patient weekly for three weeks, continually reassessing needs. If the patient is discharged without services, the SW conducts a home visit within 48 hours. Typically, the patient is supported by the care team for 30 days.

The pharmacist conducts in-home medication reconciliation as needed and monitors medication changes. The NP clinically assesses the patient in their home and provides referrals and help navigating the patient's care. As needed, the CHART care team collaborates with the Visiting Nurse Association or Skilled Nursing Facility to ensure that appropriate services are in place.

xiv According to the Center for Health Information and Analysis, 36% of readmissions in Massachusetts occur within one week of discharge, peaking at two days following discharge.

Exhibit 14: Care model example: Reducing emergency department (ED) revisits for patients with a behavioral health (BH) diagnosis

TARGET POPULATION
Adult ED patients with a primary or secondary BH diagnosis

PRIMARY AIM
Reduce 30-day ED revisits

STAFFING MODEL
Program Manager, 2 BH Nurses, 4 BH Navigators, Intake Coordinator, 6 Community Health Workers, 2 BH Case Managers

TYPICAL PATIENT PATHWAY

EMERGENCY DEPARTMENT

A patient with a BH complaint presents in the ED, is registered as a BH patient, and is brought to the BH area of the ED.

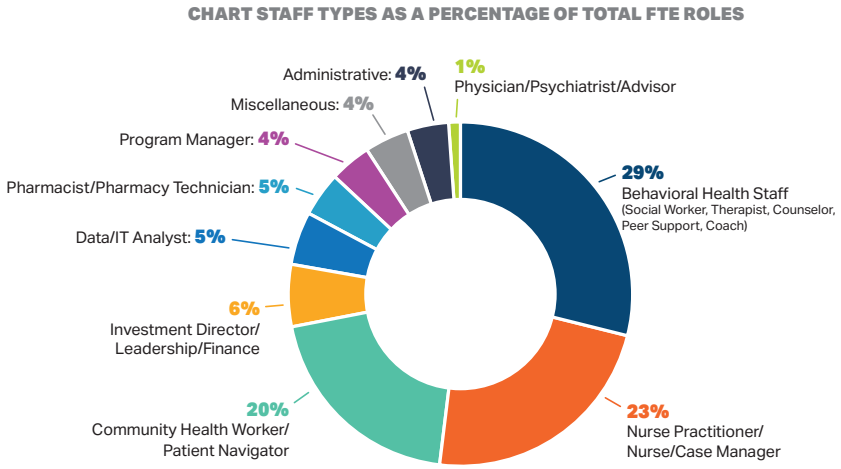
After the patient is medically cleared, a BH evaluation is conducted and a discharge disposition is decided (inpatient, home, or psychiatric inpatient) to connect the patient with appropriate care. A BH health navigator meets the patient, informs them about the program, performs a brief screening, and obtains consent.

POST EMERGENCY DEPARTMENT DISCHARGE

Depending on the discharge disposition, the navigator follows up with the patient in the program office or patient's room or communicates with the inpatient facility. The navigator schedules medical and program appointments and helps with discharge planning as appropriate.

After discharge, depending on the patient's needs, they may be assigned a case worker or community health worker. Follow-up occurs by phone or through in-person meetings at the program's office or in the community. If the patient has higher intensity needs, they may complete a Psycho-Social Needs Assessment. The program provides assistance with scheduling appointments, finding new providers, discharge planning, and connecting with social service agencies. The patient is re-evaluated every 90 days to determine if they need continued support, a change in level of care, or to exit the program.

Exhibit 15: Behavioral health staff, nurses, and community health workers made up over 70% of the budgeted FTE roles in CHART



NOTES: This analysis includes all CHART staff and community partner staff funded in whole or in part by the HPC CHART award or through in-kind contributions during the HPC award performance period. If positions were partially funded (e.g. 0.5 Case Manager), only the portion dedicated to the CHART Program is included in this analysis. This chart excludes all start-up costs and fringe benefits.

SOURCES: Final approved budgets submitted to the HPC by CHART hospitals.

STAFF AND TEAM PLANNING

Innovative staffing models were a central component of interventions across the cohort, with CHART funding allocated to over 400 full and part-time positions. CHART teams developed their staffing models during IPP. Because the HPC had noted during CHART Phase 1 that programs with dedicated Program Managers were more successful, CHART teams were required in CHART Phase 2 to have a designated Program Manager. While nursing was the most common professional background among Program Managers, Program Managers had a wide variety of educational and professional backgrounds.

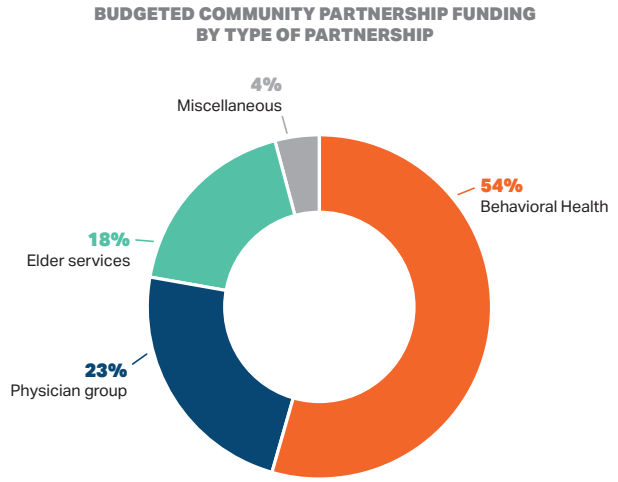
The Program Managers typically built interdisciplinary teams including clinical and nonclinical patient-facing staff, as well as data analysts. Most clinicians were not physicians, but rather nurses, social workers, BH providers, and pharmacists. Non-clinical roles included CHWs, navigators, and case managers. The focus on these non-clinical roles reflects the CHART Phase 2 program-wide emphasis on high-touch care coordination and whole-person care, often involving home visits after discharge. CHART funding was often used for nonclinical roles, in part because their work has not generally been covered by fee-for-service reimbursement.

PARTNERSHIP PLANNING

Building partnerships was an important strategy to advance the goals of CHART Phase 2. Partnering with organizations in the community leveraged existing services and expertise to manage patients with complex medical, behavioral, and social needs. Partnerships were also critical for teams to coordinate services post discharge and to connect patients with appropriate services in the community.

Partnerships were formal or informal, funded with direct financial or in-kind support, and/or represented new relationships or strengthening of existing ones. Partnerships were based on the anticipated needs of the CHART hospital's target population patients and the availability of relevant services and expertise in the community. Partnerships frequently focused on (1) building stronger relationships with local clinicians and medical service providers, including primary care providers

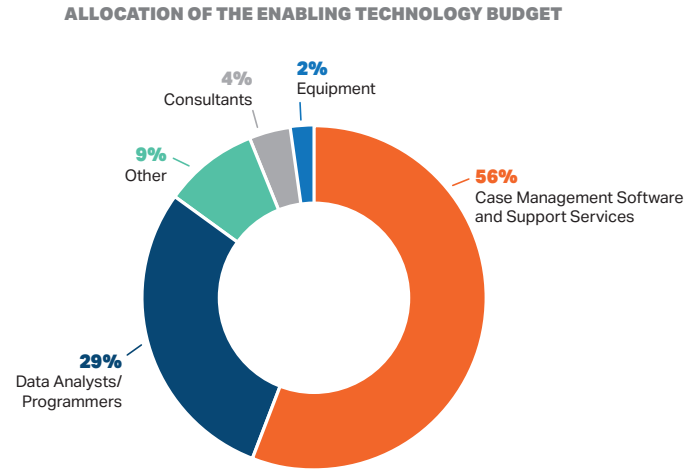
Exhibit 16: The majority of community partner budgets were allocated to behavioral health organizations, physician groups, and elder services organizations



NOTES: This analysis includes all funding that was budgeted for community partnerships through the HPC CHART award or in-kind contributions during the HPC award performance period. It does not include external consultants or subcontractors that were not patient facing. In some instances, partner funding was listed as a direct cost in the hospital's budget. In those instances, costs were reallocated to community partnership funding.

SOURCES: Final approved budgets submitted to the HPC by CHART hospitals.

Exhibit 17: Case management software and personnel represented 85% of the enabling technology budget



NOTES: This analysis includes all funding that was budgeted for enabling technology through the HPC CHART award or through in-kind funding during the HPC award performance period. It does not include indirect costs for enabling technology, such as fringe for personnel. In addition, hospitals had discretion to categorize technology purchases as enabling technology or direct costs. Therefore, this analysis does not provide a complete picture of all technology equipment purchases.

SOURCES: Final approved budgets submitted to the HPC by CHART hospitals.

and specialists, community health centers, home care nurses (through visiting nurse associations (VNAs)), long-term care providers, BH and palliative care providers; (2) strengthening connections to local government and public services (e.g. local health departments, police, and schools); and/or (3) collaborating with local human services organizations (e.g. food banks, transportation services, homeless shelters). Partner services were provided in a variety of medical and non-medical settings, but the majority of partners provided care outside of the hospital setting.

Hospitals and their proposed partners formalized their relationships through Memorandums of Understanding (MOUs) or contracts that described the nature of the collaboration, expectations of both parties, ownership of certain activities, and any funding to be provided by the hospital. Many of the CHART teams organized regular cross-continuum meetings to support the goals outlined in their MOUs.

The majority of hospitals chose to use HPC funding or in-kind funding to support their relationships with partners. In total, there were 34 funded partnerships. The most common types of partners were BH services, physician groups, and elder support services. Funding arrangements varied, with agreements ranging from $5,000 to $1.1 million (between <1% to 33% of total award amounts). In several cases, CHART teams also formed non-financial partnerships to strengthen referral processes and build or strengthen channels of communication.

ENABLING TECHNOLOGY PLANNING

As the start of the performance period approached, an important operational consideration was selection of appropriate technologies and personnel to facilitate patient identification and service delivery and to aid in adequate measurement and reporting to the HPC. CHART teams examined the capacity of their hospital's existing health information technology infrastructure and outlined capabilities and gaps. These assessments led CHART teams most commonly to invest in case management software and data analyst staff.

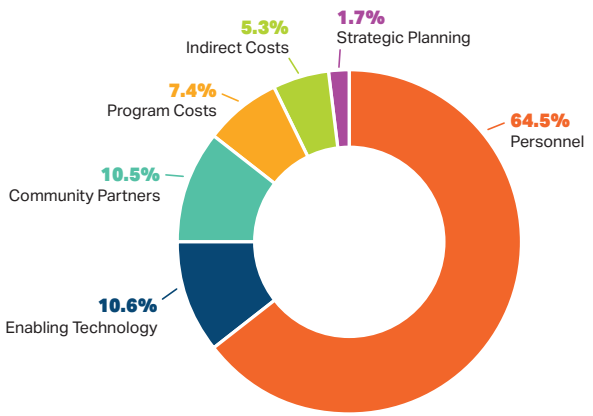
INITIAL MEASURE DEVELOPMENT

Consistent with the goal of advancing hospitals' use of data to better serve patients, data collection and measurement were central to CHART Program design. In collaboration with the HPC, CHART teams developed measurement plans for the collection and validation of standard cohort-wide measures, as well as program-specific measures to be reported monthly to the HPC. The emphasis on measurement during IPP was intended to establish a foundation for data-driven, iterative improvement throughout implementation.

BUDGET PLANNING

CHART teams developed budgets that outlined the direct and indirect funding needed to finance their care delivery models. Between CHART funding and approximately $17 million contributed in-kind by hospitals and health systems, the total CHART Phase 2 Program budget amounted to approximately $76.8 million.[xv, xvi] The majority of funding was allocated to personnel costs (64.5%), followed by enabling technology investments (10.6%) and community partnership costs (10.5%) (see **Exhibit 18**).

Exhibit 18: The majority of the CHART budget was allocated for personnel, community partnerships, and enabling technology



NOTES: This analysis includes both HPC CHART award funding and in-kind contributions. Program costs include items such as consultants, equipment, training, travel, and patient assistance funds. Enabling technology includes relevant personnel, consultants, equipment, training, and other direct and indirect costs related to enabling technology. In some instances, hospitals listed community partner funding as a direct cost. For this analysis, those costs were reallocated to community partnership funding. This chart does not include capital awards.

SOURCES: Final approved budgets submitted to the HPC by CHART hospitals.

CALL OUT BOX: ADDITIONAL CHART AWARD SPENDING

Capital Awards: Emergency Department (ED) Redesign at Harrington Hospital and Holyoke Medical Center

- At Holyoke Medical Center, CHART funds supported the construction of a new behavioral health unit within the ED. After two years of planning and construction, the new ED offers more space and services to residents from Holyoke and its surrounding communities. The ED behavioral health unit features a new Crisis Center for Psychiatric Services, including showers, laundry facility, detoxification recliners, and a patient navigation service. The design of the unit captured detailed input from patients and Recovery Peers, even down to the color scheme.
- Harrington Hospital added 16 inpatient psychiatric beds (7 semi-private patient rooms and 2 private patient rooms) to a formerly vacant inpatient unit of the old Hubbard Hospital in Webster. The new unit aimed to expand Harrington's Behavioral Health Services to include acute treatment for those individuals with comorbid conditions of substance use and mental health disorders.

Baystate Joint Telemedicine Award

As a continuation of a Phase 1 pilot, Baystate Franklin Medical Center, Baystate Noble Hospital, and Baystate Wing Hospital offered convenient specialty telemedicine consults to keep appropriate care local and reduce inpatient transfers to academic medical centers. The program aimed to develop the hospitals' competency to deliver teleneurology/telespeech, telecardiology, and telemedicine services. The target population for this award was lower acuity, medically-focused Neurosciences, Adult Medicine (includes Pulmonary, Infectious Disease, Geriatrics/Palliative Care Services, Critical Care), and Cardiology patients.

xv In addition to this budgeted amount, two hospitals, Harrington Hospital and Holyoke Medical Center, were awarded capital funds to support renovation projects. CHART funding was also awarded to Baystate Franklin Medical Center, Baystate Noble Hospital, and Baystate Wing Hospital to offer specialty telemedicine consults (see Call Out Box: Additional CHART Award Spending). Given of the different nature of these awards, they were not included as part of this budget analysis or in the Phase 2 Evaluation Report.

xvi Reflecting the CHART Program's emphasis on continuous quality improvement, throughout the program period, CHART teams modified their budgets to reflect program changes. Modified budgets were submitted to and approved by the HPC. This analysis reflects the final approved program budget.

CALL OUT BOX: TECHNICAL ASSISTANCE FOR CHART PROGRAMS

Beginning during IPP, the HPC provided ongoing technical assistance (TA) and performance coaching related to development of the care model. The HPC contracted with Collaborative Healthcare Strategies, a clinical consultancy with national experience and expertise in hospital transformation, to serve as medical advisors to the CHART Program and provide operational and clinical guidance as CHART teams implemented their care models. Technical assistance was tailored to help CHART teams identify their target populations, utilize operational dashboards, build innovative multidisciplinary care teams, and engage patients with complex medical, behavioral, and social needs.

In addition to providing tailored TA, the HPC acted as a convener for CHART teams, hosting quarterly regional learning collaborative meetings and annual statewide conferences, bringing together hospital clinical and non-clinical leaders, managers, and front-line staff to develop communities of practice, celebrate successes, and share challenges. These meetings featured presentations and breakout sessions on topics such as effective partnerships, program optimization, strategic planning, enabling technologies, and strategies to overcome common challenges. Members of the CHART team and other hospital staff were invited to attend, including project managers, community health workers, physicians, IT staff, and other hospital employees. While CHART teams were required to participate in convenings, most went beyond the program requirements by sending multiple team members and giving presentations to share their work with other hospitals.

Toward the end of the performance period, the HPC administered a survey to assess the delivery and impact of TA provided by the HPC. The survey asked respondents to rate their satisfaction with the content and frequency of TA and assessed whether TA supported CHART teams' efforts to deliver services to target population patients, achieve their primary aims, and prepare for value-based care participation.

Overall, the survey responses reflected very high satisfaction with the HPC's TA offerings. CHART teams reported that the most helpful types of engagement included TA meetings with the HPC's contracted clinical advisor, phone or in-person interactions with their HPC Program Officer, and the CHART Newsletter.

In addition, all of the CHART teams reported high satisfaction with the convenings and other opportunities for shared learning and frequently cited these as a valuable opportunity to trade tips on program implementation strategies. CHART teams noted that they would have liked more opportunities to collaborate at statewide convenings, especially at program launch when they were all implementing new structures and processes.

Exhibit 19: Key findings from the Technical Assistance Survey

KEY FINDINGS FROM THE TA SURVEY[xvii]	AGREE OR STRONGLY AGREE
1. CHART TA has helped my hospital advance the following:	
Advancing the hospital's readiness to participate in value-based care arrangements	79%
Achieving program aims	89%
Building capacity	89%
2. TA provided by the HPC has been helpful to my CHART program in the following areas:	
Post-acute follow-up	83%
In-hospital clinical processes	84%
Measurement & analysis	89%
3. My hospital is in a better position to achieve its CHART Phase 2 goals because of the TA and programmatic support we have received from the HPC:	89%

xvii In total, there were 20 respondents to the survey, 17 of whom identified as the CHART Program Manager or Director. The remaining three surveys were filled out by a Clinical or Operational Director.

1.3 IMPLEMENTATION

>>>> KEY TAKEAWAYS <<<<

- As CHART programs launched between September 2015 and February 2016, **hiring and training multi-disciplinary staff** was a top priority.
- Strategies for identifying and engaging with eligible patients were strongly influenced by the **patient population characteristics** and the **setting of the intervention**, either ED or inpatient.
- **Post-discharge follow-up** was an important focus of the CHART care models; CHART teams aimed to **engage patients** via phone call or follow-up visit within 48 hours of discharge and services often **extended beyond** the walls of the hospital.
- CHART teams developed **creative solutions** to navigate information sharing and interoperability issues both within and outside of the hospital.
- Teams applied **continuous improvement strategies** to adapt their models as they gained experience working with their target populations.
- The HPC worked with CHART teams to **build capacity** for data collection in order to **monitor** programmatic performance and **inform** data-driven decision-making.

Following the Implementation Planning Period (IPP), teams launched their CHART Phase 2 programs between September 2015 and February 2016 with a 24-month performance period from launch (see **Exhibit 20**).

Exhibit 20: Chart Phase 2 programs launched between September 2015 and February 2016

HIRING AND STAFFING

Building multidisciplinary care teams was critical to the CHART approach to care transformation for patients with complex needs. Informed by technical assistance from the HPC, all CHART teams opted to create teams staffed by a wide range of patient-facing personnel, such as pharmacists, nurses, social workers, CHWs and patient navigators, as well as operational roles such as Program Managers and data analysts.

As teams gained deeper understanding of their patients' needs, they adapted their staffing models accordingly and gained further appreciation for the value of frontline staff. For example, Emerson Hospital's care model started as a primarily nurse-led initiative. Recognizing that follow-up outside of the hospital was important for relationship building, the team hired a patient navigator to focus on ongoing patient contact after discharge. At Lowell General Hospital, HealthAlliance Hospital, and Baystate Franklin Medical Center, the role of the pharmacist shifted from primarily hospital-based to include home visits.

In some cases, shortages of qualified professionals – particularly BH providers – and staff turnover proved to be barriers to fully staffing care models. Many hospitals had limited experience creating job descriptions and recruiting for some patient-facing CHART roles, such as CHWs, licensed independent clinical social workers (LICSWs), and peer coaches, which also slowed the hiring process. To address these challenges, Program Managers expanded their recruiting tactics to include postings on LinkedIn, revising job postings, and/or directly approaching nursing and social work schools for candidates.

TRAINING STAFF

The majority of teams funded advanced training for CHART team staff to improve their skills in coordinating care for patients with complex medical, behavioral, and social needs. Common training topics included motivational interviewing, Bridge Model care coordination,[18] Screening, Brief Intervention and Referral to Treatment (SBIRT),[19] trauma-informed care, pain management, and general strategies to collaborate more effectively in a multidisciplinary model.

For new patient-facing roles, such as patient navigators and CHWs, teams focused on providing on-the-job training and created new resources and reference materials to aid staff as they developed new processes. Consistent with emerging guidance from other complex care programs, many CHART Program Managers adopted a strategy of "hire for attitude, train for skill." Team leaders described critical traits such as curiosity, compassion, a pioneering spirit, and strong self-care practices. In some cases, they noted rapport with patients exhibited by individuals in other roles, such as receptionist or security guard, and recruited and trained these colleagues to join the CHART team. This commitment to hiring and training was seen by Program Managers as an essential feature of their roles.

FINDING TARGET POPULATION PATIENTS

Identifying eligible patients and connecting with them before discharge was critical to effective patient engagement. CHART teams had to tackle the technical and operational challenges inherent in identifying target population patients at the point of acute care presentation. Each team's approach was informed by the hospital's existing technological capabilities and by the criteria used to define target populations.

Many CHART teams created real-time notification processes to alert them when an eligible patient presented in an acute care setting. Some programs achieved this manually by having staff monitor ED and/or inpatient admissions. Teams with greater technological capabilities created registries of eligible patients using historical billing data and then added tools to their Electronic Health Records (EHR) to automatically send real-time notices to the CHART team to ensure timely engagement. Others worked with separate care management platforms that enabled similar functions.

Many teams used administrative data to identify patients with a history of frequent hospital utilization. Patient identification was more complex for teams that targeted patients with BH conditions or used multiple factors to identify high-risk individuals within a general population. While EHR data were usually effective at identifying patients with prior BH diagnoses, these same data often failed to identify patients with new BH presentations, particularly for patients with medical complaints alongside an underlying BH condition. Use of historical records could also result in over-identification of eligible patients because all prior BH conditions were flagged, even if the patient no longer had an active BH need.

In response, some CHART teams developed a brief clinical screen to verify the BH condition or restricted queries to identify patients with recent BH diagnoses. For teams targeting patients with high-risk factors that were not easily identifiable in the EHR, screening tools – like the Biopsychosocial Risk Factors Assessment used at Lawrence General Hospital — were administered to identify social or medical complexity.

Many programs faced challenges specifically related to technology. A few programs experienced a delayed start as organizational attention was directed to new EHR implementation processes. Other programs that purchased new technologies required several months to acclimate to new platforms. Despite these challenges, teams that did not adopt enabling technologies encountered additional difficulties operating their care models. Teams that used manual systems reported challenges identifying, tracking, and documenting target population patients, especially in real-time. The teams' varied experiences implementing systems for timely patient identification highlight the important role that technology can play in facilitating program operations.

ENGAGING PATIENTS IN THE HOSPITAL

Each program's selection of target population criteria and decision to focus on ED or inpatient aims necessitated different operational approaches. Individuals admitted as inpatients typically had higher medical acuity and therefore, longer stays, which created more opportunities to make connections with patients while they were in the hospital. In contrast, ED-focused teams faced logistical challenges in making connections during the typically short ED stays. In response, ED- focused teams often co-located CHART services in the ED in order to facilitate connection and improve communication and interdisciplinary collaboration.

The point of acute care presentation was an obvious time for intervention. As part of TA, the HPC coached hospitals to use root cause analysis to better identify specific patient needs or gaps in care that were contributing to unnecessary acute care utilization. Face-to-face engagement in the hospital paired with timely follow-up calls or post-discharge visits was often the most successful way to engage patients. If patients were in crisis and not ready to engage with the CHART program in the hospital setting, telephonic or face-to-face follow-up post-discharge was viewed as a more effective use of resources.

Recognizing that some patients were hesitant about participating in hospital-based programs, CHART teams developed straightforward approaches to describing their CHART program and communicating its benefits. At some hospitals, CHART team members explained the program in face-to-face conversations. To ensure consistent messaging and to increase staff comfort in engaging patients, some teams initially developed scripts for team members to use while explaining the program, which transitioned to unscripted conversations over time. In other cases, the team did not describe CHART as a separate program and instead presented CHART as an extension of the hospital's existing services. In either case, teams generally found that structuring the program as an opt-out versus opt-in model improved participation.

Persistent outreach was important to engaging patients who were initially hesitant to participate. CHART team members noted that patients sometimes declined the first attempt but chose to participate on subsequent attempts. CHART team members were encouraged to continue trying to contact patients and viewed each outreach attempt as a new opportunity to engage patients. Outreach was often conducted by CHWs or peer coaches, who were able to establish a connection and subsequently gain the trust of the patients over time.

ENGAGING PATIENTS IN THE COMMUNITY

Enhancing post-discharge services was a key aspect of the CHART care models. A core element of the care model – required by the HPC for all teams – was for the CHART team to engage patients via follow-up phone calls or visits within 48 hours of discharge. These follow-up contacts presented an opportunity to solve problems or resolve misunderstandings about the patient's discharge instructions or treatment plan. Given the importance of timely and effective follow-up, the CHART teams continually worked to improve their approaches to connecting with patients after they left the hospital (see **Call Out Box: 48-Hour Follow-up**).

CHART teams adapted to the needs of their patients by extending efforts beyond the walls of the hospital. CHART team members often visited patients at home and sometimes transported them to their medical appointments. In some cases, CHART staff attended social service or legal appointments to advocate on behalf of their patients with other providers or agencies. In the event that their patients were experiencing homelessness, CHART teams arranged to meet in public or outdoor spaces.

An important component of post-discharge follow-up care was connecting patients with their primary care provider to ensure that patients had ongoing access to the appropriate levels of care. In cases in which the patient did not have a primary care provider, team members worked with the patient to identify and address access barriers such as lack of insurance coverage, transportation, and/or access to a phone. CHART teams worked with primary care providers to develop a shared understanding of the patient's care plan and discuss circumstances in which primary care or hospital-based care would be appropriate.

CHART teams also worked closely with post-acute care providers and service organizations to ensure continuity of support post-discharge. The scope of partnerships between the CHART programs and local organizations varied. Some teams created inventories of social service agencies, treatment centers, skilled nursing facilities (SNFs), and non-profits, and built referral relationships with those organizations. Others embedded staff or formed small, focused teams – often comprised of a nurse, CHW, or social worker, and sometimes a pharmacist – to conduct collaborative case conferencing and deliver services outside the hospital setting. These teams conducted home visits to deliver services such as home safety evaluations, medication reconciliation, health education, basic clinical care, and BH treatment.

CALL OUT BOX: 48-HOUR FOLLOW-UP

According to the Center for Health Information and Analysis, 36% of readmissions in Massachusetts occur within one week of discharge, peaking at two days following discharge. In keeping with emerging guidance from acute care utilization reduction interventions such as Project RED,[20] the HPC determined that engaging with target patients within 48 hours of discharge was an essential step to preventing readmissions. The HPC required that CHART teams initiate follow-up calls or visits within 48 hours of discharge and track their rates of successful connection with patients. As programs launched, technical assistance focused on helping CHART teams implement, improve, and incorporate 48-hour follow-up into standard workflows.

During the first four months of the performance period, CHART teams noted a number of barriers to connecting with patients through 48-hour follow-up calls or visits:

- Patients did not have access to a phone or cellular service
- Patients' phone numbers were not correctly recorded or were inactive
- Patients, particularly those experiencing homelessness, were unavailable or non-responsive
- Patients were sometimes in custody through Section 35, incarcerated, or committed to psychiatric facilities
- Staff coverage for timely follow-up was limited
- Language barriers prevented effective communication

To improve their rates of successful connections, teams designed or improved processes to address these barriers. For example, observing that patients often presented to the ED over the weekend, Hallmark Health System implemented weekend call coverage by a CHW paired with a clinician. The CHW conducted 48-hour follow-up phone calls over the weekend and answered any incoming calls. The clinician was available as a resource if there were clinical questions or challenges.

Over time, performance on 48-hour follow-up connections improved. Teams were able to execute 48-hour follow-up calls or visits for nearly all discharges, and programs targeting inpatient utilization achieved successful connections with patients more than 50% of the time. Despite initial challenges, 48-hour follow-up connections came to be one of the most successfully adopted components of the program, and teams found them to be critical to engaging patients and addressing their needs and concerns after hospital discharge.

EDUCATING PROVIDERS AND COMMUNITIES ABOUT CHART

As the CHART programs launched, hospital leadership worked with clinical teams to promote CHART, clarify how CHART integrated with existing hospital departments and processes, and set expectations around referrals and case management. CHART teams often found it valuable to meet with non-CHART hospital staff — particularly in the ED, pharmacy, palliative care, and social services — to communicate about CHART services and build support for the program. Sharing patient success stories increased awareness of the program and demonstrated the value of new staff roles like patient navigators, particularly in chaotic ED environments. The teams also worked with their marketing departments to promote awareness and consistent messaging for patients and providers through print and electronic materials. Outside of the hospital, CHART team staff conducted "meet and greets" and presentations to local social service organizations, primary care physician offices, and post-acute care facilities to build awareness of the CHART program and begin developing shared workflows.

Over time, CHART teams reported that they were well-integrated into the ED and inpatient units. As hospital staff came to understand how CHART programs could benefit patients and mitigate readmissions and ED revisits, non-CHART staff became more proactive in notifying CHART teams when patients were ready to be seen or discharged. This behavior change was validating for the CHART teams who worked hard to spread awareness of the program. Anna Jaques Hospital noted with pride that ED physicians even began to seek advice from the CHART case managers on non-CHART patients as their professional expertise in understanding and responding to the unique needs of patients became more widely understood and relied upon in the department.

CALL OUT BOX: COMMUNITY PARTNERSHIP MEETINGS

Establishing both formal and informal channels of communication between CHART teams and partnering organizations was key to effective collaboration. These channels created opportunities for all stakeholders to come together to discuss common issues and best practices for shared patients. The CHART team at Milford Regional Medical Center (MRMC) led monthly community partner meetings to learn more about available community services, discuss patient stories, and brainstorm solutions to common challenges. MRMC also hosted a Hospice Vendor Fair to promote care collaboration by providing introductions between hospice agency liaisons and MRMC staff and sharing updated information on the services offered by each agency.

SHARING PATIENT INFORMATION WITH PARTNERS

Sharing patient information is inherently challenging given privacy considerations and technological barriers. CHART teams and their partners often had to navigate differences in terminology and distinct legal and institutional protocols that could inhibit communication, as well as interoperability issues that prevented patient data from moving across information systems. As CHART teams worked to coordinate care both within and outside of the hospital, team members documented enduring challenges and failures in Health Information Technology (HIT) integration that were not specific to the CHART model. Technological barriers, such as the interoperability of Electronic Health Record (EHR) systems and issues operating complex care planning software, limited the ability of the teams to truly integrate with other providers supporting complex patients. These challenges were often rooted in the presence of multiple, uncoordinated internal EHR systems as well as paper-based documentation, which impeded information sharing and generated extra work for CHART team members.

To address some of these issues and systematize data entry and reporting, some CHART programs created home-grown data systems. Others opted to purchase new data entry and analytics systems, such as Loopback or Qpid. Loopback created real-time email notifications when target population patients presented in the ED and helped teams document their workflow to track the efficiency of their operational approach. Qpid enabled teams to create operational dashboards and acted as a search engine and graphics generator in concert with the hospital's EHR. Hallmark Health System reviewed Loopback, the EHR, and Emergency Department Information System (EDIS) information on eligible ED patients during morning huddles in order to identify and summarize issues for new patients prior to conducting first post-discharge phone calls. This method helped the Hallmark team create patient "snapshots" that informed their initial engagement plan.

Teams also sought to develop strong relationships and new channels of communication with partners to navigate HIT integration barriers with non-hospital organizations. CHART team staff identified key members of their partner organizations whom they could contact in order to discuss patient care and support transitions between settings. Some teams were able to share information with partners successfully in new ways. For example, Baystate Noble was able to share care plans through the Pioneer Valley Exchange System, a health information exchange for providers in Western Massachusetts.

CALL OUT BOX: SECURE TEXTING

For many CHART teams, secure text messaging enabled information sharing and continuity of care as team members used texting to communicate about patient care, hospital admissions, and patient discharges.[21] Several CHART teams used HPC funds to purchase secure texting technology with the capability of encrypting Personal Health Information (PHI) to enable the CHART team to communicate within the group and alert each other when target population patients presented for care. In addition to facilitating communication within the CHART team and with providers, the secure apps enabled CHART team members to text patients between appointments and identify emerging issues. Team members also used texting to check in with patients about upcoming medical or court appointments.

CARE MODEL ADAPTATIONS

By design, the CHART Program stressed iterative improvement rather than model fidelity. Throughout the performance period, teams applied continuous quality improvement strategies, such as Plan-Do-Study-Act (PDSA) cycles,[22] to adapt their models as they gained experience working with their target population patients. These strategies generally resulted in small, but meaningful refinements to care models to better meet patients' needs. Occasionally, they resulted in more fundamental changes. For example, Holyoke Medical Center recognized quickly that their initial clinic-based model was not enrolling as many patients as expected. CHART staff realized that patients in their target population were declining CHART services because they did not want to return to the hospital for another appointment. Program and hospital leadership collaborated with CHART staff to shift to a model which prioritized visits in non-hospital clinic settings, resulting in improved patient engagement with CHART services.

Ongoing analysis of local data also informed care model adaptations. Through analysis of utilization patterns, hospitals were able to risk-stratify their patients and better match services to varying levels of need. For example, after stratifying patients by frequency of ED visits, Hallmark Health System prioritized cross-disciplinary and intensive care planning for patients with higher utilization patterns. After learning which discharge locations were correlated with the highest reutilization rates, Beverly Hospital modified how they targeted intensive services to better align with patient needs.

Similarly, several teams conducted analyses of utilization patterns and identified that target patients often used the ED during weekends or off-hours when CHART staff were not available. To accommodate these gaps in coverage, CHART programs expanded their capacity to meet with patients by staggering team hours, hiring more staff, or collaborating with non-CHART staff members in the ED or hospital.

As CHART staff learned more about their target population's needs, they also adapted their partnership strategies. For example, Beth Israel Deaconess Medical Center - Milton identified that they needed a different care pathway for patients with substance use disorder (SUD) and partnered with a local rehabilitation center to get priority access to detox beds. Marlborough Hospital identified that a high percentage of its high-utilizer population qualified for enrollment in a Palliative Care Program and established partnerships with a visiting nurse association (VNA) and hospice providers. These types of adaptations enabled CHART programs to be responsive to patients' needs while improving operational efficiency.

CALL OUT BOX: CARING FOR PATIENTS WITH OPIOID USE DISORDER

During the CHART Phase 2 program period, hospitals across Massachusetts and the country faced a growing opioid epidemic. As reported in the HPC's 2017 Opioid Epidemic DataPoints,[23] between 2011 and 2015, heroin-related hospital discharges in Massachusetts grew by 256% while all other opioid-related discharges grew by 50%. Given the critical need, many CHART hospitals designed their programs to address the needs of patients with opioid use disorder (OUD). Many of the core components of the CHART care models, such as addressing whole-person needs, post-discharge follow-up, and partnerships with local organizations, were deployed when engaging with patients with OUD. However, CHART teams also identified that some subpopulations require specialized approaches. For example, Hallmark Health System recognized the need for a tailored approach for pregnant and postpartum women with OUD and a portion of their program was adapted for this subpopulation. At Harrington Hospital, members of the CHART team collaborated with the local Drug Court after observing the same people repeatedly presenting to both the Harrington ED and the Dudley Drug Court.

As they adapted their CHART programs to meet the needs of patients with OUD, teams used root cause analysis to develop a holistic understanding of their patients' lives. That understanding helped them to build close, trusting relationships between patients and a diverse team of support staff, including CHWs and licensed mental health counselors (LMHCs), that helped to mitigate the stigma that patients often experienced from the health care system. Drug Court staff and CHART team staff observed that patients were motivated by these relationships and looked forward to sharing successes with the staff. Similarly, staff who invested in building lasting relationships with patients found these challenging cases personally and professionally rewarding.

CHART teams found that connecting to the right local medical, governmental, and social service supports was critical for getting patients on a path to long-term recovery and support. For example, the Hallmark Health System team often helped pregnant and postpartum women with OUD enroll in the Women, Infants, and Children nutrition program and navigate involvement with the Department of Children and Families. Teams tailored services depending on patients' needs, recognizing that the path to recovery is neither linear nor consistent across individuals.

BUILDING DATA COLLECTION CAPABILITIES

A key element of CHART implementation was data collection and measurement. The HPC encouraged teams to develop data dashboards to inform program monitoring and quality improvement activities. The HPC advised CHART teams to prioritize data that was easy to collect and interpret and worked with CHART teams to select the most relevant and useful programmatic information. Components of the HPC-recommended dashboard included:

Exhibit 21: Components of the HPC-recommended data dashboard

PART 1: VOLUME, SCREENING, ENGAGEMENT	PART 2: SERVICES DELIVERED	PART 3: OUTCOMES
• Number of encounters by the target population • Daily volume of target population • Number of people in the target population • Proportion of total patients accounted for by the target population • Number of new patients per month • % of patients screened • % of patients engaged (or % of patients refused)	• Timely follow-up • Total number of patients served in the month • Total number of service contacts (average, range) • Average (range) of days served in CHART • Services delivered – by service type, mode, role type • % of patients with a care plan • Program specific measures	• Readmissions, revisits, length of stay; monthly and trended over time • Pre-Post utilization

While there was variability in the ability to collect accurate data, teams that were able to build a real-time data dashboard reported numerous benefits to the operation of their care models. Dashboards allowed CHART teams to see where a patient was in the hospital, understand their previous visit history, and access their care plan. Dashboarding was also important for collecting data on programmatic performance and informed data-driven decision making for Plan-Do-Study-Act (PDSA) strategies. For example, Signature Healthcare Brockton Hospital developed a real-time, web-based dashboard that could be viewed on each CHART team member's computer. On the dashboard, team members could see both patient-level information (such as where in the hospital the patient was at any time) and program-level information (including up-to-date performance on specific metrics). Program leadership regularly relied on this dashboard to closely monitor the program's progress.

In addition to creating local dashboards to inform workflow and programmatic decisions, teams submitted monthly outcome and process measures to the HPC. Initially, some hospitals encountered challenges collecting and reporting data for a number of measures, including revisits and readmissions. The HPC worked closely with teams to build data collection and reporting capacity, reducing and refining reporting requirements throughout the program to allow the teams to focus on the most meaningful measures. Since reutilization metrics were an important measure of progress toward the teams' primary aims, the HPC focused data improvement efforts on measures of readmissions and revisits. HPC Program Officers also formalized steps for follow-up when data errors were flagged. The combination of increased measurement guidance from the HPC and reduced reporting burden resulted in higher-quality, more reliable data over time.

1.4 STRATEGIC PLANNING

>>>> KEY TAKEAWAY <<<<

» As the CHART hospitals approached the end of their two-year performance period, the HPC provided **Strategic Planning Payments** to encourage hospitals to **plan for the future** of their CHART service delivery model and staff and to identify new funding sources.

Although CHART was a time-limited investment program, the goal was to create lasting impact and to prepare hospitals for a changing health care payment environment. While grant opportunities often serve as a catalyst for change, conducting analyses and planning for sustainability can be particularly challenging for organizations that have limited resources and personnel to dedicate to strategic planning. As the CHART hospitals approached the end of their two-year performance period, the HPC provided Strategic Planning Payments to encourage hospitals to plan for the future of their CHART service delivery model and staff. Based on approved proposals, the HPC awarded each hospital $50,000 for strategic planning purposes.

While the strategic planning process varied by awardee, CHART teams typically convened internal strategic planning groups in which CHART staff, hospital leadership, and advisors worked together over a three month period to develop a strategic plan. Some hospitals hired consultants to advise on the process and make recommendations. During planning meetings, hospitals developed evaluation questions and conducted locally-derived data analyses to assess the capabilities they developed and outcomes they achieved with their CHART programs. Hospitals considered a variety of factors when deciding whether and how to sustain their CHART programs, including impact on acute care utilization, perceived staff and patient experience, and financial viability. At the conclusion of CHART Phase 2, hospitals were required to submit their final strategic plans to the HPC. Findings from the strategic plans are discussed in more detail in Section Three: *Sustainable Organizational Change*.

SECTION TWO:

IMPACT

2.1 ASSESSING CHART PHASE 2 IMPACT

>>>> KEY TAKEAWAYS <<<<

» The HPC analyzed the performance of the 29 CHART teams across **five impact domains:** operational use of data, provision of integrated whole-person care, partnerships, acute care utilization, and patient experience.

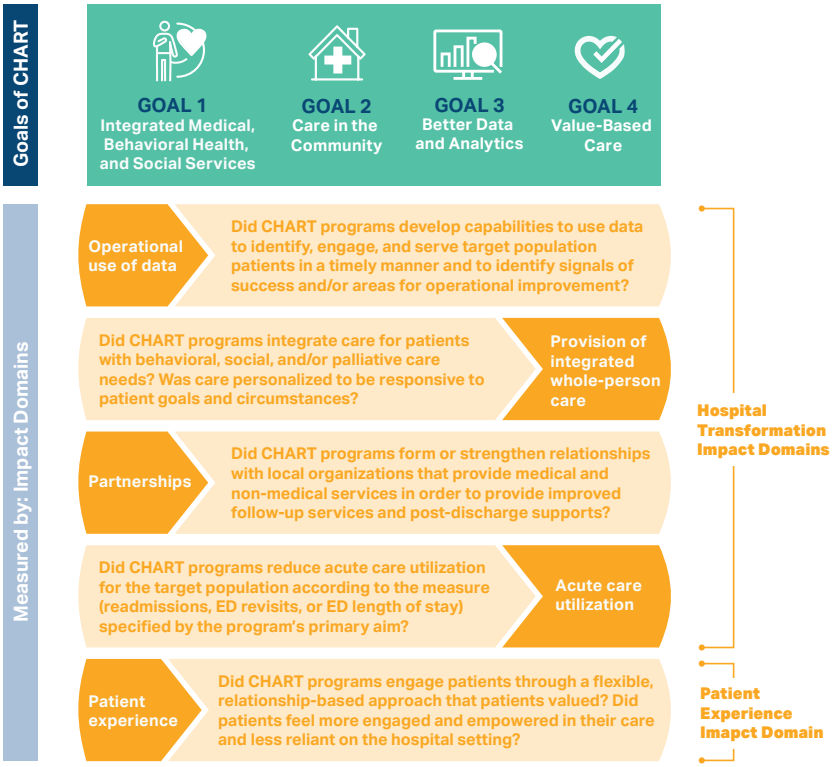
Over the 24-month performance period, approximately 137,000 hospital encounters were targeted for intervention in CHART Phase 2 across 29 CHART programs.[xviii] Each discharge represented an opportunity to intervene and influence the trajectory of a patient's care by delivering integrated, patient-centered care across medical, behavioral, and social needs. At the same time, CHART was designed to transform how community hospitals delivered care and to prepare community hospitals for success in the context of a changing health care payment environment. These changes are represented by the four goals of Phase 2:

1. **Integrate care across medical, behavioral health, and social needs,**
2. **Shift care from the hospital to the community as appropriate,**
3. **Use data and analytics to better serve patients, and**
4. **Orient organizations toward value-based care.**

To measure awardee achievement of the CHART Phase 2 goals, the HPC analyzed program performance across five impact domains: operational use of data, provision of integrated whole-person care, partnerships, acute care utilization, and patient experience (see **Exhibit 22**). Achievement in the first four domains, which together represent hospital transformation, was assessed through a synthesis of qualitative and quantitative data sources. Patient experience was assessed through interviews with CHART patients (see **Appendix: Methods** for more details).

xviii While there were 24 CHART Phase 2 awards, five hospitals selected two primary aims and operated two CHART teams. Performance was measured for each of the 29 CHART teams. Thirteen programs were focused in the ED and 16 were inpatient-focused. See Appendix: Methods for additional detail.

Exhibit 22: Progress toward the CHART Phase 2 goals was assessed across five impact domains



SECTION TWO

2.2 ASSESSING HOSPITAL TRANSFORMATION

>>>> KEY TAKEAWAYS <<<<

Hospitals demonstrated transformation across four impact domains:

1) **Operational use of Data:** 28 of 29 CHART programs progressed in their use of data and analytics, implementing new technology to improve workflows and/or practices for data-driven decision-making.

2) **Provision of whole-person care:** Attention to integration of behavioral and social needs became widespread; 27 out of 29 CHART programs made significant progress toward integrating care across medical, behavioral, and social needs.

3) **Partnerships:** 28 of 29 CHART programs developed or strengthened relationships with partners and frequently included co-location service models, embedded staff, and case conferencing for shared patients.

4) **Acute care utilization:** 24 out of 29 CHART programs reported reductions in acute care utilization for their eligible patient populations, with 16 programs reporting a 15% or greater reduction.

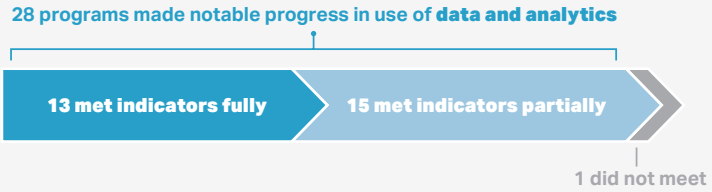
SECTION TWO

In order to assess progress toward the goals of CHART Phase 2, hospital transformation was analyzed across four impact domains: 1) operational use of data, 2) provision of integrated whole-person care, 3) partnerships, and 4) reduction in acute care utilization. The evaluation team drew on extensive qualitative and quantitative data collected throughout the performance period for the 29 CHART teams. Data sources included acute care utilization metrics, Program Update notes completed by CHART teams, organizational surveys,[xix] and transcripts of over 200 interviews with staff who implemented CHART programs. Progress on the four hospital transformation impact domains was analyzed across all 29 programs and aggregated to provide a cohort-wide assessment. However, recognizing that ED and inpatient-focused programs often encountered distinct needs, challenges, and successes, this section also describes strategies and performance specific to ED and inpatient-focused programs (for more information, see **Appendix: Methods**).

OPERATIONAL USE OF DATA

A primary goal of CHART Phase 2 was to enable CHART teams to monitor and track performance and to encourage data-driven decision-making. Building the hospitals' analytic capacity was critical for guiding service delivery and quality improvement efforts during the CHART Phase 2 performance period, as well as preparing hospitals to participate in value-based care delivery models, such as Accountable Care Organizations (ACOs). Toward this end, the HPC worked closely with CHART programs to develop capacities to collect, analyze, and use data.

Exhibit 23: Hospital transformation findings: operational use of data



xix Two web-based surveys were both administered twice to CHART hospitals by the Boston University School of Public Health in November-January 2017 and October-January 2018. The Organizational Change survey included questions about ACO participation, leadership, organizational culture, care processes, quality and performance improvement, health information technology, patient engagement, community partners, and more. Surveys were sent to CHART Investment Directors and Program Managers, who were asked to identify the employee(s) who could best answer the questions. The Behavioral Health Integration Survey was based on the Integrated Practice Assessment Tool and adapted to account for the CHART context. The survey aimed to gather information about the level and scope of integration between medical care and behavioral health providers in an organization. See Appendix: Methods for more detail.

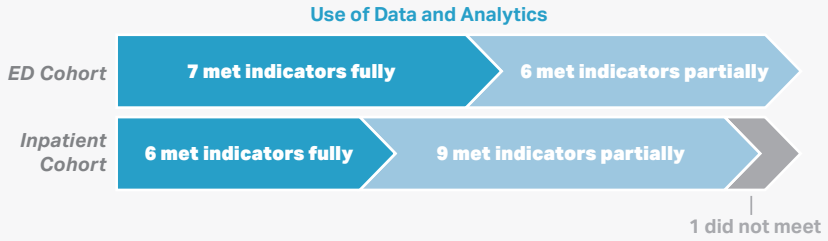
Despite some early operational and technical hurdles outlined in Part 2, 28 CHART teams made notable progress in their use of data and analytics. The 13 teams that were most successful deployed many or all of these strategies:

- Built systems to effectively identify and engage target population patients in a timely manner. This included leveraging existing Electronic Health Record (EHR) systems or deploying new case management platforms to generate real-time alerts to automatically notify CHART team staff when an eligible patient was present at the hospital.
- Tracked patient status and utilization and used these data to inform operational considerations, including staffing and service mix.
- Conducted sub-analyses to stratify patients based on need or discharge disposition and tailored services to match service intensity with patient complexity.
- Created dashboards to track progress and made a regular practice of reviewing data with frontline staff and partners where appropriate.
- Dedicated resources for a data analyst to help with data collection and analysis.

An additional 15 teams made moderate progress toward building these capacities but did not formalize or standardize practices for regular collection and use of data.

OPERATIONAL USE OF DATA IN THE ED AND INPATIENT SETTINGS

CHART programs that were based in the ED and inpatient settings encountered distinct patient needs and operational considerations. As a result, the strategies that CHART teams developed to collect and use data and analytics varied.



SUCCESSFUL STRATEGIES AMONG ED-FOCUSED PROGRAMS:

» **Real-time patient identification:** Real-time patient identification was critical in the fast-paced ED setting and enabled rapid identification of patient needs and relationship building that could support continued interaction. All hospitals in the ED-focused cohort implemented real-time or near real-time data systems to identify target population patients in their ED.

» **Regular data review with front line staff:** All of the ED-focused programs conducted regular data review with front-line staff to ensure all members of the CHART team in the ED were informed and responding to utilization trends for the target population.

» **Risk stratification and supplemental analyses:** The majority of the ED-focused programs conducted risk stratification and supplemental analyses to target services more efficiently, particularly for teams whose target populations were defined by utilization criteria (see **Call Out Box: Beth Israel Deaconess Medical Center - Plymouth Analysis of ED Utilization Trends**).

SUCCESSFUL STRATEGIES AMONG INPATIENT-FOCUSED PROGRAMS:

» **Adoption of Care Management and Risk Stratification Tools:** The majority of teams in this cohort actively utilized care management and risk stratification tools to target services to the most high-risk patient groups, such as patients with a serious chronic illness or with particularly high utilization (see **Call Out Box: Operational Use of Data**).

CALL OUT BOX: OPERATIONAL USE OF DATA

Instilling practices for data review with frontline staff: Baystate Franklin Medical Center implemented a new protocol to review data on a weekly basis with all team members in order to inform program operations. For example, the team stratified their patient population, creating a patient registry of the top 30 highest utilizers. Staff then used this analysis to inform resource allocation and provide higher intensity services to those patients. In addition, by examining utilization data, the team identified a coverage gap on Fridays. In response, the team redeployed non-CHART mental health counselors and trained them to perform 48-hour follow-up calls with patients on weekends to avert ED revisits during that time.

Creating "flags" in Electronic Health Records (EHRs) to identify eligible patients: HealthAlliance Hospital added a yellow icon to their EHR to "tag" eligible CHART patients. When eligible patients arrived in the ED, this yellow CHART icon alerted staff (both CHART staff and ED staff) that the patient needed to be seen by the CHART program prior to or immediately following discharge. This practice improved internal communication and hand-offs.

Utilizing dashboards to display data: Holyoke Medical Center worked with their care management software vendor to create a dashboard that could be utilized by ED and BH staff to search medical records quickly and easily. This readily accessible information helped the team to more quickly and comprehensively understand their patients' needs and connect them with appropriate services.

PROVISION OF INTEGRATED WHOLE-PERSON CARE

A second goal of the CHART Program was to shift from strictly medical, hospital-based care to integrated, patient-centered care across medical, behavioral, and social needs in order to provide patients with more appropriate, efficient care and reduce unnecessary hospital utilization.

CHART programs addressed whole-person needs to varying degrees depending on their target population and primary aim. Many adapted their strategies over time as teams became more familiar with their patients' needs. CHART teams generally targeted three areas to improve care integration: 1) health-related social needs (HRSN), 2) behavioral health (BH) needs, and 3) hospice/palliative care needs. HRSN was the most commonly addressed focus area, with 27 out of 29 programs targeting social factors such as housing, food security, and social support. Teams often addressed HRSN by providing warm hand-offs and referrals to local organizations, assisting patients with enrollment for benefits, arranging or providing transportation, accompanying patients to appointments, and using patient assistance funds (see **Call Out Box: Patient Assistance and Transportation Funds**).

While many programs identified BH care as a central component of their care model from the outset, others added BH services and expertise as they learned more about this need among their patient population. Programs incorporated staff with BH expertise and trained patient-facing staff in provision of trauma-informed care and Screening, Brief Intervention and Referral to Treatment (SBIRT). Teams worked to develop relationships with local BH providers and provided enhanced referrals to appropriate BH treatment. For some CHART teams, palliative care emerged as a critical tool in providing integrated care. These teams improved assessment and documentation of palliative care needs through screening for consults, completion of Medical Orders for Life Sustaining Treatment (MOLST) forms, and inclusion of staff with palliative care experience or relevant training (see **Call Out Box: Palliative Care Spotlight**).

Exhibit 24: The majority of CHART programs addressed health-related social needs and behavioral health needs

CALL OUT BOX: FINDINGS FROM THE BEHAVIORAL HEALTH INTEGRATION AND ORGANIZATIONAL CHANGE SURVEYS

The emphasis on addressing BH needs in the CHART programs, along with other hospital BH initiatives, was reflected in cohort-wide increases in BH integration, as assessed by the Behavioral Health Integration survey administered during the first and second year of CHART Phase 2. The survey found that the percentage of hospitals that were "Integrated" (levels 5-6) increased from 22% to 44% in the ED and 30% to 41% in inpatient settings.

In addition, during CHART Phase 2 hospitals increasingly attended to the needs of patients with serious or life-limiting conditions by expanding the use of hospice and palliative care. The Organizational Survey found that initially only four CHART hospitals reported having processes in place to identify, counsel, and plan for end-of-life care, while by the end of Phase 2, the number with such processes had grown to 10. Hospitals increasingly incorporated automated electronic notifications which triggered palliative care consults into their EHR. In some instances, the CHART teams drove this progress, while in other cases, teams leveraged changes already happening in their hospitals.

Regardless of the area of need, many CHART patients required coordination across multiple types of medical, behavioral, and social service providers. While some patients already had some type of coordinator, CHART team members often stepped in to "coordinate the coordinators" and provided a holistic understanding of patients' needs, priorities, and resources. This approach helped reduce fragmentation and eliminate duplicative care for high-risk patients. Many teams also incorporate home and community-based visits to develop a more comprehensive understanding of patients' lives and align service offerings with patient needs (see **Call Out Box: Home and Community Visits**).

CALL OUT BOX: HOME AND COMMUNITY VISITS

For many CHART programs, home and community-based visits with patients were an integral part of their care model and represented a departure from the traditional approach to care delivery "within the four walls" of the hospital. Visits in the home or in public or outdoor spaces were often more convenient and comfortable for patients and supported the development of trusting, longer-lasting therapeutic relationships. These visits often enabled CHART teams to support their most vulnerable patients and deepened team members' understanding of the circumstances that affected their patients' health and acute care utilization. As Lawrence General Hospital CHART staff recounted, "Home visits are a worthwhile investment to build trust, and to understand the patient's environment. It is invaluable to see how the patient navigates her physical space, understands her medications, whether she has enough food or the ability to prepare healthy food, the relationship with family members and caregivers. This environment often contains clues to root causes of emergency room visits and admissions."

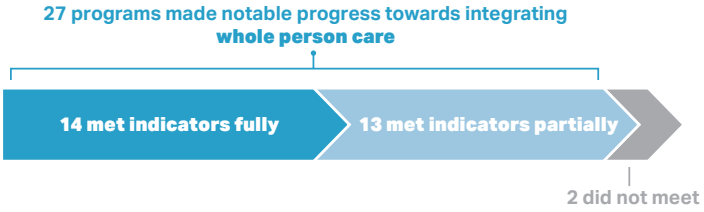
Home and community-based visits were conducted by interdisciplinary CHART team members, sometimes traveling alone or in teams comprised typically of a social worker, nurse (RN or NP), and/or a CHW. Pharmacists and pharmacy technicians also conducted home visits to consult on medication issues and ensure patients understood the instructions of how to take the medications. CHART teams often worked with patients who did not have permanent housing or feel comfortable inviting someone unfamiliar into their homes. In these cases, CHART team members engaged with patients at a coffee shop, library, or public park. CHART teams also accompanied patients to non-hospital based appointments, providing advocacy and support as patients navigated their care and ensuring that patients were connected to appropriate care, such as primary care.

Ultimately, attention to integration of clinical and nonclinical needs became widespread as 27 CHART teams made significant progress toward that goal. The CHART teams that were most successful (14 out of 29) demonstrated progress in three ways:

- Increased and standardized assessment and documentation of clinical and nonclinical patient needs,
- Incorporated appropriate expertise into the team, either through training or hiring, and
- Aligned care offerings with patient priorities, including locations and types of assistance outside of traditional clinical services.

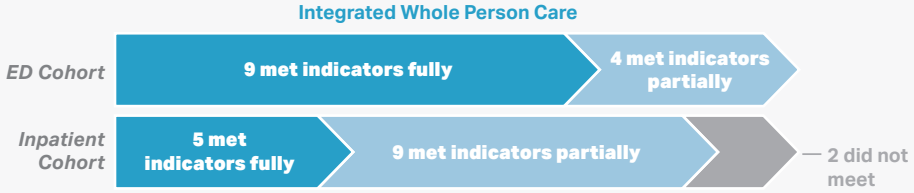
For the 13 teams that made moderate progress, formalization of assessment and documentation was often the missing element. Teams encountered challenges incorporating documentation of non-medical conditions into existing EHRs and/or lacked standardized tools to assess and document non-medical conditions. The two remaining teams focused their programs more narrowly on addressing medical conditions to avoid readmissions.

Exhibit 25: Hospital transformation findings: provision of integrated whole-person care



INTEGRATION OF WHOLE-PERSON CARE IN THE ED AND INPATIENT SETTINGS

ED and inpatient-focused programs developed strategies to integrate whole-person care based on the needs of their patient populations. For ED-focused programs, BH and health-related social needs were a priority for many patients, while inpatient programs often served patients with higher medical complexity.



SUCCESSFUL STRATEGIES AMONG ED-FOCUSED PROGRAMS:

- **Screening and documentation of behavioral health needs:** BH needs were a common driver of ED utilization. In response, almost all of the ED-focused teams conducted staff training that supported improved identification, screening, and treatment of BH needs (i.e. SBIRT, trauma-informed care, substance use disorder training modules). Screening practices enabled teams to more accurately identify relevant BH needs. Improved and standardized documentation of BH needs, particularly via the use of care plans, were critical for notifying downstream providers of BH concerns.
- **Addressing health-related social needs:** CHART teams in this group universally provided enhanced referrals to outpatient providers, such as BH treatment centers, homeless shelters, and/or social service organizations. They also provided insurance enrollment assistance and accompanied patients to medical or court appointments. Further, almost all ED-focused programs used HPC funding to establish flexible patient assistance and/or transportation funds to address barriers patients faced accessing health care (see **Call Out Box: Patient Assistance and Transportation Funds**).
- **Provision of care in the community:** CHART team members delivered integrated BH and medical care outside of the hospital, either in patients' homes, long-term care facility, or in a public space (see **Call Out Box: Home and Community Visits**).

SUCCESSFUL STRATEGIES AMONG INPATIENT-FOCUSED PROGRAMS:

- **Incorporating the pharmacist and pharmacy technicians into the care team:** Patients eligible for inpatient-focused programs often had a plethora of prescriptions and needed help navigating medication schedules, side-effects, and co-pays. Ensuring that patients had access to appropriate medications was a critical lever for reducing readmissions and improving patient outcomes. CHART team pharmacists played a critical role in reviewing the whole picture of a patients' care and ensuring that all of their medications aligned with broader care integration. Pharmacists conducted home visits as well as met directly with patients in the inpatient setting to resolve medication issues.
- **Development of longitudinal care plans:** Many teams created longitudinal care plans, which sought to document all aspects of patients' lives with input from family, friends, and medical and social service providers. Patients described their needs comprehensively, and the team assessed their risk for future readmissions. CHART teams then acted upon these plans post-discharge, sending CHART team members to patients' homes or long-term care facilities.
- **Training staff to address medical and social comorbidities:** Target population patients in inpatient-focused programs often had multiple medical and social comorbidities. Many teams used HPC investment funds to train their CHART team staff in skills and topics relevant to their target population patients such as palliative care, SBIRT, trauma-informed care, and substance-use disorder treatment.

CALL OUT BOX: PALLIATIVE CARE SPOTLIGHT

Identifying and planning for palliative care services as early as possible is important for improving patient care and reducing avoidable hospital utilization. In addition, patients, families, and caregivers are not always informed about the benefits of palliative care and how it differs from hospice care. In order to improve access to palliative care, Marlborough Hospital implemented the following practices:

- Adopted Emerson Hospital's palliative care screening tool to better identify patients eligible to receive a palliative care consult and, if appropriate, a referral to the Palliative Care Team physician.
- Created educational materials for hospital staff, patients, and their families about how to approach palliative care conversations with clear explanations of its benefits.
- Contributed to the expansion of the hospital's palliative care program to offer home visits to eligible patients with serious chronic illness, ensure care continuity, and prevent unnecessary hospital utilization.
- Strengthened relationships with palliative care providers in the community, such as VNA Cares, in order to more easily refer patients and ensure access to needed services.

CALL OUT BOX: PATIENT ASSISTANCE AND TRANSPORTATION FUNDS

Across the CHART cohort, teams allocated a portion of their budget to patient assistance funds. Patient assistance funds were used to pay for a variety of services and supports for health-related social needs and transportation that are not traditionally reimbursable in the health care system.[xx] Examples include helping patients afford their medications, durable medical equipment, medication dispensers, transitional housing costs, clothing, food, and cell phones and phone minutes to enable frequent communication with CHART team members. Several teams created dedicated funds to exclusively cover transportation-related expenses, such as taxi/cab vouchers to help patients travel to medical or social services appointments.

Exhibit 26: Hospitals allocated funding for transportation and patient assistance funds to address social needs not traditionally covered by insurance

PATIENT ASSISTANCE FUNDS AND TRANSPORTATION FUNDS		TRANSPORTATION FUNDS ONLY
Addison Gilbert Hospital	HealthAlliance Hospital	Baystate Franklin Medical Center
Beverly Hospital	Holyoke Medical Center	Baystate Wing Hospital
Baystate Noble Hospital	Lahey-Lowell Joint Award	Beth Israel Deaconess Medical Center - Milton
Berkshire Medical Center	Lawrence General Hospital	Emerson Hospital
Hallmark Health System	Southcoast Hospitals Group	Milford Regional Medical Center
Harrington Memorial Hospital	UMass Marlborough Hospital	Heywood Hospital

Funding amounts ranged widely among programs, but per-patient spending was generally small and made a significant impact on the patient's ability to be successful in their care plan. For example:

- The Marlborough CHART team used their patient assistance fund to run a program called "Bread and Milk." Prior to a storm, the team would call all patients whom they were concerned about and deliver groceries to their homes if necessary.
- Berkshire Medical Center used their patient assistance fund to help patients afford their medications, refill their mobile phone minutes, and purchase food, bus passes, clothing, and blankets.
- Harrington Memorial Hospital used their patient assistance funds to assist patients in crisis or emergency situations. For example, the team used the funds to place a patient in a motel room for a few nights while working with them to fill out emergency housing assistance applications.

CHART teams reported that the patient assistance funds facilitated an individualized, patient-centered approach in a way that other, less flexible sources of funding could not.

xx Some hospitals also utilized patient assistance funds established at their hospital separately from the CHART program.

PARTNERSHIPS

The third hospital transformation indicator, forming or strengthening partnerships, was identified as a key strategy to advance the goals of CHART Phase 2. Partnerships with local medical and non-medical organizations enabled CHART teams to better meet patients' medical, behavioral, and social needs and served as long-term, community-based resources for patients as they transitioned out of the acute care setting. Twenty eight CHART programs established new or enhanced existing partnerships with medical, governmental, or social service organizations in the community.

Exhibit 27: Hospital transformation findings: partnerships

The CHART teams with the most robust partnerships (20 of 29) were characterized by:

- Formalized relationships with partners and frequently included co-location service models,
- Embedded staff from partner organizations in the hospital setting or vice versa, and
- Case conferencing between CHART staff and partner staff for shared patients.

Many of these strong partnerships involved commitment of CHART investment funds to support collaboration, with 34 funded partnerships. Among the eight CHART programs that made more moderate improvements in partnerships, teams focused on developing new, often informal, systems of communication with community providers and social service organizations to facilitate referrals.

PARTNERSHIPS IN THE ED AND INPATIENT SETTINGS

Patient needs drove the types of collaboration and partnerships that ED and inpatient-focused programs developed. Many ED-focused programs partnered with BH partners, whereas partnerships with palliative and elder care services were more common among inpatient-focused programs.

SUCCESSFUL STRATEGIES AMONG ED-FOCUSED PROGRAMS:

» **Embedding external behavioral health expertise:** ED BH-focused programs in this cohort embedded external BH staff onto their CHART teams or built relationships with local BH providers to ensure continuity of BH care outside of the ED.

» **Formalizing data-sharing and case conferencing practices:** A number of programs in this cohort established practices for data-sharing and regular case-conference meetings with their partners to coordinate care for shared patients (see **Call Out Box: Community Partnerships**).

SUCCESSFUL STRATEGIES AMONG INPATIENT-FOCUSED PROGRAMS:

» **Focus on palliative care and elder services:** Improving palliative care and elder services was a distinct focus for seven inpatient-focused teams (see **Call Out Box: Palliative Care Spotlight**). Partnerships with community based organizations, such as skilled nursing facilities (SNFs) or elder services, were often critical to ensure continuity of care post-discharge. The inpatient cohort frequently embedded partner organization staff in their hospitals or adopted co-location models whereby, for example, a CHART team member would accompany staff at a SNF for patient rounds.

CALL OUT BOX: COMMUNITY PARTNERSHIPS

Partnering with Behavioral Health Providers: Recognizing that they served many of the same patients with significant BH challenges, Baystate Noble Hospital developed a close partnership with the Carson Center, a behavioral health and crisis services organization. CHART staff obtained releases from shared patients and conducted regular case conferencing sessions with the Carson Center to discuss patient needs and develop care plans. CHART teams then uploaded the most up-to-date patient information and care plan documents to the hospital's ED EHR so that when shared patients registered in the ED, an automatic flag would notify ED providers about the care plan. ED providers appreciated access to the care plans created by the CHART team and the Carson Center.

Partnering with local Skilled Nursing Facilities: A key component of Addison Gilbert and Beverly Hospitals' models was their active engagement with skilled nursing facilities (SNFs) in their service area. CHART team nurses rounded weekly at the facilities to communicate regarding shared patients and iterate upon their discharge plans. As relationships developed, information flowed more freely between institutions, and CHART team members were able to follow-up quickly when problems arose.

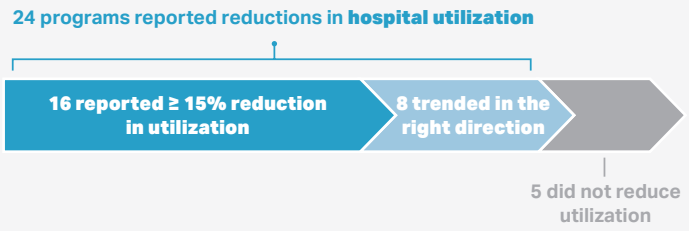
Partnering to address transportation needs: Recognizing that access to reliable transportation services was a barrier for many of their target population patients, Harrington Memorial Hospital formed contractual partnerships with Elderbus and the Worcester County Sheriff's Office (WCSO). The Elderbus provided transportation to outpatient appointments for patients with disabilities or BH diagnoses which, in turn, helped these patients achieve stability in community settings. The WCSO provided patient transportation to outpatient substance use treatment centers in their service area (e.g. Southbridge, Dudley and Webster).

ACUTE CARE UTILIZATION

Frequent acute care utilization is a driver of high health care costs and can be a marker of unmet care needs. As such, reducing unnecessary acute care utilization and shifting care from the hospital to appropriate community care was an important CHART Program goal. Across the CHART Phase 2 cohort, CHART teams tracked acute care utilization for all eligible target population patients, regardless of whether they received CHART services. By collecting data for the entire target population, teams were motivated to think broadly about their target populations and to engage as many patients as possible. When hospitals had two CHART teams with separate primary aims (such as reducing ED revisits and inpatient readmissions), the teams tracked their performance separately.[xxi]

Across the cohort, 24 CHART teams reported reductions in acute care utilization as defined by their primary aims (see **Appendix: Methods** for more details). Of those, 16 programs reported a 15% or greater reduction in utilization for their eligible target population. Five CHART teams demonstrated little or no change in acute care utilization as measured by their primary aim(s) for their eligible target population, though some of these observed positive trends among subpopulations, such as reduction of utilization among patients with complex needs or patients actively served by their CHART program (as opposed to eligible in the target population).

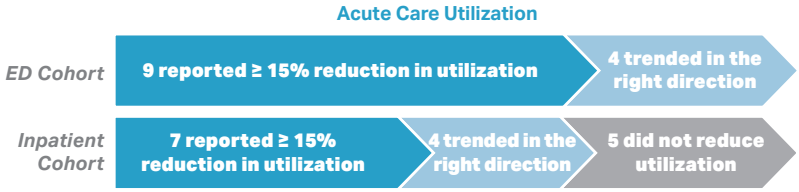
Exhibit 28: Hospital transformation findings: acute care utilization



All of the ED-focused programs reported reductions in acute care utilization. Of the 13 programs that were based in the ED, seven ED teams reported reductions in 30-day ED revisit rates by 15% or more, and two teams observed reductions in ED length of stay by 15% or more. Notably, six of the seven awards that targeted patients with a BH diagnosis reported 15% or greater reductions in

xxi One team had one primary aim for two target populations. Their performance for each target population was measured separately. This team achieved a 15% or greater reduction for both populations.

their primary aim. The other four ED-focused programs did not achieve reductions that were as significant, but still reported smaller reductions in acute care utilization.



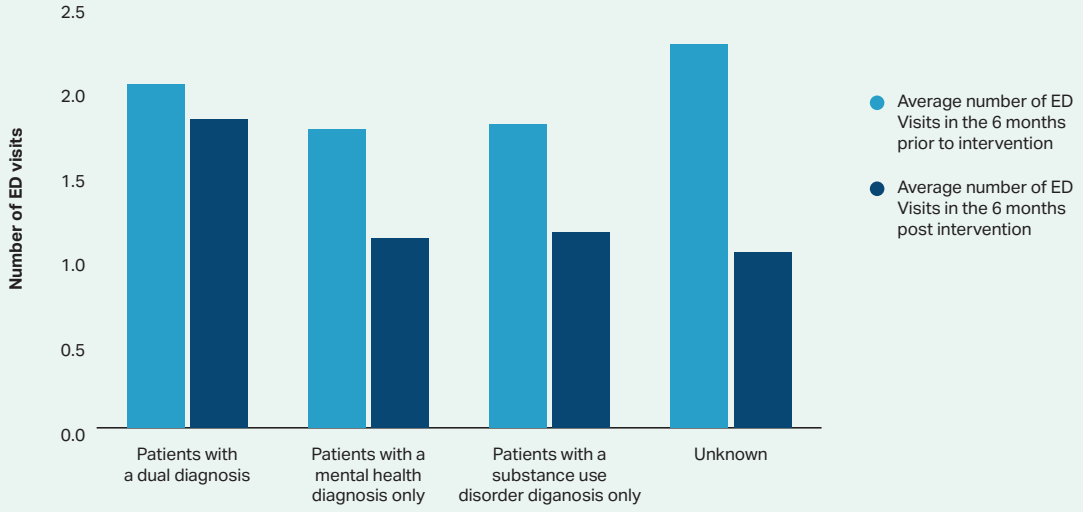
Sixteen of the CHART programs were primarily based in inpatient settings and targeted 30-day inpatient readmissions or 30-day returns as their primary aim. Of the inpatient based programs, eight targeted readmissions among high-risk populations with social or medical complexity,[xxii] seven targeted readmissions among patients with a history of high utilization, and one program targeted readmissions among both their high-risk and high-utilization populations. The majority of these CHART programs reported progress toward their primary aim; seven teams[xxiii] observed reductions in 30-day inpatient readmissions or 30-day returns of 15% or more, and four additional teams observed trends in the right direction. However, impact on inpatient readmissions varied, with five teams making little or no progress toward their aim.

SECTION TWO

CALL OUT BOX: BETH ISRAEL DEACONESS MEDICAL CENTER- PLYMOUTH ANALYSIS OF ED UTILIZATION TRENDS AMONG PATIENTS WITH CO-OCCURRING DISORDERS

Among patients with BH diagnoses, those with co-occurring mental health and substance use disorder (SUD) conditions have higher ED utilization and longer stays in the ED. Despite high prevalence, national rates of engagement in treatment for co-occurring disorders are low.[24, 25] Beth Israel Deaconess Medical Center-Plymouth tracked ED utilization among patients with a mental health diagnosis, a substance use diagnosis, or a dual diagnosis and found that post-enrollment in their CHART program, ED visits decreased only slightly for patients with co-occurring disorders, in contrast to substantial decreases for patients with either SUD or mental health diagnoses. These findings speak to the complexity of needs of patients with co-occurring disorders and the need to conduct sub-analyses to better understand how specific subgroups respond to this type of intervention.

Exhibit 29: Emergency department utilization at Beth Israel Deaconess Medical Center-Plymouth among patients with a dual diagnosis, mental health diagnosis, or substance use disorder diagnosis



NOTES: This analysis includes records six months before and six months after patient identfication date (n=2,062 patients).

SOURCES: Data provided by Beth Israel Deaconess Medical Center

xxii Social complexity criteria included dual eligibility for Medicaid and Medicare, Medicaid status, and housing instability. While none of the hospitals focused on patients with one specific condition, such as coronary artery disease or pneumonia, several used medical criteria, such as discharges to post-acute care, as markers of medical complexity. Most programs were payer-neutral, though one focused on patients who are dually-eligible for Medicaid and Medicare. Other variations included a program that targeted elderly patients discharged to post-acute care settings, and one that elected to serve all discharged patients residing in a specific geographic area.

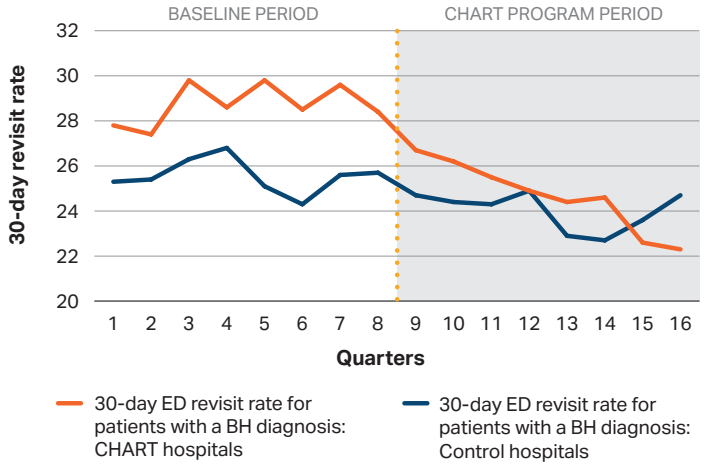
xxiii One team had one primary aim for two target populations. Their performance for each target population was measured separately. This team achieved a 15% or greater reduction for both populations.

To further understand utilization trends at CHART hospitals, the HPC contracted with the Boston University School of Public Health (BUSPH) to conduct a difference-in-difference analysis to place acute care utilization trends at CHART hospitals within a statewide context. Using statewide hospital discharge data collected by the Center for Health Information and Analysis (CHIA), the difference-in-difference analysis compared acute care utilization trends at CHART hospitals to trends at all non-CHART, non-Academic Medical Center hospitals in the Commonwealth during the same time period.

For the purposes of this analysis, the CHART hospitals were grouped into four categories based on target population and aim: 1) programs focused on ED revisits for patients with a BH diagnosis, 2) programs focused on ED revisits for patients with a history of high acute care utilization, 3) programs focused on inpatient readmissions for patients with a history of high acute care utilization, and 4) programs focused on inpatient readmissions for patients at high-risk for readmissions. Unlike hospital-reported utilization data, analysis of case-mix data allowed for visibility into utilization at *any* hospital, not only at the same hospital, and provided a standardized data source (see **Appendix: Methods** for more details).

While ED revisit rates fell at both CHART and control hospitals during the CHART performance period, the decrease was larger at CHART hospitals than control. When looking at only the ED revisit rates among patients with BH diagnoses without considering other hospital or patient characteristics, the revisit rate decreased by 4 percentage points, compared to 1.5 percentage points at non-CHART hospitals for the performance period. When adjusting for patient and hospital-level differences between the control and CHART hospitals, the difference-in-difference analysis still found that CHART hospitals' revisit rate fell more than control hospitals revisit rate (by 1.1 percentage points) for patients with BH diagnoses for the intervention time period.

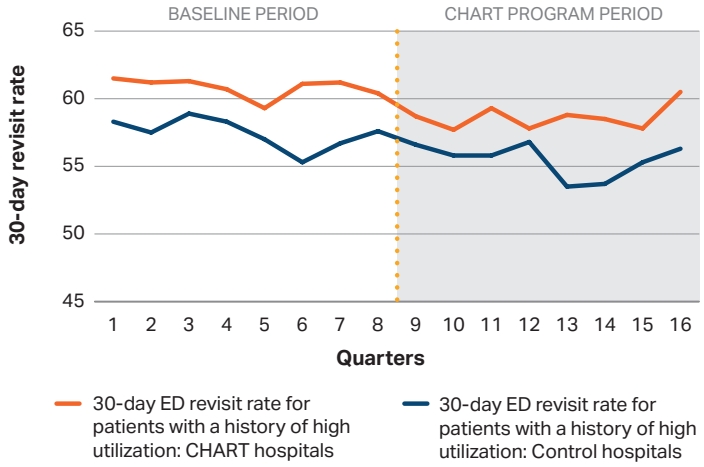
Exhibit 30: 30-Day ED revisit rate to any hospital for patients with a behavioral health diagnosis



NOTES: This graph shows the outputs of a difference-in-difference analysis by quarter. Quarters 1-8 represent the two years prior to CHART implementation; Quarters 9-16 represent the two years following CHART implementation. Exact dates vary based on program launch date. See Appendix: Methods for more details.

SOURCES: Health Policy Commission analysis of Center for Health Information and Analysis Massachusetts Acute Hospital Case-Mix Hospital Inpatient Discharge Database (HIDD).

Exhibit 31: 30-Day ED revisit rate to any hospital for patients with a history of high utilization



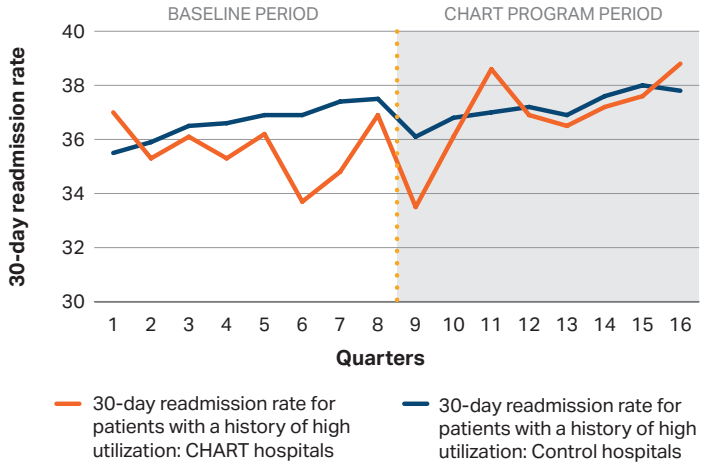
NOTES: This graph shows the outputs of a difference-in-difference analysis by quarter. Quarters 1-8 represent the two years prior to CHART implementation; Quarters 9-16 represent the two years following CHART implementation. Exact dates vary based on program launch date. See Appendix: Methods for more details.

SOURCES: Health Policy Commission analysis of Center for Health Information and Analysis Massachusetts Acute Hospital Case-Mix Hospital Inpatient Discharge Database (HIDD).

Among patients with a history of high ED utilization, the revisit rate decreased by 2.2 percentage points at CHART hospitals, compared to 2 percentage points at control hospitals. When adjusting for hospital-level differences between the control and CHART hospitals, the difference-in-difference analysis found that CHART hospitals' revisit rate fell more than control hospitals revisit rate by 1.9 percentage points. While neither ED difference-in-difference analysis was statistically significant (at $p<0.05$), both analyses indicate that the CHART Program may have contributed to hospitals making progress on reducing unnecessary ED utilization among patients with a history of high utilization and/or a BH diagnoses for the 2 years after the intervention launched. In addition, BUSPH conducted a sensitivity analysis around the BH readmission cohort by examining only the primary diagnoses. These additional analyses found similar results.

Among inpatient-focused programs, the difference-in-difference analyses found that readmission patterns across inpatient-focused CHART hospitals were similar to control hospitals during the performance period. Because most Massachusetts hospitals were engaged in efforts to reduce readmissions during this time frame, these results suggest that CHART hospitals as a group kept pace with, but did not outperform, statewide efforts. These findings align with research concluding that programs aimed at readmissions reduction – even for a high-risk population with room for improvement – face challenges sustaining performance in the near term and may require longer interventions to demonstrate significant change.[26, 27]

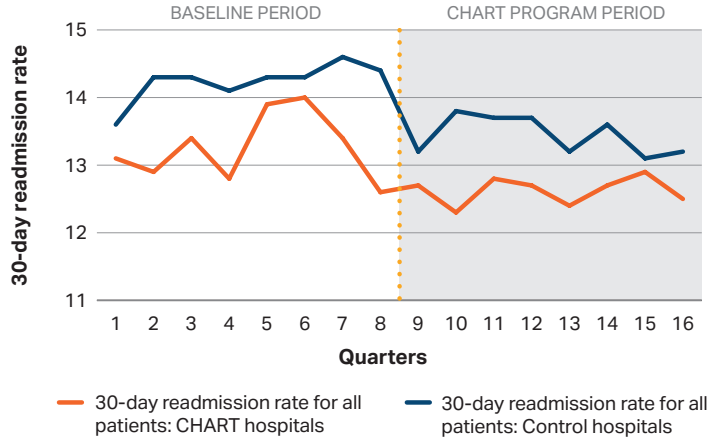
Exhibit 32: 30-Day readmission rate to any hospital for patients with a history of high utilization



NOTES: This graph shows the outputs of a difference-in-difference analysis by quarter. Quarters 1-8 represent the two years prior to CHART implementation; Quarters 9-16 represent the two years following CHART implementation. Exact dates vary based on program launch date. See Appendix: Methods for more details.

SOURCES: Health Policy Commission analysis of Center for Health Information and Analysis Massachusetts Acute Hospital Case-Mix Hospital Inpatient Discharge Database (HIDD).

Exhibit 33: 30-Day readmission rate to any hospital



NOTES: This graph shows the outputs of a difference-in-difference analysis by quarter. Quarters 1-8 represent the two years prior to CHART implementation; Quarters 9-16 represent the two years following CHART implementation. Exact dates vary based on program launch date. See Appendix: Methods for more details.

SOURCES: Health Policy Commission analysis of Center for Health Information and Analysis Massachusetts Acute Hospital Case-Mix Hospital Inpatient Discharge Database (HIDD).

While the difference-in-difference analyses provide a useful perspective on utilization trends at CHART hospitals, there are some significant limitations to this study design. The analysis required target populations and primary aims to be standardized across each of the four groups, which means that CHART programs were not necessarily evaluated against their specific primary aim. Additionally, using discharge data undercounts patients without a unique patient identifier (see **Appendix: Methods** for additional detail).

2.3 UNDERSTANDING PATIENT EXPERIENCE

>>>> KEY TAKEAWAYS <<<<

- CHART patients described **myriad medical, social, and behavioral health needs**, underscoring the **complexity** faced by CHART patients. Due to siloed care, a lack of supports, and stigmatizing encounters, patients often had a difficult relationship with the health care system.
- Patients described how the individualized, comprehensive, and relationship-based CHART care models **positively impacted** their care experience and engagement.
- Patients reported that the CHART care models **improved care coordination** and created new ways for patients to engage in their care and access help.
- Patients provided specific anecdotal examples of the way the program changed their patterns of health care service use and specifically **reduced hospitalizations and ED use**.

SECTION TWO

Recognizing that patient experience is a key indicator of the CHART Program's success, the HPC engaged the BUSPH to evaluate patient perspectives of CHART care team interventions.[xxiv] A diverse sample of 51 patients from 8 CHART hospitals were individually interviewed to understand how they perceived changes in: the care they received, how they participated in managing their care, and their utilization of health care services. Interviews focused on patients with frequent acute care utilization or BH diagnoses, including those with frequent inpatient admissions and ED visits. The patient sample was not expected to be statistically representative of the eligible patient population but rather to be an informative cross-section. Interviews were semi-structured, including open-ended invitations for patients to describe their experience of health care in general and in the CHART Program specifically (see **Appendix: Methods** for more details).

The collected patient perspectives highlighted three thematic areas: 1) the needs and experiences of CHART patients with health care, in general; 2) their experience of care delivery in the CHART Program; and 3) the influence of CHART on their health care use and engagement.

THE NEEDS AND EXPERIENCES OF CHART PATIENTS

Interviews with CHART patients highlighted how their intersecting medical and/or BH needs contributed to the complexity of their care and their frustrations with the health care system. Consistent with the hospitals' initial findings during IPP,[28] most patients had long term experience with at least one chronic condition, such as chronic obstructive pulmonary disease (COPD), renal failure, or heart disease. CHART patients also described how BH issues such as substance use disorder, anxiety, psychosis, and suicidal ideation contributed to the complexity of their care and could be a driver of frequent ED utilization.

Some patients – especially those with BH diagnoses – described feeling frustrated or stigmatized by the health care system. For example, one patient described a negative experience while being treated in the ED for pain and numbness from a spinal injury. The patient said, "This one nurse, she's treating me really horribly, and she was like sick of seeing me, and she made it known to me that she thinks I was just abusing the medical system." The perception of stigma and judgment from care providers influenced patients' perceptions of themselves and their health care needs. These encounters created negative feelings, including shame

xxiv The interviews conducted as part of the patient perspective study were distinct from the interviews conducted during IPP. During IPP, CHART hospital staff conducted interviews with patients to gather data about the drivers of hospital utilization among patients with a history of high hospital utilization. These interviews helped inform hospitals' target populations, primary aims, and care models (see the Implementation Planning Period section for more detail). In contrast, the interviews in the patient perspective study were conducted with CHART patients to collect their perspectives on the CHART Program.

and a perception that patients were not entitled to the care they needed: "I always felt like my being sick was such a burden [to the care providers] and something that I needed to be ashamed of and feel guilty of." These feelings could make patients reluctant to seek out or participate in their health care.

Patients expressed frustration at the lack of control they felt over their health and health care when they did seek care. Patients described their lack of empowerment, which sometimes manifested as an inability to voice their needs with their providers. One patient commented, "[My doctors and nurses] just want me to keep my mouth shut, and it's very disheartening to me." CHART patients also described fragmented care resulting from multiple complex medical and BH conditions and disconnected specialty providers. After repeated negative experiences, some patients had reached a state where they did not trust providers to understand their concerns, treat them as unique individuals, or provide appropriate and respectful care. This lack of trust and confidence was detrimental to the management of their health and set the stage for inappropriate hospital utilization.

PATIENT EXPERIENCE IN THE CHART PROGRAM: COMPREHENSIVE, RELATIONSHIP-BASED CARE

During interviews, CHART patients provided many specific, positive examples of how they experienced the CHART Program. Patients stressed the importance of the CHART staff's holistic understanding of their lives and the staff's willingness to help with non-medical needs such as transportation, food, or other necessities. One patient paraphrased the CHART staff, saying, "We can probably get a phone card [...] and we can get the names of where the food bank is around here for you. In the wintertime, we'll try to hook you up with elder care bus that would come to your door to bring you to the shopping center so you wouldn't have to carry all that stuff." Patients also described the value of interactions outside of traditional appointments. Patients shared that when program staff made phone calls and home visits, attended health care appointments, or assisted in arranging outpatient care or local social services, they gained trust and confidence in their providers. These services helped ensure patients received support after discharge and that patients had access to essential services and resources, including non-medical needs that had previously been beyond the scope of their health care providers.

Patients often described warm relationships with CHART staff and small acts, gestures, or assistance that were both memorable and meaningful. Patients reported that CHART staff provided emotional support through regular interactions and clear communication. One patient recalled, "The follow-up team is beyond expectation. It was more than I expected, more than I deserved, quite frankly. Follow-up letters, notes... 'Are you doing okay?' ... handwritten letters. It was almost to the point where I needed a tissue to wipe the tears away from my eyes." Another patient described, "Before I left the hospital, I had somebody come and ask me about what was happening in the emergency room. And it was a good feeling to know that they really did care."

Patients expressed trust in CHART staff, noting that they felt confident they could reach out to CHART staff in person or by telephone to get the help they needed. Patients felt secure knowing that CHART staff was responsive and caring. When describing a CHART team member, one patient commented, "She really put me at ease [through] her friendship, her personality, her ease, and her wanting you to feel at ease." Another patient described clear lines of communication established through a responsive, relationship-based approach: "[The CHART team members] know I have issues. They always ask me questions like, 'How do you feel?' They're always good at listening and knowing what I need or what I want. And they always provide what I need."

Patients also described efforts by CHART staff and other providers to engage them in their health care through building durable patient-provider relationships. Patients described actively participating in conversations with CHART staff about their care and reported that CHART staff identified gaps in services and worked with them to fill those needs. Patients also noted that CHART staff listened carefully to their needs and served as their "eyes and ears" with their other providers. A patient said, "You have somebody on your side. They made themselves available when I go to the clinic. Whatever they're doing, they come down while I'm there to see what's going on. And they'll stand there [and] listen to the nurse talk to me and how I'm being taken care of." The presence of a trusted figure helped patients feel more comfortable with their care, which built the foundation for greater engagement. Patients frequently described communicating with CHART providers to give input about their own care and needs. These discussions allowed patients to feel heard, which led to the perception that the care provided through CHART was tailored to their individual needs.

The positive elements cited by patients reflect important focus areas of CHART teams. While each CHART program had unique elements, all strived to bring care directly to patients, to earn their trust, and to engage them in their own care. Most patients

interviewed valued ongoing and caring relationships with CHART team members who made themselves reliably available, came to patients' homes, and facilitated communication among providers. These responses suggest that the CHART model's emphasis on flexibility and relationship-building aligned with patients' own priorities.

THE INFLUENCE OF CHART ON PATIENT HEALTH CARE USE

While patient interviews did not directly examine utilization outcomes, most patients could describe anecdotally the ways that CHART influenced how their health care use patterns may have shifted. Some patients described their positive perceptions of care coordination through CHART as compared to prior experiences. Patients reported that providers and CHART team members often identified gaps in care, services, or basic needs, and then worked with patients to connect to appropriate resources or care. In addition, patients reported that CHART team members communicated with health care providers to coordinate care.

Patients also described how their relationships with CHART team members created new ways for patients to engage in their care and access help. Patients spoke about how the CHART staff operated as a central point of contact for concerns about patients' health care, often representing a more accessible way for patients to ask questions and get answers. One patient remarked, "If I get overwhelmed with trying to get a hold of doctors not answering, I call [a CHART team member] and they take care of it. It really helps me be able to stay calm and make sure I get things done that I'm supposed to for my recovery instead of getting overwhelmed." Patients also relayed that having a regularly scheduled visit time with a reliable point of contact helped them manage their care. One patient noted, "I still have my doctors and dialysis and all of that, but [CHART team members] come to the house once a week. So if I had any questions, I would just wait until then unless it was really important or bothering me to the point of calling the doctor."

Patients felt that the CHART Program emphasized increasing patients' knowledge and self-efficacy as they navigated their health care. After enrolling in the CHART Program, several patients noted greater involvement in their own care and feeling empowered to make themselves heard. A patient noted, "I think I'm more knowledgeable about my care and more apt to step up when something happens that's not appropriate. And I used to let things go in the past. And I don't anymore. I have resources now." Patients' descriptions of having a stronger voice and active engagement in their care contrasted with the feelings of disempowerment that characterized other prior experiences.

Through the interviews, CHART patients were able to provide anecdotal examples of ways CHART changed their patterns of health care service use and specifically reduced hospitalizations and ED use. Sometimes, access to resources and programming arranged by CHART staff allowed patients to be engaged in community activities and outpatient care that reduced the need for hospitalization. In other cases, increased confidence in managing their own health resulted in reduced utilization. Patients credited CHART services with reducing their reliance on hospital-based care, substantiating a connection between the CHART services provided and avoided hospital utilization.

Taken together, these findings suggest that many patients involved in the CHART Program received appropriate services both in and outside of the hospital setting, felt engaged in their care management, and consequently relied less on hospital-based care. These changes in experiences and use of health care, as described by patients, are consistent with reports by CHART team members, as well as with the stated goals of the CHART Program. In addition to reduced reliance on hospital care, patients described personal changes that they attributed to their participation in the CHART Program, such as increased empowerment, involvement in their care, and knowledge about their health care needs. Internalized changes are particularly noteworthy, as they have the potential to persist after the CHART Program ends; these capacities might enable patients to better manage their own care even without ongoing intensive services.

SECTION THREE:

SUSTAINABLE ORGANIZATIONAL CHANGE

3.1 ASSESSING SUSTAINABLE ORGANIZATIONAL CHANGE

>>>> KEY TAKEAWAYS <<<<

- The CHART Phase 2 Investment was designed to create **lasting transformation** that extended beyond the performance period and to prepare community hospitals to **succeed** in a value-based care environment.
- The HPC drew primarily on results from surveys of CHART hospitals, interviews with CHART stakeholders, and strategic plans submitted by hospitals at the end of their CHART-funded strategic planning processes to **analyze sustainable organizational change**.

The CHART Phase 2 Investment Program was intended to foster organizational transformation in key areas that would continue beyond the award period and to prepare community hospitals for success in a value-based payment environment. As such, sustainability was emphasized throughout the design, implementation, and evaluation of CHART Phase 2. To assess the CHART Program's potential for impact beyond the performance period, the evaluation team considered two broad aspects of sustainability: 1) organizational culture change, and 2) hospital commitment to sustaining CHART roles and activities.

To inform this analysis, the HPC drew primarily on results from surveys of CHART hospitals,[xxv] interviews with CHART stakeholders (i.e. hospital leadership, project managers, staff members, and community based organizations[xxvi]), and strategic plans submitted by hospitals at the end of their CHART-funded strategic planning processes (for additional detail, see **Appendix: Methods**). Survey responses and stakeholder interviews captured perspectives on the CHART Program specifically, but also offered insights into broader changes in organizational culture and practices in the hospitals and across the Commonwealth. This additional organizational context was particularly notable in responses from hospital leadership.

xxv Two web-based surveys were administered by the BUSPH in November 2016-January 2017 and October 2017-January 2018 to CHART hospitals to understand hospital practices taking place during the CHART award period. Topics included ACO participation, leadership, organizational culture, care processes, quality and performance improvement, health information technology, patient engagement, community partners and more. Surveys were sent to CHART Investment Directors and Program Managers, who were asked to identify the employee(s) who could best answer the questions.

xxvi Between September and November 2017, 75 interviews were conducted by the BUSPH with CHART hospital leadership, Program Managers, staff members, and community based organizations.

3.2 ORGANIZATIONAL CULTURE CHANGE

>>>> KEY TAKEAWAYS <<<<

- Many hospitals reported **positive organizational culture change** that resulted from the Phase 2 interventions, including adoption of a holistic approach to population health, recognition of the value of extending care beyond the hospital, an understanding of how provider stigma influences care, integration of non-clinical staff into the care team, and an orientation towards data-driven decision-making.
- Leadership and staff **expressed support** for the Phase 2 model; providers felt better equipped with the tools needed to meet patients' needs and reported that streamlined workflows reduced administrative burden.

Implementation of the CHART Program contributed to a reconsideration of the hospital's role in managing care for patients with complex medical, social, and behavioral health needs. By the close of Phase 2, the percentage of hospitals reporting that they had fully developed programs to reduce preventable hospital readmissions increased from 32% to 52%. Similarly, the percentage of hospitals that were routinely addressing inappropriate ED use increased from 28% to 52%. In addition, existing relationships with clinical providers – particularly SNFs and BH providers – evolved from reactive, largely transactional encounters to durable, structured collaborations (e.g. regular, joint case conferencing). At the same time, new lines of communication were established with local organizations to address health-related social needs.

Underlying these developments were changes in staff perspectives about both the drivers of avoidable utilization and the complement of resources that could be brought to bear to address them. In survey and interview responses, hospital leadership and staff described numerous ways that their organizational culture changed during the CHART Phase 2 award period, including:

- **Adoption of a holistic approach to population health management:** Hospitals reported that their staff gained a greater understanding and acceptance of care delivery approaches that better account for patients' physical, behavioral, and social needs. Staff increasingly sought to understand the underlying drivers of acute-care utilization and to think more holistically about care planning. Hospitals also reported greater awareness of the role that BH issues play in driving acute care utilization and the importance of managing BH needs.
- **Recognizing the value of extending care beyond the hospital:** Hospitals identified the need to extend care beyond the walls of the hospital, either through visits in the home or community or through partnership with local organizations to create a network of resources to support patients after discharge. Hospitals noted the value of partnering with local organizations to break down silos of care and that these relationships were sustainable beyond the CHART award period.
- **Understanding how provider stigma influences care:** Staff reported a new awareness of the negative impact that stigma could play in patients' experience and observed positive changes in perceptions of patients with complex social, behavioral, and/or medical needs as a result of their experience with CHART.
- **Embracing non-clinical staff as part of the care team:** CHART teams' use of non-clinical staff, such as CHWs and peer coaches, prompted greater recognition of the value of these roles and their contributions to hospital-based population health management strategies at CHART hospitals.
- **Orientation toward data-driven decision-making:** Many hospitals reported improved ability to process, analyze, and use data, and recognition of the importance of using data to inform decision-making. Over time, fewer CHART hospitals identified data analysis as a barrier to population health management and integrated patient care.

Hospitals also described how CHART-driven culture change extended beyond the CHART Program to influence approaches to managing non-CHART patients.[xxvii] Twenty-four hospitals reported that they had begun to or had spread CHART processes, programs, and clinical guidelines in other areas of the hospital. One hospital noted, "The most important contribution that the CHART grant has made for us [is] the learning around how to manage a population that has mental health issues, substance use issues, and how to intervene and change their pattern of coming to the ED. Other departments are beginning to learn about what we're doing." Other hospitals reported that the CHART discharge planning processes were deployed in other areas of the hospital.

CREATING VALUE FOR PROVIDERS AND STAFF

In interviews and strategic planning documents, staff and leadership expressed their support for the CHART approach to care delivery and believed that the CHART model could improve both patient and staff experience. Providers shared that, "The CHART Program made [providers] feel better about the care their patients received in and outside the hospital," and equipped them with the tools to address the root causes of utilization rather than feel frustrated by "non-compliant" patients. The presence of CHART staff in the ED or inpatient departments also provided reassurance to attending clinical staff that high-risk patients could be discharged safely with follow-up from a CHART team member. One non-CHART hospitalist reported, "If I didn't know that a CHART grant social worker would be following up, I would have kept a couple of my patients an extra day."

CHART staff also reported a reduced administrative burden associated with managing the care of patients with complex needs. For example, new referral patterns developed with local partners "saved us time" and "enabled a seamless handoff" to another facility or to home self-care. Non-CHART hospital staff saw similar value, reporting that they "wish that all of our high-risk patients had access to [the CHART program]."

xxvii For example, in 2018, Lahey Health Behavioral Services received a grant from the Argosy Foundation to evaluate the CHART program at three Lahey hospitals: Addison-Gilbert, Beverly, and Winchester Hospitals. The evaluation, conducted by Brandeis University, found that their CHART program reduced unnecessary health care utilization, extended clinical care to encompass patients' social needs, and saved money. These findings were used as the foundation for a collaborative working session to develop the "Framework for Complex Care Innovation." Through this work, the collaborative identified a set of Aligning Principles to inform complex care practices for the Lahey system. Principles included addressing social determinants of health, prioritizing patient voice, improving access to behavioral health services, increasing cross-sector collaboration, and increasing interoperability and linkage between all data systems.

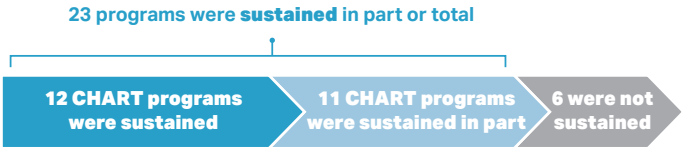
3.3 SUSTAINING CHART ROLES AND ACTIVITIES

>>>> KEY TAKEAWAYS <<<<

- Overall, **23 CHART programs were sustained** in total or partially beyond grant funding, such that CHART roles were sustained and/or CHART practices were hardwired into standard operating processes.
- Among hospitals that sustained all or part of their CHART programs, the majority cited their existing or anticipated **participation in ACOs**, particularly MassHealth ACOs, as a **key factor** that influenced their decision to continue CHART roles and activities.

As the two-year CHART performance period came to a close, CHART and hospital leadership engaged in a strategic planning process to determine if and how the they would continue to support CHART roles and activities. The strategic plans submitted by hospitals at the end of the performance period outlined future plans as well as the main rationales and influences that supported hospital leaderships' decisions with respect to the CHART program.[xxviii] Overall, hospitals reported that they planned to sustain all or some of 23 CHART programs beyond the performance period.

Exhibit 34: The majority of CHART programs were sustained in full or in part



Decisions to continue, adapt, or discontinue the programs were based on a broad view of program success and were largely driven by alignment with other business strategies, coherence with other quality or cost initiatives, and/or budget availability/flexibility. Most hospital leadership seemed to view the CHART programs as successful regardless of acute care utilization performance for the target population overall. Instead, they often cited positive results for a subgroup of patients (e.g. patients enrolled in the program) as an indication of the potential for sustainable impact. Among hospitals that planned to maintain some or all elements of their CHART program, many cited a commitment to patient satisfaction as an important consideration. For example, one hospital wrote, "Senior leadership decided to fund the CHART team both to sustain the readmission reduction work as well as the positive patient experience impact." Another noted that CHART teams were able to "spend quality time unstructured by insurance coverage, guidelines, and time restraints." Therefore, target population patients were "receiving higher quality of care than ever before and also enjoying a significantly improved health care experience."

Some of the ED-focused teams framed their sustainability discussions within a broader conversation around safety, patient experience, and provider satisfaction in the ED. Reducing ED length of stay also provided a powerful motivation for the two hospitals that chose this metric as their aim. Long stays in the ED often represented a financial loss, as well as contributing to overcrowding, staff stress, and safety concerns. For these hospitals, their CHART programs were seen as directly meeting immediate institutional needs.

xxviii The strategic planning documents capture a moment in time. The evaluation team was not able to verify to what extent the plans were enacted after the CHART Program ended.

ALIGNING CHART PROGRAMS WITH ACCOUNTABLE CARE ORGANIZATION STRATEGY

Among hospitals that sustained all or parts of their CHART programs, the majority cited their existing or anticipated participation in ACOs, particularly MassHealth ACOs,[xxix, xxx, 29, 30] as a key factor that influenced their decisions. In an ACO model, care management programs that address patients' medical, social, and behavioral health needs are considered imperative to meeting quality and cost goals required under risk-based arrangements.

Hospitals reported that they envisioned CHART as a pilot to prepare for changes in payment models that had already impacted Medicare and were becoming increasingly prevalent throughout the health care industry. Nineteen hospitals reported that the CHART Program facilitated broader hospital culture changes that were helpful in developing their MassHealth ACO strategies. Even hospitals not involved in an ACO at the time of their strategic plan submission cited a desire to form partnerships with ACOs in their coverage areas in the future and saw CHART's emphasis on appropriate site of care, integration, and use of data and technology as valuable to that strategy.

Among hospitals that sustained ED-focused teams, some noted that process measures for monitoring ED patients with high utilization closely aligned with quality metrics defined in the ACO program. For example, one awardee's strategic plan recommended "maintaining the following key functions as identified by stakeholders: SBIRT in the ED, 48-hour follow-up calls, integration at the primary care level, and psychiatric bridge services," and noted, "these functions have the added benefit of being aligned with many of the ACO quality metrics identified thus far in the delegation process with the ACO."

Even in the context of their existing or nascent ACO strategies and their positive feelings about the CHART Program, many CHART hospital leaders still had to confront difficult business choices in deciding whether to fully fund CHART programs from their hospital budgets. As noted in HPC research,[1] community hospitals are generally limited in their ability to take on risk and often lack leverage in negotiating contracts, so risk-based payments were not expected by leadership to fully replace revenue lost through reduced utilization. In addition, even with the planned increase in MassHealth members covered by alternative payments, the slower movement of the market to value-based payments[31] made it challenging for hospital leaders to commit to a care model that relies on value-based payments.

In light of these concerns, hospital leaders who were eager to sustain and spread CHART care models often advocated for their adoption within the ACO.[xxxi] For CHART hospitals that participated or planned to participate in ACOs, CHART staff were often transitioned to the same or very similar ACO-funded roles to support the ACO's care management operations.

ALIGNING CHART PROGRAMS WITH OTHER QUALITY INITIATIVES

Some hospitals used the opportunity to improve on Medicare inpatient quality metrics as a rationale for ongoing funding for their CHART programs. Tracks 2 and 3 of the Medicare Shared Savings Program (MSSP), NextGen ACOs, and the Value-Based Purchasing (VBP) Program incentivize the reduction of 30-day readmissions. Hospitals that pursued this strategy often redefined their patient populations to focus specifically on Medicare patients. For example, one hospital reported that "given the positive impact on patient care, the team has been retained post-CHART to manage patients discharged with Medicare readmission penalty diagnoses, many of which are dual eligible." Hospital and Physician-Hospital Organization leadership were keenly aware of the penalties and the impact of poor performance on measures related to readmissions and avoidable hospitalizations – a powerful incentive to maintain the successes of CHART.

Some hospitals may have determined that the ED-facing CHART programs were duplicative of other initiatives. One possibility is that hospitals participating in the MassHealth ACOs may have chosen not to fund ED-BH focused programs due to overlap with existing services covered under MassHealth. The MassHealth Community Partner Program requires participating ACOs to contract with a BH provider in their service area that coordinates medical and BH services for certain members with BH and long-term services and supports needs. CHART awardees participating in ACOs may, therefore, have found their CHART BH teams duplicated the work of the MassHealth BH Community Partners.

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xxix In March 2018, MassHealth transitioned over 850,000 MassHealth members to 17 ACOs.

xxx The MassHealth program required participating ACOs to obtain ACO certification. Five CHART hospitals cited their CHART programs in their application for ACO certification.

xxxi Delivery System Reform Incentive Payment (DSRIP) funding provided a short-term mechanism to help the hospitals sustain CHART-like teams and services until ACOs and/or participating providers can identify internal sustainability strategies.

CONTINUING CHART PROGRAMS VIA HOSPITAL BUDGETS

A smaller number of hospitals committed their own resources to retain key CHART staff and services and streamlined and refined their program to align with their budgetary constraints. For example, one hospital funded the majority of its CHART team members through its hospital operations budget and reallocated other duties across the funded positions. Another hospital could not retain the CHART team as an independent body but planned to integrate key staff positions (licensed clinical social worker, CHW, and pharmacist) into other hospital departments. A third hospital planned to consolidate several different functions of the CHART team into a single BH-focused social worker. The fact that even this consolidated role could be funded only on a break-even basis in a fee-for-service environment is a reflection of the budgetary constraints that routinely affect CHART hospitals.

CONCLUSION

Community hospitals play a vital role in providing lower cost, high quality care to communities across Massachusetts. Recognizing their importance as well as the significant challenges facing community hospitals, the CHART Program was designed to support sustainable care delivery transformation through innovative investments. With CHART Phase 2 funding and technical assistance from the HPC, hospitals made significant strides in re-aligning people, programs, and processes and, in so doing, delivered meaningful value to thousands of patients – many of them experiencing complex illnesses and/or facing challenging social conditions.

The 29 CHART programs in Phase 2 targeted approximately 137,000 hospital encounters. The HPC and CHART teams worked collaboratively to rethink their approach to patient care, shifting from a strictly medical model to integrate care across medical, behavioral, and social needs. To deliver integrated care, a significant portion of CHART funding was dedicated to hiring multidisciplinary teams, including new roles such as community health workers and social workers that reached into the community to deliver whole-person care. Patients reported that the relationship-based, holistic approach of CHART aligned with their own priorities and that they found significant value in both the connections they forged with CHART staff and the services and supports they received. The CHART Program contributed to hospital staff development as well by equipping them with tools to address the root causes of utilization and deliver meaningful care to their patients.

A key CHART Phase 2 program goal was to connect patients with appropriate care and services to prevent avoidable hospital use. During CHART, hospitals successfully initiated new partnerships and deepened and formalized existing relationships with BH providers, SNF and elder services, as well as a variety of government and human services organizations. Patient interviews and utilization data suggest that hospitals implementing CHART models were able to influence acute care utilization for their target populations, particularly in the ED setting. Consistent with emerging research findings,[26] CHART hospitals kept-pace with statewide trends in readmissions, highlighting both the challenge of reducing readmissions and the need for a broad array of metrics to capture the impact of programs designed to transform care delivery for patients with complex needs.[32]

By design, the CHART Program stressed iterative improvement to be responsive to patient needs and changing circumstances. To ensure that these adaptations were data-informed, CHART teams built capacity for data collection and systems to monitor programmatic performance. With advisement from the HPC, teams developed dashboards to display relevant data and established protocols for staff, including frontline staff, to regularly review data.

At the close of CHART Phase 2, hospitals expressed confidence that their CHART programs had improved patient care and that the capabilities built during CHART helped position hospitals to participate in value-based care. For CHART hospitals that opted to participate in an ACO or in other value-based payment arrangements, their CHART Phase 2 experience serves as an important foundation to better position them for success. Despite operating in a market slower to move to value-based payment than anticipated,[31] most CHART hospitals found ways to sustain their programs in whole or in part, which underscores CHART's value in supporting ongoing transformation.

APPLYING LESSONS FROM CHART PHASE 2 TO FUTURE HPC INVESTMENT PROGRAMS

Insights from CHART Phase 2 informed the HPC's approach to other investment programs. First, CHART demonstrated how large scale investments can be a catalyst for sustainable change that improves care for patients and strengthens the Commonwealth's health care system. Second, the CHART teams' experiences underscored the importance of addressing patients' behavioral health and social needs in tandem with their medical needs. At the same time, the CHART teams' efforts to address health-related social needs also uncovered underlying gaps in the community resource landscape which limit the ability of the health care system to connect patients to non-medical needs. Third, CHART demonstrated the value of deploying team-based models that include

medical and non-medical staff and the need for close collaboration with non-medical partners to ensure that patients are getting the right care in the right place at the right time. Fourth, the hospitals' experiences in CHART highlighted the importance of adaptability and continuous quality improvement driven by data. Finally, understanding the impact of CHART Phase 2 required a multifaceted approach; the impacts of CHART were wide reaching and could not be fully captured by utilization data alone.

Based on the CHART Phase 2 experience, the HPC has continued its commitment to innovative investment programs, with a particular focus on patients with complex medical, behavioral, and social needs. In 2016, the HPC launched the first phase of the Heath Care Innovation Investment (HCII) Program. Awardees' programs spanned a range of settings and focus areas, and many of the programs focused on high-touch care coordination for patients with substance use disorders, mental health conditions, and/or mitigating social needs. In 2018, the HPC launched the second phase of HCII funding, the SHIFT-Care Challenge. Awardees were invited to propose programs to address health-related social needs or to increase access to behavioral health care, including substance use treatment in the ED setting. Across the HCII phases, awardees have deployed multidisciplinary teams, including peer recovery coaches, patient navigators, and social workers and have partnered with a range of community organizations. Several of the hospitals that participated in CHART have reengaged with these new investment programs.

Most recently, in 2020 the HPC announced the Moving Massachusetts Upstream (MassUP) Investment Program. MassUP will provide funding to support partnerships between health care provider organizations and community-based organizations working to address upstream social, environmental, and/or economic challenges to enable sustainable improvements in community health and health equity. In addition, MassUP will fund an interagency policy alignment group to address social determinants of health.

In summary, the successes, challenges, and lessons learned from the CHART Program continue to affect the Massachusetts health care delivery system and the HPC. By leveraging their CHART investments, more Massachusetts community hospitals are better equipped today to serve their patients and succeed in a value-based health care environment. While more must be done to ensure the vitality of community hospitals, their achievements through CHART show their dedication and ability to innovate as they continue to provide high-quality, cost-effective health care to the Commonwealth's residents.

APPENDIX

CHART Phase 2 Awardees featured in the Evaluation Report

NAME	REGION	AWARD	TARGET POPULATION (TP)	AIM
Addison Gilbert Hospital	Lower North Shore	$1,269,057	High Utilization/ Social Complexity	Reduce 30-day returns
Anna Jaques Hospital	Upper North Shore	$1,200,000	High Utilization & Medical Complexity	Reduce 30-day readmissions
Baystate Franklin Medical Center	Pioneer Valley/ Franklin	$1,800,000	Behavioral Health/High Utilization	Reduce 30-day ED revisits and 30-day readmissions
Baystate Noble Hospital	Pioneer Valley/ Franklin	$1,200,000	High Utilization	• Reduce 30-day readmissions • Reduce 30-day ED revisits
Baystate Wing Hospital	Pioneer Valley/ Franklin	$1,000,000	Behavioral Health/Medical Complexity	Reduce 30-day readmissions
Berkshire Medical Center	Berkshires	$3,000,000	Patients discharged in Northern Berkshire County zip codes	Reduce 30-day returns for all inpatient and observation discharges
Beth Israel Deaconess Medical Center-Milton	Metro Boston	$2,000,000	Behavioral Health/High Utilization	Reduce excess ED boarding
Beth Israel Deaconess Medical Center-Plymouth	South Shore	$3,700,000	Behavioral Health/Social Complexity	• Reduce returns • Reduce ED revisits
Beverly Hospital	Lower North Shore	$2,500,000	High Utilization & Social Complexity	Reduce 30-day returns
Emerson Hospital	West Merrimack/ Middlesex	$1,200,000	Behavioral Health/High Utilization/ Medical Complexity	Reduce 30-day readmissions
Harrington Memorial Hospital	Central Massachusetts	$3,500,000	Behavioral Health	Reduce 30-day ED revisits
Health Alliance Hospital	Central Massachusetts	$3,800,000	Behavioral Health	Reduce 30-day ED revisits
Holyoke Medical Center	Pioneer Valley/ Franklin	$3,900,000	Behavioral Health	Reduce 30-day ED revisits
Lawrence General Hospital	East Merrimack	$1,482,654	Social Complexity/Medical Complexity	Reduce 30-day readmissions
Lowell General Hospital	West Merrimack/ Middlesex	$1,000,000	High Utilization	Reduce 30-day readmissions
Mercy Medical Center	Pioneer Valley/ Franklin	$1,300,000	Behavioral Health	Reduce 30-day ED revisits
Milford Regional Medical Center	Metro West	$1,300,000	High Utilization	Reduce 30-day revisits
Signature Healthcare Brockton Hospital	Metro South	$3,500,000	Social Complexity/Medical Complexity/High Utilization	• Reduce 30-day readmissions for all admitted patients • Reduce LOS in ED 3-11pm
Winchester Hospital	West Merrimack/ Middlesex	$1,000,000	• Patients with high utilization • Patients discharged to SNF	Reduce 30-day readmissions
UMass Marlborough Hospital	Metro West	$1,200,000	High Utilization	Reduce 30-day readmissions
JOINT HOSPITAL AWARDEES	**REGION(S)**	**AWARD**	**TARGET POPULATION**	**AIM**
Addison, Beverly, Winchester, and Lowell General Hospitals	Lower North Shore & West Merrimack/ Middlesex	$4,800,000	High Utilization	Reduce 30-day ED revisits
Athol Memorial Hospital and Heywood Hospital	Central Massachusetts	$2,900,000	Behavioral Health	Reduce 30-day ED revisits
Hallmark Health System	Metro Boston	$2,500,000	High utilization	Reduce ED utilization
Southcoast Hospitals Group	Fall River & New Bedford	$8,000,000	High Utilization (ED and inpatient)	• Reduce 30-day readmissions • Reduce 30-day ED revisits

CHART PHASE 2 EVALUATION METHODS

The CHART Phase 2 evaluation design employs a framework applied in evaluations of many Centers for Medicare and Medicaid Services (CMS) programs designed to test innovative health care service delivery or payment models. The framework was adapted from Berry et al., 2013,[33] and includes three broad categories of investigation: Implementation, Impact, and Sustainability.

Exhibit 36: The evaluation framework aims to understand the CHART Phase 2 program's implementation, impact, and sustainability

These three evaluation elements track and assess the program from its initial adoption, to its implementation, and subsequently to its impact and ongoing sustainability. The CHART Phase 2 Evaluation Report explores whether the overall CHART Program was implemented effectively, had the intended program impacts, and the extent to which it was sustained by the hospitals after the performance period, without ongoing investment by the HPC. Together, these findings grow the evidence base about community hospital transformation initiatives designed to move hospitals toward accountable, integrated care delivery.

The HPC used a mixed methods approach to assess program-wide performance. While there were 24 CHART Phase 2 awards included in the evaluation, five hospitals selected two primary aims and operated two CHART teams. Ultimately, 29 CHART programs were included in the evaluation; findings from the 29 programs were aggregated to provide a cohort-wide assessment. Given the Programs' focus on continuous quality improvement and adaptive design, causal attribution of results was complex and required the integration of qualitative and quantitative findings. The HPC contracted with the Boston University School of Public Health (BUSPH) to inform and support the evaluation of CHART Phase 2.

The BUSPH conducted interviews with CHART patients and staff, implemented hospital-wide surveys, and performed an analysis of hospital discharge case-mix data from the Center for Health Information and Analysis (CHIA). Hospitals reported utilization data, process metrics, and written materials directly to the HPC. The HPC evaluation also drew on contemporaneous program notes and reflections prepared by HPC staff and the Program's technical advisor, Collaborative Healthcare Strategies. The evaluation was conducted in two phases: 1) Implementation and 2) Impact and Sustainability, as outlined below.

IMPLEMENTATION: WAS THE INTERVENTION FULLY DEPLOYED?

The first phase of the evaluation was designed to understand and assess how the CHART Phase 2 intervention was developed and implemented across the CHART cohort. The following sources were used to identify cohort-wide implementation themes in order to understand common successes and challenges:

- **Staff Interviews:** The BUSPH conducted a First Round of interviews with 235 staff, including Program Managers, clinical and non-clinical patient-facing staff, and staff from partner organizations. Interviews were conducted between September and December 2016, roughly half way through the performance period. The semi-structured interviews were recorded, transcribed, and qualitatively coded to identify key implementation themes, successes, and challenges.
- **Written Program Updates:** CHART programs were required to submit quarterly structured written reflections to the HPC as part of their ongoing relationship and technical assistance. Program Updates from the 16 month and 24 month quarters were coded to identify key implementation themes, successes, and challenges.

» **Technical Assistance Survey Results:** Toward the end of the performance period, the HPC administered an anonymous survey to hospitals to assess the delivery and impact of technical assistance (TA) provided by the HPC. In total, there were 20 respondents to the survey, 17 of whom identified as the CHART Program Manager or Director. The remaining three surveys were completed by a Clinical or Operational Director. Analysis of survey results was conducted at a cohort-wide, aggregate level.

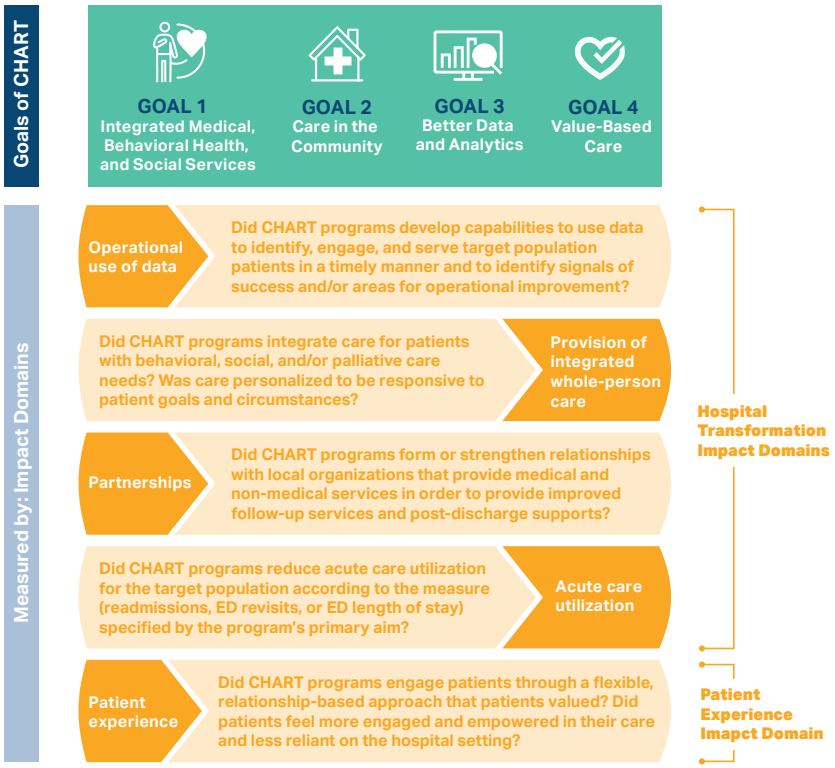
» **Final Approved Budget Documents:** CHART programs were required to submit budget documents to the HPC for review and approval. Throughout the performance period, CHART teams modified their budgets to reflect evolving care models. This evaluation drew on the Final Approved Budgets to understand how the programs ultimately intended to allocate HPC and in-kind funding for personnel, community partnerships, enabling technology, program costs, and indirect costs.

» **Hospital-Reported Data on 48-hour Follow-up:** Reflecting the importance of 48-hour patient follow-up to the CHART care models, the HPC required hospitals to submit monthly data about successful connection with patients post-discharge. The percentage of completed 48-hour follow-ups was analyzed over time.

IMPACT AND SUSTAINABILITY: DID THE INTERVENTION ACHIEVE THE PROGRAM GOALS? DID THE INTERVENTION PRODUCE LASTING CHANGES?

The second phase of the evaluation was designed to understand and assess whether the CHART Phase 2 initiatives made progress toward the four Phase 2 goals: 1) integrate care across medical, behavioral health, and social needs, 2) shift care from the hospital to the community as appropriate, 3) use data and analytics to better serve patients, and 4) orient organizations toward value-based care. In order to translate these Program goals into measurable outcomes, the HPC developed five impact domains: 1) operational use of data, 2) provision of integrated whole-person care, 3) partnerships, 4) acute care utilization, and 5) patient experience. The development of the impact domains was informed by Technical Assistance and best practice guidelines used in CHART development and refined in light of implementation challenges identified during year 1 of CHART.

Exhibit 37: Progress toward the CHART Phase 2 goals was assessed across five impact domains



Hospital Transformation and Sustainable Organizational Change: The first four impact domains were intended to capture impact at the hospital level. The HPC conducted a systematic review of qualitative and quantitative materials for each of the 29 CHART programs to look for evidence of CHART driven change across each impact domain. Each CHART program was then assigned a "fully met," "partially met," or "did not meet" indicator rating based on the degree to which the relevant criteria were met (see **Exhibit 38**). After analysis of each CHART program, the HPC evaluation team and members of the HPC CHART Program Operations team met to review and calibrate ratings across the cohort.

Exhibit 38: Criteria for measuring the Hospital Transformation Impact Domains

HOSPITAL TRANSFORMATION IMPACT DOMAINS	CRITERIA FOR PERFORMANCE
Operational Use of Data	• Generated real time alerts when an eligible patient presents at the hospital • Created dashboards to track patients' progress and inform operational considerations • Conducted sub-analyses to stratify patients based on need
Provision of Integrated Whole-person Care	• Increased assessment and documentation of patient needs • Incorporated appropriate expertise into the team, either through training or hiring • Aligned care offerings with patient priorities, including location and type of assistance
Partnerships	• Formalized channels of communication, including case-conferencing • Embedded or shared staff between partner organizations and the CHART team
Acute Care Utilization	• Reduced acute care utilization for the eligible target population

Similar to the Hospital Transformation impact domains, Sustainable Organizational Change was analyzed based on a systematic review of qualitative and quantitative materials for each of the 29 CHART programs. The evaluation team looked for evidence of CHART-driven organizational culture change and whether the CHART roles and activities were sustained beyond the performance period without continuing funding from the HPC.

To inform the analysis of Hospital Transformation and Sustainable Organizational Change as measured through these impact domains, the HPC evaluation team drew on qualitative and quantitative sources:

» **Staff Interviews:** The BUSPH conducted a Second Round of interviews with 75 staff between September 2016 and December 2017. At each hospital, three staff members, including a CHART Program Manager and a hospital leader, were contacted by phone for a semi-structured interview. The interview transcripts were qualitatively coded to identify key areas of CHART-driven change towards the goals of CHART.

» **Written Program Updates:** CHART programs were required to submit quarterly structured written reflections to the HPC as part of their ongoing relationship and technical assistance. Program Updates from the 16 month and 24 month quarters were coded for performance on impact domains.

» **Program Notes from Technical Advisor:** Throughout the performance period, the HPC's Technical Advisor, Collaborative Healthcare Strategies, provided regular written updates, noting progress and barriers for each CHART program. Program notes also included the estimated volume of discharges that were eligible for participation at each hospital. The HPC compiled these estimates for each program to develop a cohort-wide estimate of total number of discharges eligible for participation in CHART Phase 2.

- **Hospital-Reported Utilization Data:** CHART programs submitted monthly, aggregated utilization data to the HPC throughout the performance period. Programs reported on their performance on their primary aim for all members of their eligible target population, not only patients served by the CHART programs. Because hospitals only had access to their own data, they were only able to capture readmissions, returns, and/or revisits to the same hospital. The method that hospitals used to analyze acute care utilization varied based on the program model.
  - Programs that aimed to reduce utilization for individuals with a history of frequent acute care utilization were assessed by calculating a pre/post utilization accounting for a historical control.
  - Other programs used a linear trend over time to illustrate their trends in acute care utilization.

  A limitation of this approach is that the results may reflect a regression to the mean or other bias found in this type of study design. Performance was grouped into three categories: greater than or equal to 15% reduction in acute care utilization, less than 15% reduction in acute care utilization, and no improvement on acute care utilization.

- **Analysis of Hospital Discharge Case-Mix Data from CHIA:** The BUSPH analyzed hospital discharge case-mix data to understand cohort performance on acute care utilization. Unlike hospital-reported utilization data, analysis of case-mix data allowed for visibility into utilization at any hospital, not only at the same-hospital, and provided a standardized data source. The BUSPH used difference-in-differences (DID) analysis, a quasi-experimental design, to evaluate CHART hospitals' success in reducing 30-day readmission rates and 30-day ED revisit rates. The key assumption in the DID analyses is that the average pre- to post-intervention change in a comparison group of hospitals represents the counterfactual change in the CHART group in the absence of the intervention. A challenge to this assumption is that the number of non-CHART hospitals in the Commonwealth is limited. In order to boost power, the BUSPH included all non-CHART hospitals in Massachusetts for comparison (n=27), with the exclusion of specialty hospitals (which differ in patient population) and the six academic medical centers (which differ in mission). With advisement from the HPC, the CHART hospitals were placed into four groups based on target population and aim: 1) programs focused on ED revisits for patients with a behavioral health diagnosis, 2) programs focused on ED revisits for patients with a history of high acute care utilization, 3) programs focused on inpatient readmissions for patients with a history of high acute care utilization, and 4) programs focused on inpatient readmissions for patients at high-risk for readmissions. A high utilizer readmission or ED revisit was defined as one in which the patient had ≥ 4 admissions or ≥ 10 ED visits in the 365-day period prior to the admission or ED visit (rolling eligibility). Sensitivity analyses were also conducted with varied admission thresholds at ≥ 2 ,3, 5 and 6 and ED thresholds at ≥ 3, 5, 8 and 15. The behavioral health population was defined as patients with any IDC-9 diagnosis code in the range 291-316, excluding dementia and intellectual disability. ICD-10 codes were used for the time period after October 1, 2015. In order to follow the same population over time, the BU team used National Center for Health Statistics generated General Equivalence Mappings. BUSPH conducted behavioral health sensitivity analyses, in which patients were identified only if behavioral health appeared in the first position (primary Dx). An important limitation of this design was that standardizing the target population and primary aim for each group of hospitals meant that the CHART programs were not necessarily evaluated against their specific primary aim. For example, some ED-based programs targeted ED length-of-stay, but for the purposes of this analysis, were grouped with ED-revisit focused programs. The high-risk readmission group is the least homogenous, as it included readmissions and returns and a wide range of target population definitions. Additionally, using discharge data undercounts patients without a unique patient identifier.[34] Observations were at the quarterly level, with eight pre-intervention observations and eight post-intervention observations for each CHART hospital and for each control group hospital. The dependent variables were measured as rates of 30-day readmissions and rates of 30-day ED revisits. To improve comparability, BUSPH adjusted for hospital level differences using the following covariates:

  - Teaching hospital indicator
  - Number of beds
  - Member of a hospital group indicator
  - Occupancy rate
  - Hospital percent Medicare patients
  - Hospital percent Medicaid patients
  - Hospital operating margin

  BUSPH estimated the DID analyses using Ordinary Least Squares (OLS) regression with errors clustered at the hospital level.

- **Organizational Surveys:** Two web-based surveys were administered by the BUSPH in November 2016-January 2017 and October 2017-January 2018 to CHART hospitals to understand hospital practices taking place during the CHART Phase 2 award period. Surveys were sent to CHART Investment Directors and Program Managers, who were asked to identify the employee(s) who could best answer the questions. Each hospital submitted one response. The Organizational Survey focused on five domains: 1) ACO participation and outlook, 2) Leadership and Culture, 3) HIT Infrastructure and Use, 4) Care Processes, and 5) Patient and Community Engagement. The Behavioral Health Integration Survey was based on the Integrated Practice Assessment Tool (IPAT)[35] and was adapted to account for the CHART context. This survey aims to understand the level and scope of integration between medical care and behavioral health providers in an organization. Based on respondent's answers, the survey categorizes organizations into seven categories, ranging from pre-coordination, exchange of information without communication, to Level-6 integration, full collaboration in transformed/merged integrated practice. Response rates for both the Organizational and Behavioral Health Integration surveys were 100% (27/27) for both rounds of surveys, although one hospital did not complete one section of the BHI survey in Round 1.

- **Strategic Planning Documents:** As the CHART hospitals approached the end of their two-year performance period, the HPC provided Strategic Planning Payments to encourage hospitals to plan for the future of their CHART service delivery model and staff and to identify new funding sources. Hospitals created Strategic Plans, which were submitted to the HPC and outlined their plan for the future of their CHART service delivery model and identified new funding sources (if applicable). Hospitals also reflected on their CHART program's impact. The HPC evaluation team qualitatively coded Strategic Plans for performance on impact domains. Strategic planning documents were particularly important for understanding continuance of program staff and activities and themes connected to sustainability. One limitation is that Strategic Plans capture a moment in time. The HPC evaluation team was not able to verify to what extent the plans were enacted after the CHART program ended.

Patient Experience: The HPC contracted with the BUSPH evaluation team to perform individual in-depth interviews with 51 patients from 8 CHART hospitals. The interviews were approved by the Boston University Medical Center Institutional Review Board (IRB). A three-pronged recruitment strategy was developed and implemented, with corresponding IRB approval at all stages. All participating CHART hospitals utilized a combination of 2 of the 3 strategies to recruit patients for interviews: 1) hospitals prospectively distributed an information packet to patients, asking them to participate; 2) hospitals with a HIPAA waiver provided a password-protected list of patients to the evaluation team, who sent a direct patient recruitment mailing with an opt-out option; and 3) hospitals without a HIPAA waiver sent a direct patient recruitment mailing. All but one of the interviews were conducted by telephone, aided by a semi-structured interview guide. Upon completion of the interview, patients were mailed a small incentive ($20 gift card to a chain type store) for participation. Interviews were audio-recorded with patients' permission and transcribed verbatim by a professional transcription company. A directed content analysis approach was used to analyze the interview data.[36] A limitation of the study is that it is not guaranteed that all patient responses refer specifically to care provided within the CHART program.

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